Investigation of the cell phone video recording feature by Japanese undergraduate EFL learners

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DECLARATION ON ETHICS

The research presented and reported in this thesis was conducted within the guidelines for research ethics outlined in the *National Statement on Ethics Conduct in Research Involving Human (*1999*)*, the *Joint NHMRC/AVCC Statement and Guidelines on Research Practice* (1997), the *James Cook University Policy on Experimentation Ethics*. *Standard Practices and Guidelines* (2001), and the *James Cook University Statement and Guidelines on Research Practice* (2001). The proposed research methodology received clearance from the James Cook University Experimentation Ethics Review Committee (approval number
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STATEMENT ON THE CONTRIBUTION OF OTHERS - could include the following

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Abstract

Japanese students are renowned for their ability to master reading comprehension and for their retention of vocabulary and grammatical structures. They are also renowned for their shyness with speaking English. Research emerging out of Japan has often reported on studies to enhance reading, writing, and listening skills, often because it is easy to develop testing materials or use technology to enhance these skills. But limited research from Japan has investigated methods and approaches for enhancing autonomous speaking skills.

Research studies about cell phone integration in education have investigated the use of Short Message Service (SMS) for enhancing students' writing skills and the use of the photo camera to establish users' identities and to engage students to document class content. Research out of Japan has explored the social impact of cell phones and some educationalists have explored the merit of using this tool to expose students to specific target language lexical items.

This thesis reports on a single holistic case study to investigate the potential of the cell phone video recording feature to enhance students' speaking abilities. Sixty-seven Japanese second year university undergraduate English learners, in four different classes, used the video recording feature on their cell phones to produce weekly video productions. The task required participants to produce thirteen, 30-second videos in English on various teacher-selected topics. One video per week, per student, over thirteen weeks, was produced. The purpose of this research was to investigate the impact of using the video recording feature regularly to enhance oral performance in the target language.

To enhance student content production, some researchers have argued that by combining content learning with sustained practice and project-based learning, educators can increase students' acquisition and eventually improve retention. Thus by combining language learning with independent learning, technology-assisted learning and project-based learning, it is anticipated that students would be able to become more confident speakers. The learning outcomes are based on active learning, as the students learn by using both the technology and the target language to construct content on a given topic. Through the construction of videos, students learn to operate the technology to produce suitable visual resources. They also learn to use the language to express their opinions and to use their voices effectively to produce comprehensible audio resources. Cell phone technology provides students the opportunity to produce videos anytime and anywhere. By producing these videos on a regular basis in locations of their choice, they are learning to represent their knowledge through videos. Students are also encouraged to keep track of their videos, thus potentially enhancing their ability to improve their audiovisual performances.

Consequently, this research was guided by a simple research question: Is the cell phone video recording feature a suitable learning tool for Japanese students learning to speak English? The proposition is that using the cell phone video recording feature regularly to produce audiovisual content in the target language will enhance students' speaking abilities. To address this research question and to accept or refute this proposition, both qualitative and quantitative data was utilised to evaluate students' performances. Five units of analysis were established. First, the video speeches

were transcribed and analysed in terms of words spoken per second. Second, the cell phone video content was viewed to establish location and visual cues participants used to enhance viewer comprehension. Third, students were also required to fill in a weekly report to document their video recording process and strategies. Fourth, students were invited for a video recorded interview organised in two stages. In the first stage, students demonstrated their video production process. In the second stage, they were interviewed regarding their production process as well as their opinion of the project. Finally, students also completed pre- and post-intervention surveys to collect their opinions of the project.

Data were analysed by comparing students' individual performances at the beginning and end of the term. Individual student's data were also compared against the peers in their class and against the data from other peers in other classes, so as to understand the significance of the individual student's performances. The weekly video performances indicated that some students were able to increase the number of words they spoke in their speeches over the length of the term. The feedback gathered from the weekly reports indicated that students used different strategies to produce their speeches and their videos. The responses suggested that these change depending on the perceived difficulty of the weekly topic. The pre- and post-intervention surveys indicated that participants believed that using the cell phone video recording feature was a useful activity. However, they did not believe that such a task was practical for other courses. The discussion emphasises that students were able to make progress and they believed that the video recording feature on their cell phones was a suitable educational tool.

The thesis identified some recommendations for future research, both with regards to using cell phones as learning tools and engaging students to speak more spontaneously. The thesis outlined some areas for further research, such as the need to conduct a study which can provide more generalisable evidence, as well as the need to define a better method for identifying extreme cases.

The thesis has reviewed the selected literature with depth and breadth so as to be able to contribute crucial evidence that adds to the current research on the educational benefits of using cell phones as learning tools in the language classroom. In particular, it identified the processes that enhanced and constrained students from using the technology and the target language effectively to produce comprehensible and viewable audiovisual resources. While keeping generalisability in mind, the evidence collected through this case study revealed that whereas in the past researchers focused on using cell phones to enhance reading and writing skills, this thesis suggested that it is now possible to use the video recording feature to enhance learners' speaking skills.

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Chapter 1: Introduction

Mobile phone-based education is a research area that is receiving greater academic interest. This chapter introduces the topic under investigation, the cell phone video recording feature as a language learning tool. This research topic is presented in terms of research context and learning approach. Then, after providing a brief rationale for considering technology integration in the classroom, a brief history of the research background is presented. The research question is stated and the aims are discussed to outline the significance of the study. Then a summary of the research methodology is described, followed by a description of the scope of this research. The chapter closes with an outline of following chapters and their content.

Context and Rationale

As a researcher and a teacher, my teaching experience in Japan included working in primary, secondary, and cram schools and eventually at the tertiary level. It was of great concern to me as an educator that by the time students completed my course, many of them were still unable to speak spontaneously. Japanese students are well known for having strong reading, writing, and listening abilities. But after six years of participating in the national English education program, students entering university are poor English speakers (Hinkelman & Grose, 2005; Sullivan & Schatz, 2009). During their university studies, students are exposed to an extra two years of compulsory English. By the time they graduate students are not confident speakers (Carney, 2006). As a Computer Assisted Language Learning (CALL) lecturer at a national university, I decided that instead of focusing on improving students' reading and writing skills, I would focus on enhancing their ability to speak without notes.

To improve students' speaking skills, I decided to move away from drill and practice and to apply a task-based situated learning approach. The task to engage students to speak about a topic of interest to them would become the means to provide them with the confidence to speak spontaneously. While Nunan (1988) explained that drilling was necessary with beginner students, Cummins (1983) asserted that more advanced learners needed to be challenged with more demanding real-life tasks.

The problem I encountered with a communicative learning approach is that face-to-face communication with one student at a time is a luxury that many university lecturers do not have. University demands on lecturers and large class size can diminish the best of communicative language learning intentions. Technology integration in the language classroom is one possible solution worth investigating.

Consumer-Friendly Costs and Specifications

In a way similar to that of the industrial revolution, the technology revolution has placed electronic devices at the forefront of every human activity. For example, current technological developments reveal that cell phones and portable devices are gaining popularity. Cell phone popularity is

influencing the presence of market leaders. In 2013 it was predicted that investment in smarphones and tablet computers would lead to a change in technology market leader; Microsoft the computer leader being replaced by Google the smartphone and Tablet Android leader (Napach, 2013). To gain an appreciation of leadership change, investment in technology and the effects of its integration in the daily life of consumers, Google bought Motorola, not for its hardware, but rather for the "17,000 patents" in its range of mobile devices (Liedtke & Svensson, 2011, 4C).

As competition and demand for technology increases, the cost of production decreases and the cost to consumers becomes more affordable. Increased production affects computer part demands and thus reduces the cost of components. In addition, to increase demand for mobile technologies, some governments have subsidized the cost of production (Curwen, 2002). Also, service providers have introduced "plans" in which the cost of the device is subsidized by the profits from a longer term service contract. The combination of decreased cost of production and government intervention makes the final product more easily accessible to consumers regardless of their financial status.

The interest in mobile technology lies in the fact that, whereas in the past computer users could only work or be entertained at their desks, more portable technology has enabled computer users to carry the technology with them. This transition from a sedentary to a more mobile lifestyle has redefined the purpose of mobile technology and its advantages. The prevalent emergence and further development of technology means that people today have access to all the tools and resources needed to independently produce audiovisual online content (Friedman, 2005). As individuals, people can create digital material directly from their surroundings or they can access forums and social networking sites to share with peers resources not formerly readily available to them, but relevant to the message they wish to deliver. Creating and accessing information can be done anytime and anywhere at the discretion of the mobile user. Mobile Assisted Language Learning (MALL) has capitalised on this and given rise to an ever-increasing range of learning options.

Choosing the right technology can prove problematic. The wide range of interest in technology integration in the classroom reveals that researchers are testing all types of devices for learning purposes, ranging from electronic dictionaries to iPods (O'Brien & Hegelheimer, 2007), and game consoles such as Nintendo DS Lite (Kondo et al., 2012). I have tested iPods and cell phones as learning tools and found that there are greater opportunities with cell phones. Therefore the focus of this study centred on the use of cell phones as a tool to enhance students' speaking skills.

As I began my research, I noticed that cell phone subscribers included teachers and students who had wide-ranging perceptions of and abilities with their cell phones. As consumers, educators can benefit from understanding how to use cell phones and their features in order to offer more relevant learning experiences to their students. Educators can not only become more aware and appreciative of their students' technology competencies, but they also need to develop the skills to effectively integrate technology in the learning environment. The increasing investment in cell phones from both manufacturers and consumers led me to believe that conducting research in this field would contribute greatly to the academic community.

Learning Approach and Technology

Although, in my experience, Japanese students need to become better speakers, their needs were not being met by the predominantly text-based curriculum. Given the technological developments in the cell phone industry, I decided to investigate whether or not cell phones could become a suitable learning tool in the communicative classroom.

Mobile learning (m-learning) is an approach that enables the learner to access learning anytime and anywhere at their convenience. Via portable technology such as handheld computers, MP3 players, notebooks, and mobile phones, students can learn to read, write, and listen to audio files to assist them in accessing resources that can deepen their understanding of classroom content.

MALL falls under the category of m-learning and follows the teaching concepts from CALL. Like m-learning, MALL is about learners taking advantage of the opportunities that handheld devices offer. Similar to CALL, MALL predominantly focuses on delivering content to students' devices to expose them to the target language.

Portable devices such as mobile phones can do more than just receive and provide access to data. Among the many features available to them, subscribers can now view video files and they can create audiovisual files to publish on the internet or share with peers on social networking sites.

Historical Background of Research Project

The decision to undertake research regarding cell phone integration in the language learning classroom did not emerge spontaneously, but was the culmination of a collection of publications by this researcher and collegial discussions.

Research interest in video production and online learning.

By the year 2000, the internet offered a variety of interactive websites that allowed users to make simple animated movies, including Dfilm (now Dvolver Moviemaker). Dvolver provides simple animated backgrounds and characters that users choose and then write a script to create their own movie. The short animated message can then be emailed to a friend. Gromik (2003) reported that such software provided high school Japanese students with an engaging way to use written English.

After the students had produced their animated videos, they could create a team and use a video camera to reproduce a live version of their animation. The animation offers students an example of the potential scene and storyline. Scaffolded projects provide students with an interesting and enjoyable, controlled environment that engages them to speak in the target language. This initial project launched a greater exploration of the potential of video production as a teaching and learning tool.

In 2004 I gained employment at Tohoku University, where I continued to research video-project integration in the language learning classroom. Until 2006, digital video equipment in the classroom was usually limited because of budget constraints and availability. Little research had been conducted

regarding video production in the language classroom at any Japanese institution. First, I reviewed the Japanese literature on video production integration and then reported on research conducted overseas. Then I proceeded to document a project in which second year undergraduate students used video cameras to produce videos on selected themes. As the literature states, managing large classes to produce and edit videos can be time consuming.

Cell phone research.

In 2007, Thornton and Houser delivered a speech regarding the use of cell phones to increase students' exposure to text-based lexical items. After listening to the details of their project conducted in Osaka, I considered the possibility of using portable devices to engage students to speak. Conducting a more extensive literature review concerning cell phone technology led to the observation that the potential of the cell phone video recording feature as a learning tool needed to be more fully understood. Therefore, new research was needed to provide an evidence base for the expanded use of mobile devices in second language acquisition.

Thornton and Houser's presentation was based on their 2005 publication, which was the only available evidence at that time concerning cell phone use by Japanese students for language learning purposes. International publications, especially from the US, concentrated more on personal digital assistant devices (PDAs), digital voice recorders, and MP3 technology. As this was an emerging area of research, I had to rely on prior experience with integrating digital video production in the language classroom as the foundation of the research that ensues.

Preliminary cell phone research with seven participants.

Preliminary research with a small group of participants was necessary to test the technology, the process for integration, and the language learning outcomes. At the time, I was allocated a class of advanced English learners, with near native-like speaking abilities. This group of seven students was deemed appropriate since they would be able to discuss their experiences without difficulty and contribute to the research project as a whole.

Action research methodology was appropriate given the need for cycles of development, testing, and improvement, and a socio-constructivist framework of learning was an ideal theoretical foundation to anchor an understanding of the students' learning outcomes. The outcome of this research revealed that students enjoyed creating diary-type videos with their cell phones about various aspects of their lives (Gromik, 2009a). Students involved in the study reported that the process of storing their cell phone video recorded performances online was user-friendly and they appreciated the value of writing about the reasons for producing each particular video. The next step was to attempt to conduct the same research on a larger scale. Prior experience with video production and cell phone research and a preliminary literature review indicated that it would be possible to consider investigating the cell phone video recording feature as a language tool to enhance speaking.

Research Question

This case study research investigates the educational benefits of engaging students to use their mobile phones to create audiovisual files in the target language. There is one main research question:

Is the cell phone video recording feature a suitable tool for Japanese students learning to speak English?

This question aims to identify the advantages and disadvantages of using the cell phone video recording feature as a language learning tool. The data will be collected in terms of learning strategy use, linguistic improvements gained, and learner perspectives on using mobile technology for learning. To determine the educational merit of using this device to enhance speaking abilities, students will complete weekly videos in the target language on randomly selected themes. The research is conducted at a Japanese national university. The sample group comprises both male and female Japanese second year undergraduate students from various departments.

Methodology

A mixed-method single case study is used to explore the use of the cell phone video recording feature by Japanese undergraduate language learners. A single case study is used to address the research question and to report evidence from extreme cases. The single case study is conducted with four classes of second year students, each with varying participant numbers from the in situ environments where the research is conducted. The sixty-nine participants are between 19 and 21 years old and have a similar educational background.

The mixed method collects both qualitative and quantitative evidence from surveys, video performances, weekly diaries, interviews, and observations. Data analysis includes non-parametric statistical tests using the quantitative data and generic qualitative data analysis reports on students' opinions about the benefits of this learning approach. Surveys report learners' and groups' perceptions of the project. Speaking performances are analysed in terms of word output per second and lexical item range. Interviews and videotaped observations report students' personal accounts of the advantages or disadvantages of conducting the project.

Scope of the Study

This study does not aim to understand how Japanese learners acquire a second language, nor does it aim to research how they use the language to express their opinion. Rather, the objective of the research is to investigate the use of cell phone technology to verbally communicate an opinion in the target language.

Undergraduate Japanese students have six years of English as a Foreign Language (EFL) exposure at junior and senior high schools, so they have had six years to acquire the language by the time they enter university. To some extent, this research is concerned with the extent to which undergraduate

learners can use the language that they have acquired during their formal schooling and as part of the prerequisite English foundation course provided by universities. The focus of the research, however, is on the technology and whether it can be used to improve these outcomes.

While the research is conducted within a communicative language course for Japanese undergraduate students, the objective is to understand how technology can be utilised to engage learners to deepen their ability to communicate. This creates another focus on the approach applied to integrate technology in the language classroom. Central to this objective, the research will review the literature on communicative language teaching methodologies to ascertain whether or not the cell phone video recording feature as a learning tool can be integrated as part of the learning activities that students complete.

Using cell phones as part of educational research is not a novel focus. Some researchers have investigated the use of short message services (SMS) to expose students to new vocabulary. Others have inquired about the use of cell phones to maintain online public and private identities. More recent research has explored the ethical use of cell phones in public places. In addition, using technology for communication can include many devices (digital tape recorders, flip cameras, digital cameras, iPods, phones) and functions. While all these devices and issues are pertinent, they are separate research areas of their own and thus are beyond the scope of this paper. The scope of this paper is to investigate the appropriateness of the cell phone video recording feature as a language learning tool. The objective is to document practical methods for integrating the video recording feature and to report on students' use and perception of the educational benefits of this learning approach.

While the use of the video recording feature will lead to a collection of speaking performances, these will not be analysed according to Second Language Acquisition (SLA) discourse analysis practices. Rather the data will be used to observe how students have used the video recording feature to communicate. For example, one research focus documents whether students prefer to create videos in private or public spaces. The feedback provided by the students will be analysed to determine whether or not these students believe that the use of the cell phone enabled them to improve their speaking abilities. The objective is to understand the relationship between the regularity of completing the task due to the technology's mobility and students' abilities to become spontaneous speakers because of regular video productions.

Therefore, the scope of the study is concerned with student-cell phone interaction for the purpose of extending learning. Hence, this case study investigates the benefits and challenges of cell phone interaction in terms of *what* the students do with the technology and *how* they are doing it (Dourish, 2004; Yin, 2003).

Thesis Outline

Chapter Two provides a review of the literature to discuss prior use of cell phone technology relevant to this case. The gaps in the literature are identified to justify the need for research on cell phone use in the communicative classroom, as well as to assist in the choice of collection methods and analysis.

Chapter Three justifies the selection of single case study as a suitable research methodology for this study. The literature concerning the advantages and disadvantages of case study research is reviewed in order to ensure potential weaknesses are addressed and the strengths of the method are fully capitalised. A strength of case study research lies in the use of extreme cases and it allows for careful examination of phenomena within a particular context.

Chapter Four describes the data collection method. The general characteristics of the case location and the participants are provided to set the study within a clear and comprehensible context. In addition, the literature is further reviewed to determine whether or not previous data collection processes were successful and may be of use to this case study. Findings from the literature review are also used to structure the surveys, provide justification for the participants' task design, and to offer some insight and guidance for data analysis.

Chapter Five describes the process for analysing the data. Definitions for data analysis are presented first, followed by analysis and results. The analysis is divided into general findings, class findings, and extreme cases. The decision to divide the results into these three groups is to extrapolate and isolate the extreme cases from which further evidence is advanced.

Chapter Six discusses the findings from Chapter Five and positions them within the relevant literature. While the findings are reported in line with the data collection method, possible reasons for the findings are presented.

In the closing chapter, the research aims are revisited and final conclusions are made. In addition, directions for future research are suggested and a description of the limitations is provided.

Summary

This chapter discussed the history behind the construction of this research project. It briefly outlined the technological developments that have led to the possibility of investigating new learning tools. This historical description also provided an overview of the types of research methodologies that were applied and the rationale for applying a more suitable research method. While describing the methodology section, an explanation was provided to identify the data collection process.

The culmination of previous research projects, technological improvements, and students' needs led to the research question: is the cell phone video recording feature a suitable language learning tool? The next chapters will attempt to answer this question by reviewing the literature and providing a more in-depth analysis of the research method and data analysis strategies. The discussion chapter will attempt to provide a balanced representation of students' opinions of this project.

Chapter 2: Literature Review

Introduction – Purpose of Literature Review

The literature review is one of the primary and pertinent features of research because it helps develop an understanding of the field of research and it assists in establishing propositions (Hart, 1998; Yin, 2003). The aim of this literature review is not to cover everything related to information and communication technology (ICT) in education research (an approach that Gary Marx [1997] defines as "becoming a bibliophile," p. 106), but to seek out research areas not yet investigated, or research that contradicts other research and thus needs further investigation (Lajom & Magno, 2009), and offer a synopsis of the most relevant research (Dunleavy, 2003) as it pertains to the establishment of units of analysis and boundaries for this case study research (Hart, 1998). This chapter presents the literature in terms of context, purpose, and findings that can guide the case study's investigation.

This case study investigates the use of the cell phone video recording feature by Japanese university EFL learners, so the aim of the literature review is to examine four components relevant to the topic. First, there is a need to investigate MALL literature to understand the issues and development of using cell phones in the classroom. This section provides a brief overview of the history of cell phone technology. It then describes different types of technology that have been used in research and the rationale for selecting cell phones as a learning tool over other devices. The next part of the literature review reports on the various studies conducted. General literature is discussed before reviewing more specific literature emerging from Japan, where this case study is conducted. Cell phone research constraints are reported and studies that have explored the cell phone photo capability are examined to make a case for conducting research concerning the pedagogical value of the cell phone video recording feature in higher education. The final area examined in the literature review involves curriculum design for ICT integration in the classroom. This is important because the case study will report on the integration of cell phones in the language learning environment and therefore best teaching practices for this teaching method need to be reviewed. Another issue related to curriculum design is the fact that the cell phone video recording feature will be used to document students' speaking abilities. Hence, the literature is examined to understand the strategies required for using cell phone technology to enhance speaking performances.

As Figure 1 displays, a socio-constructivist theoretical framework is explored to help understand the learning development of participants with a particular tool to undertake a task.

Figure 1. Establishing an Understanding of Cell Phone-Based Language Learning

There are other issues applicable to cell phone-based EFL learning; however, as explained in the introduction, these issues are beyond the scope of this thesis.

M-Learning

To understand the importance of mobile learning (m-learning) to educational outcomes, a conceptual definition of the word 'learning' is required. Learning is the active process of acquiring knowledge. Learning occurs anytime and anywhere through interactions with individuals or groups and not necessarily through the use of tools (such as technology) and the natural environment (Naismith, Lonsdale, Vavoula, & Sharples, 2004). Learning also involves the merging of prior knowledge and the formation of new knowledge (Bruner, 1966). For example, when walking through a museum, an individual observes, notices, and may attempt to remember visual or textual information. If accompanied, discussions, reflections, and experiences will be shared during this visit. To remember some of the information, an individual might draw pictures, write notes, or take photos or brief video footage. So, learning does not take place only in the classroom but also takes place outside it. Learning is ubiquitous. Anything can be a source of learning; it is up to the individual to use that information either instantly or to store and retrieve it at a later time.

Electronic learning (e-learning) has capitalised on this aspect of learning to offer opportunities with desktops, CD-ROMs, and an internet connection for students to access authentic resources (Peters, 2005). As the technology has advanced, some teachers have begun to investigate and use new devices, such as digital voice recorders instead of analogue voice recorders. More recently, digital devices

have been replacing analogue completely. The teaching methodologies have often remained the same, but the technological advances and the lower costs have allowed more schools to access electronic hardware. This has led to a shift from immobile location-specific learning to exploring the benefits of mobile learning.

M-learning is an extension of e-learning. Both share the principal idea of using technology as a tool to learn, but with m-learning students can purchase and control the technology they use. Many students, as consumers, can obtain laptops, ultrabooks, netbooks, iPads, MP3 and other portable media players (PMPs), digital cameras, and cell phones at a reasonable price, since the price relative to income has greatly decreased. The accessibility of affordable technology, as Friedman (2005) explained, created an environment where learners gained access to internet files, information, and data that they could manipulate to meet their needs and publish online to share with peers anytime and anywhere at their convenience (see also O'Malley et al., 2003). Such possibilities led to the emergence of m-learning, whereby learning methods changed to accommodate new learning needs and preferences.

In Australian education parlance students are clients, consumers of educational products (Peters, 2005). Students are also consumers of technology and subscribers to various services that they carry with them everywhere (Kukulska-Hulme & Traxler, 2005; Peters, 2005). As consumers, students have begun to choose the type of equipment they need to interact online and with peers. For entertainment purposes, students originally used a computer to access audiovisual resources. With the arrival of portable media players, they began to carry audiovisual resources with them in order to learn, listen, or play on the move. Eventually, the emergence of more complex portable hardware like smartphones and tablet PCs gave students omnipresent access to all the services they require. The emergence of new technology and the plentiful and free audiovisual content it delivers means that students have constant access to resources that either reinforce their perceptions or open their minds to new views.

The emergence of e- and m-learning has led to a shift from learning within the confines of the classroom with the assistance of a teacher to the choice and ability of students to learn more independently and develop a knowledge base dependent on the individual's needs; or as Van Lier (1996) explained, the learners have control over the location, time, content, and process of learning. Students who use m-learning can foster lifelong skills of discipline and independence. Learning in the classroom is also being redefined, because e- and m-learning are conducted in more collaborative environments where learners participate in experiential learning in order to develop lifelong learning skills (Australian Department of Education, Employment and Workplace Relations, 2009; Australian Department of Education, Science and Training, 2005).

M-learning might be a useful tool that can help facilitate and enhance the learning experience, but it also has limitations. To begin with, technology cannot replace the teacher or services and support offered by schools and learning institutions, but it can complement the educational experience. Additionally, learning with mobile technology is sometimes seen as disruptive, distracting and not 'real learning' because teachers have no control over it. For example, for some professors, technology is perceived as a threat to learning. Alexander (2004) reported a case in which a law professor in Texas "climb[ed] a ladder to disconnect a wireless access point" (p. 1) because he did not agree with his students being connected wirelessly while they attended his class. In another case, the iPod was banned in some schools across the US due to concerns about cheating (Guyhto, 2007). Educators are not the only ones to struggle with the ubiquitous use and presence of mobile devices. Librarians are also facing difficulties establishing policies to accommodate the penetration of new technology within

their milieu (Lever & Katz, 2007). Similarly, in Japan, cell phones have been banned in some schools because teachers and parents believe they distract children from learning (Johnston, 2009). Cell phones have also been perceived as disrupting teaching (Mifsud, 2002). Indeed it has been noted that students' access to affordable technology could create an imbalance between teachers' skills and interests and students' technological aptitudes. Teachers may not always be able to keep up with the rapid changes taking place in and outside their classrooms (Brown, 2001). Peters (2005) suggests that teachers may not be able to appreciate the potential that affordable technology offers learners.

MALL Research

M-learning is a portmanteau term for learning in any environment with any technological hardware that can be carried (Ballard, 2007; Vinu, Sherimon, & Krishnan, 2011). Ubiquitous learning (u-learning) is a branch of m-learning that refers to the fact that technology is implanted in the environment (Ballard, 2007). MALL extends on this definition by connecting portability with the ability to complete any activity with technology at any time, through access to the internet either directly or indirectly, in order to assist consumers and learners in learning independently (Wu, Wu, Chen, Kao, Lin, & Huang, 2012). Research on MALL usage in the classroom includes using: outside classroom activities with computers, mobile devices, and software (Jones, Scanlon, & Clough, 2013) to engage students in inquiry-based learning, or with tablet personal computers (PCs) to promote business services to consumers (Sheng, Nah, & Siau, 2005); pocket PCs for training healthcare workers in the classroom (Kneebone & Brenton, 2005); iPods for content delivery (O'Brien & Hegelheimer, 2007), content exploration (Gromik, 2008) in the English language or in a tourism industry course (Dale, 2007), or across the Duke University campus (Belanger, 2005); or to investigate tablet PC influence on "learning processes" (Alvarez, Brown, & Nussbaum, 2011, p. 834). Kindle e-readers (Hearn & McCaslin, 2010), and MP3 voice recorders (Sole, Calic, & Neijmann, 2010) were used, as well as PDAs to collect information in the public health sector (Yu, de Courten, Pan, Galea, & Pryor, 2009) or to learn Chinese (Chang, Lin, Lee, & Lai, 2006). Also, while the game console Nintendo was used to learn English (Kondo, Ishikawa, Smith, Sakamoto, Shimomura, & Wada, 2012), smartphones were used to play games (Liu & Chu, 2010), create videos (Gromik, 2006) or to complete text-based activities (Kennedy & Levy, 2008; Stockwell, 2008). The "video forum add-on program" for the Learning Management System (LMS) Moodle was investigated by Collins and Hunt (2011, p. 324) but their research does not clearly explain the tools that participants used to create their videos. In their review of the trends in mobile learning, Wu et al. (2012) categorised the literature into two types "(1) evaluation-dominant with application-minor or (2) design-dominant with evaluation-minor" (p. 820). Wu et al.'s research outcome reveals that MALL research covers a wide range of devices, from mobile phones to electronic dictionaries and even satellite TV. While most researchers focus on the technology and its affordances, Ballard (2007) reminds researchers should that "'Mobile' refers to the user, and not the device or the application."(p. 3).

The MALL literature is extensive but, as the brief overview above reveals, there does not seem to be a consistent niche for each device. For example, Kukulska-Hulme and Bull (2009) postulate that any type of technological device can encourage students to 'notice' language in action in the real world. This suggestion does not take into consideration that each device is designed for a specific purpose.

For example, an MP3 recorder will not work as an electronic dictionary and vice versa. In addition, current technological developments have enabled more devices to include more features. Consumers and learners will define their interaction with the device depending on the features it possesses. During the process of collecting appropriate research articles, it was determined that it may not be suitable to compare research on iPod or iPad integration in various environments with cell phone integration because each of these devices has different features and intended purposes. As technological devices continue to be equipped with more and similar features (most mobile devices can receive and send SMS, for example), consumers may shift towards one device rather than owning several devices. For example, since most cell phones can take photos, fewer consumers are purchasing cameras. Technological capability was a determining factor when deciding to use the cell phone video recording feature for this study.

Investing in Mobile Technology

Cost was another consideration when selecting cell phones as a learning tool over another device. Singapore's Nanyan Technological University (NTU) spent 3.2 million Singapore dollars (2.5 million Australian dollars) to provide wireless services across its 200 hectare campus in 2000 (Weber, Yow, & Soong, 2005). While this is a formidable achievement, spending such an amount of money is questionable, especially when cell phone technology already has an established infrastructure, and the technology is as efficient as a PDA. In Japan, Chartran (2009) reported on a grant that successfully installed iPod Touch devices in a computer language laboratory. The objective was to expose students to using podcasts for enhancing their target language awareness. However, Chartran explains that in order to prevent students stealing these devices, they were bolted to the desks. Gromik (2009b) argued that spending money on mobile technology that is glued to a desk defeats the rationale of the design and the purpose of the device, which should involve learning on the move.

Apple (2004) also questions the expense and inefficient use of technology. With reference to Cuban's 2002 paper (as cited in Apple, 2004) on the inappropriate use of technology in American classrooms, Apple concurs that the expenditure does not lead to better educational outcomes but rather sustains poor use of hardware. However, Apple raises a point worth highlighting. By shifting the focus from the use of computers in educational settings to the use of computers for homeschooling, Apple asserts there is room to conclude that distance education can make better use of computer technology than classroom settings can. Peters (2005) explains that if Australia is to benefit from the increasing presence of mobile devices in the classroom, then government funding would be better directed towards improving teachers' and learners' awareness of the educational merit mobile technology offers. Reliance on government funding is a fundamental factor influencing schools and teachers to invest in technology. While Nanyang Technology University was fortunate to expand its wireless network, other researchers are questioning the validity of this type of expenditure. Instead, some researchers are suggesting that the availability of cell phones and constant improvements in portable devices allows teachers to restructure their budgeting issues and consider student-owned cell phones as a suitable learning tool.

The purpose of this project is to investigate the integration of cell phone technology in the classroom and to explore the best teaching practices that could improve this integration in the language

classroom. The feature of the cell phone that will be emphasised is the video recording feature. The next step is to review the literature regarding cell phone technology and to highlight research that utilises the video recording feature.

Cell phone technology

Cell phone technology has a longer history than m-learning. In 1947, the Bell Laboratory began to investigate the convergence of telephones and radios into cell frequencies (Hanson, 2007, p. 24). However, it was not until the early 1980s that cell phones became commercially available (Klemens, 2010). Since then, cell phones have advanced dramatically and offer features like text messaging, photo and video cameras, basic software such as calculators and more advanced software such as electronic games, along with GPS functionality and access to the internet through browsers. When purchasing a cell phone, consumers are now concerned about cross platform compatibility and camera pixel resolutions. Now that cell phones have become an indispensable tool for many people who require mobility and easy access to the internet, institutions are placing more funding into examining their use in business and educational environments.

Since they became commercially available, cell phone services have increased dramatically. Cell phones are now apparent on streets, in shops, cafes, planes, cars, and everywhere imaginable (Ling, 2004). The acceptance of this device means that people are no longer merely curious about it. Instead they have developed cell phone behaviour and new acceptable social rules have evolved (Lipscomb, Totten, Cook, & Lesch, 2007; Murray, 2001; Walsh, White, Cox, & Young, 2011).

Mobile technology

There are two types of handheld devices that could be considered for potential oral communication learning technology: PDAs and cell phones. In order to explain the reasons behind the selection of the cell phone for this project, these devices are briefly described below.

A PDA can have the same features and capabilities as a computer without voice communication (Ballard, 2007). It complements rather than replaces a computer (Trinder, Magill, & Roy, 2005). Originally, PDAs were designed as personal information managers. As technology has advanced, PDAs have included phone communication capabilities; however, these devices are now considered smartphones (Trinder et al., 2005).

Portable devices like Blackberrys became very popular in the US because they were designed and marketed to professionals who mainly used portable PCs (Ally, 2009). Introduced on the market in 2005, the iPhone is one brand of smartphone that gained popularity in the US, where it originated, and eventually worldwide. Originally, the iPhone did not have a video camera. Hence, when it was introduced on the Japanese market, Japanese cell phones were already more advanced and while they

included a photo and video camera these features received little attention from the research community.

While some researchers might argue that PDAs differ from cell phones, the convergence between the two means that more recent authors see little difference between cell phones, smartphones, and PDAs – the purpose and features are to some extent the same and the technology is as advanced as PCs.

Now cell phone technology allows owners to take pictures, write notes, record their voices or short videos, listen to music, watch audiovisual material, use a bilingual dictionary or language study software, play games, send text messages, access the internet, interact in social network communities online and make regular calls. One benefit common to all these features is that they do not have to be accessed and used in a set location, rather mobile users are "out and about, they are social, they are moving" (Ballard, 2007, p. 10). It is the mobility aspect that is beginning to receive some attention from researchers but it is still an emerging field in which the educational benefits have only been partially explored.

Cell phones in context

As the literature review indicates, cell phone technology is still in the early development stage as a MALL tool. Much of the research conducted with cell phones focuses on reading, listening, and viewing comprehension. Studies that have been conducted to date include the use of voice-only cell phones, short text messages which expose students to content, graphic displays to deliver photo-based content, internet browsers, cameras and video clips for collecting audiovisual data and global positioning systems (GPS) that can be used for gaming experiences, Kato and Ricci (2006) explain (see also Prensky, 2008). The general conclusion is that consumers appreciate the connectivity that this device affords them. In 2009, there were approximately 1.5 billion cell phones worldwide (Economist Intelligence Unit, 2009, p. 121). Cell phone penetration rate is 100% amongst developed countries, Zambrano and Seward (2010) reported; indicating that all potential consumers have access to a cell phone. In developing countries, because not all potential consumers can purchase a cell phone, the penetration rate is 58% and for least developed countries this rate is 25%. Not only has this technology spread more rapidly than any other technology, but it can improve the lives of the poorest people by giving them access to relatively inexpensive resources and even allowing them to develop micro-businesses (Donner, 2008).

The presence of cell phones and their usage is growing, with subscriptions reaching almost "6 billion by end 2011" (International Telecommunication Union [ITU], 2012b, p. 1). In Japan, the ratio of cell phone subscribers was 91 per 100 people (Economist Intelligence Unit, 2009, p. 122) and by 2011 it was 108.12 per 100 people (ITU, 2012a). In Japan, students are more likely to own a cell phone than a PDA. In a study conducted at a Japanese university it was revealed that 100% of respondents owned cell phones (Gromik, 2009b). While the literature on cell phone education is expanding, not all researchers are convinced about the benefits that cell phone technology can bring to education. While some assert that cell phones can be integrated in the CALL classroom (Kennedy & Levy, 2008; Kiernan & Aizawa, 2004; Thornton & Houser, 2005), others argue that technological limitations

render such a teaching tool inappropriate for the enhancement of language learning development (Wang & Higgins, 2006).

The next section reviews current cell phone-based research literature to present a general overview of projects undertaken, emphasising their most relevant results and findings (American Psychological Association, 2001). The literature will reveal both positive and negative opinions about the benefits of utilising cell phones to learn. The negative opinions argue against the feasibility of using cell phones and are outlined first. Then, the positive research outcomes are outlined. The conclusion of the literature review suggests that it is possible to integrate cell phones in the EFL classroom.

Cell Phone Literature Review

One study conducted in Japan describes the limitations that cell phones present when contrasted against the needs of the language learning environment (Wang & Higgins, 2006). Although Wang and Higgins (2006) state that cell phone technology does provide positive opportunities for language education, they argue that this technology is not yet ready for mainstream pedagogical consideration. The authors justify their decision by explaining that, since learning requires an effort, most people would be unlikely to want to study with a phone, because its primary use is for entertainment. They argue, "people lack the motivation needed to use mobile learning consistently" (p. 4). Wang and Higgins contend that learning and teaching requires interaction for learning to occur. They comment that the surrounding environment can be a source of distraction for learners and that examination via cell phone can be cumbersome to implement. These authors point out that cell phone memory capacity was still below one gigabyte at the time of the study; the internet browsing is slow, the screen is too small for maximum reading purposes, and the devices can be inconvenient for viewing learning materials. In their opinion, even if students do not need an internet or cell phone connection, the limitations of the cell phone features will reduce independent offline learning productivity. Finally, they point out that using cell phones does not replace traditional teaching; it simply provides a new tool for learning. Motiwalla (2007) concurs with this argument stating that "the differences are in the tools but the pedagogies remain similar" (p. 594).

Motiwalla (2007) explores the use of "a wireless phone simulator software called Wireless Companion™ to access the WAP [Wireless Access Protocol] user-interface on their PC" (p. 589). While the feedback from Motiwalla's participants indicates that they see benefits in the use of cell phone technology, they also express an aversion towards "the small screen-size, tedious process of typing on phone keypads, and slow connection speeds, response times, lack of pictures and visual stimulations" (p. 593). Oliver and Goerke (2008) concur with both Wang and Higgins and Motiwalla and add that for their participants, "the iPAQ compared unfavorably to three other devices they used – the laptop, the desktop and the mobile phone." (p. 9). Oliver and Goerke compared the hp iPAQ cell phone adoption rate between 54 Australian, Ethiopian, and Malaysian business and engineering undergraduates. Their findings revealed that students preferred not to use cell phones for studying purposes. These authors found that "there is little transference between social activity and study-related activity" (p. 11). They report that a high proportion of participants were not enthusiastic with the iPAQ features. Oliver and Goerke conclude that maybe the iPAQ, a business-specific telecommunication device, was not well suited for students.

Reporting on a six-week distance teacher training program, Pouezevara and Khan (2007) explain their implementation of cell phones to connect teachers working in remote parts of Bangladesh. Ten Sony Ericsson P990i cell phones were shared amongst twenty participants to communicate with the trainers. This cell phone was selected because it facilitated audio conferencing, text messaging, photo and video capture, and the transfer of these visual files. While the participants saw merit in the distance program, some problems occurred. First, teachers had to share the cell phones and they could not be used after working hours. They were locked away for security reasons. Second, due to size limitations, audiovisual files could not be sent via the multimedia messaging service. Finally, the participants could not become familiar with all the cell phone features. Most preferred to abandon using certain features rather than finding solutions. The authors do not provide any evidence to highlight teacher use of audiovisual resource production. They conclude that, while other projects provide evidence of positive use of cell phone integration, this device is not yet suitable for training teachers in Bangladesh.

Other researchers provide evidence that cell phones can be useful for enhancing learning. For example, Clough, Jones, McAndrew, and Scanlon (2007) assess the effect of PDAs and smartphones on business people's informal learning. These authors note that "it seems that acquiring a mobile device can trigger device-related learning" (p. 366). Although the participants in the study were mature business people conversant in mobile phone communication, the findings indicate prior positive experience with technology at a personal level may explain participants' increased awareness and expectations from their device (p. 368).

Another project, conducted at a Taiwanese vocational school, revealed that students have prior experience with texting anytime irrespective of their location, and such experience may be capitalised on to engage students to consider texting as a method to learn target language lexical items (Lu, 2008). Lu (2008) conducted a two-week research project that compared vocabulary acquisition between students using cell phones and those using paper. While the pre- and post-intervention data indicated that cell phones assisted students in acquiring and retaining a greater portion of the vocabulary they were exposed to, the three week delayed intervention indicated low retention of the studied vocabulary.

In Cyprus, Uzunboylu, Cavus, and Ercag (2009) investigated the benefits of integrating mobile technologies to develop undergraduates' awareness of environmental issues (p. 3). Over six weeks, "students used mobile telephones to photograph local subjects, which included environmental blights and social events" (p. 4). The researcher received and organised the photos on the project's website, and the students accessed that site to view and comment on the photos submitted by their peers. The pre- and post-project questionnaires were an adaptation of the "usefulness of mobile learning systems" questionnaire developed by Motiwalla in 2007 (p. 4). Post-project responses revealed that "students learned to value mobile technologies and their use for reporting and sharing these problems by facing environmental problems in real time" (p. 5). The implications of the research by Uzunboylu et al. address classroom integration and gender preference. First, integrating cell phones in the curriculum is well suited to project-based learning. The project engaged students to use the technology to report and document environmental concerns they observed in their localities. Second, Uzunboylu et al. did not find any major gender preference issues amongst the students for using cell phones to investigate environmental issues. Research conducted with 177 male and 86 female Finnish students also revealed "no differences in the use of the cell phone services between the genders" (Haverila, 2012, p. 179).

The Finnish-based research investigated undergraduate students' cell phone feature preferences. Haverila (2012) investigated not only feature preferences but also hardware specification preferences. The conclusion was that texting and calling were the "most heavily used features," while "all other features (E-mail, pictures, camera + video, games, and MMS) had a lighter usage" (p. 185). Haverila's findings challenge some of the previous research regarding gender differences. For example, past research assumed female subscribers would have a high preference for features such as "calendar, Internet, music and E-mail" and "heavier users of the calling function" but that was not the case with this male and female Finnish cohort (p. 185). Haverila also reports that there was no difference between males and females who use cell phones to play games. As technology becomes more ubiquitous, male and female habits might show not division.

Unlike Wang and Higgins (2006), evidence would indicate that some researchers see the potential of learning with cell phones and it is likely that further research will occur. If cell phone and telecommunication companies maintain their investments in improving cell phone technology to meet consumer needs and demands, cell phones will remain a vital mobile tool. With further research and development, Wilcox and Gibson (2005) predict that live cell phone-based videoconferencing will soon become a reality.

Japan-based cell phone research

Although some Japanese cell phones are capable of delivering live video communication (Wilcox & Gibson, 2005), very little information about consumer attitude towards this feature is available. Apart from Wang and Higgins' (2006) opinion that cell phones are not yet an appropriate platform to deliver educational material to students, other research with cell phones has produced some positive evidence that they can be a viable learning tool. Kiernan and Aizawa (2004), Thornton and Houser (2005), as well as Stockwell (2007, 2008, 2010) and Gromik (2009a) provide convincing evidence that cell phones can be useful tools for enhancing the learning development of Japanese EFL university students. Ito and Okabe (2005) reveal the role that cell phone photos play to create an identity and provide resources to establish and maintain intimate social links.

The cell phone integration feasibility study conducted by Thornton and Houser (2005) surveyed 333 female students to report on their use of cell phones. Their data revealed that 100% of these students own a cell phone. The survey also revealed that 83% of the students use their phone for chatting with friends and rarely use them for educational purposes. Then they conducted two studies. The first involved cell phone text messaging and the second study required participants to rate the quality of viewing videos of idioms (vidioms) on cell phone screens (p. 217).

Both studies targeted vocabulary retention. The first project involved 44 students divided into two groups; a cell phone and a PC group. These students received three short text messages at intervals during the day. The difference between the pre-test and post-test reveals that students from the cell phone group retained the vocabulary items better than those in the PC group. Students' feedback also indicated that 71% preferred receiving cell phone messages to PC messages and 91% saw benefits to this learning approach.

In the second study, Thornton and Houser (2005) explain that 31 students were encouraged to view a collection of 15 vidioms on either a "video capable mobile phone or a PDA" (p. 224) during a ten-minute learning session. The overall response from the participants was positive; comments indicated that not only was it helpful for learning but the videos were also fun to watch. Viewing vidioms on cell phones or PDAs seemed appropriate to students as a learning tool and approach. Feedback from these participants indicated, however, that due to screen size, PDAs are better devices than cell phones for viewing videos. Both of these devices were reported to have poor audio quality.

While Thornton and Houser's (2005) research was primarily a trial, Kiernan and Aizawa's (2004) research was more thorough in defining the benefits of using cell phones to encourage students to focus on form and negotiate meaning during particular teacher-designed tasks. The purpose of their research was to understand whether or not cell phones are valuable tools for language learning in a task-based learning environment. Conducted over a three-week period, this project involved four 45-minute lessons with approximately 30 Japanese first year engineering students. The authors first divided their classes into high and low level learners and then they divided these again into three groups; "PC email, cell phone email and speaking" (p. 73).

Prior to undertaking the tasks, students completed a survey in Japanese which elicited information about students' cell phone use habits as well as a pre-test "to test learners' knowledge of target pragmatic phrases" (p. 75). Thereafter students completed three tasks; two of the tasks encouraged students to communicate in order to complete a close gap exercise in which they shared information to fill in their worksheet (picture narrative tasks) and the other task was an invitation activity in which students used the technology to schedule a date. Kiernan and Aizawa (2004) hypothesized that students might use the target pragmatic phrases in their conversation, therefore, "the same [pre-] test was re-administered with the order of the items changed as a post-test" to assess any vocabulary gain from the tasks (p. 75). However, their findings reveal "that none of the students used" any of the target pragmatic phrases during the activities (p. 75). Kiernan and Aizawa (2004) conclude that it might have been rather naïve to anticipate pragmatic phrase retention through accidental exposure during the pre-test and expect it to transfer to a particular communicative task.

Nevertheless, Kiernan and Aizawa (2004) outline affordances and constraints with cell phone-based email communication compared to PC-based email exchange. Whereas both devices seemed conducive to facilitating outside of class time communicative exchanges, the use of cell phones appeared to be more popular with learners. In addition, students with cell phones developed a more economical form of verbal expression during their email exchange. The constraints addressed the limitation of language output possible, due partly to the ability of the cell phone to deal with text larger than one hundred words, as well as the typing speed of the users (p. 80).

However, not all cell phone-centred research reports positive results. Stockwell (2007, 2008, 2010) investigated the possibility of merging the LMS Moodle vocabulary tutor with cell phone technology. While Stockwell's studies were conducted over 13 weeks, in the first study Stockwell (2007) reported that seven out of 11 advanced English language participants "failed to use the mobile phone at all for the vocabulary activities" (p. 374). In the second study he reported that while 48 out of 75 first year students did not use their cell phones to study, another 14 students seldom used their cell phone to access the Moodle site (Stockwell, 2008, p. 260). In both studies, students were required to use their cell phones to study the researcher's selected vocabulary items. Participants used the cell phone-based LMS to complete activities and communicate with peers. Stockwell explains that the cell phone-based

LMS was an adaptation of the current computer-based LMS used by his department. The results indicate that students preferred to use the computer-based LMS. The data collection process did not include a pre- and post-test analysis to record any vocabulary gain or to investigate the learning behaviour patterns that students develop to integrate cell phone technology in their out of class learning time. These are areas that require further investigation.

Participants in Stockwell's (2007, 2008, 2010) research completed a survey to explain their preference for using either their cell phone or computer to study. The responses supplied general information indicating that the size of the cell phone screen was a major hindrance for long periods of study, hence they said the computer was more suitable. Also, studying in various locations such as the train was distracting. Finally, the students commented that using a cell phone to study can be expensive.

In the study conducted with advanced learners of English, the vocabulary competency scores of students who completed the task with computers were slightly greater than those who completed the task via the cell phone-based LMS (Stockwell, 2007). The objective of the second research project conducted with first year students was to investigate their cell phone study habits and their opinions about studying with cell phones. Forty-four out of 72 participants expressed an interest in using cell phones in the future to study English (Stockwell, 2008, p. 262). Students recognised that cell phone mobility was the main reason for wanting to use cell phones for learning. Stockwell remarked that cell phone-based learning content may need to be designed more like leisure activities rather than strict academic language acquisition.

The collection of articles concurs with Wang and Higgins' (2006) claim that, seven years ago, technology was not yet up to the standard required for educational needs. Nonetheless, the findings do not dismiss the feasibility of integrating cell phone-based learning in the language classroom. The above review of the literature supports the notion that investigating the integration of cell phones in the classroom warrants further research. The next stage was therefore to understand the limitations of these prior studies in order to define a new potential area of research about cell phones.

Cell Phone-Based Research Constraints

Some of the findings share similar limitations concerning the use of cell phones in education. For example, Thornton and Houser (2005) comment that preparing vidioms for delivery on cell phones in Japan was time demanding (see also Stockwell, 2008). Levy and Kennedy (2005) concur that "preparing the mobile phone message did take some time, about four hours a week in fact" (p. 79), and Lai and Wu (2006) observe that developing educational, audiovisual resources suitable for PDA devices for nursing undergraduates required much preparation. Finally, Stockwell (2010) admits that over a three-year research period "the system was not updated each year … predominantly due to time constraints" (p. 106).

Originally, Kiernan and Aizawa (2004) wanted to compare PC and cell phone email users with cell phone voice users, but they explain, "Speaking on the mobile phone was abandoned early on due to complaints [from students] about the potential phone bills… Instead this option was replaced by audio recorded pair work speaking" (Kiernan & Aizawa, 2004, p. 74). To overcome this obstacle, Thornton

and Houser (2005) provided learners with cell phones. This option may not have been available to Kiernan and Aizawa (2004).

The literature indicated that students identified some technological constraints, such as poor audio quality, small screens, and slow download time (Corlett, Sharples, Bull, & Chan, 2005; Thornton & Houser, 2005). In the process of engaging students to manipulate and operate their cell phones, these negative factors may have negative impacts on students' perceptions of the role of their cell phones as a learning tool. For example, in research conducted to investigate the possibility of composing music via the use of PDAs, two of Polishook's (2005) participants indicated that attaching connecting equipment to compose the music "did not seem productive or intellectually challenging" (p. 137). Polishook therefore concludes that such equipment should be utilised to engage students "to think critically about how to work creatively" (p. 137).

Reflections on the studies reported in the literature reveal that many of the interventions were teacher-led activities. Students were either required to use the pragmatic phrases they were exposed to in class (Kiernan & Aizawa, 2004), or the vocabulary covered in class (Kennedy & Levy, 2008; Lu, 2008; Stockwell, 2007, 2008, 2010; Thornton & Houser, 2005). Although such a teaching approach is suitable for collecting and analysing data in terms of linguistic improvement, this method removes any creative influence the student may have in producing authentic autonomous content. Reviewing issues concerning CALL, Chapelle (2001) points out that researchers of instructed second language acquisition (SLA) have indicated that learners will acquire certain forms and vocabulary when they are ready or interested. She adds "it may be pointless to attempt to keep a learner to a strict schedule of items to be acquired" (p. 46). Pica (2000) adds that it is possible to direct students to explore lexical items that are not directly related to the classroom needs, but rather that meet students' personal goals. In terms of utility, eventually learners have access to a repertoire big enough to allow them to select structures that best express their opinions and particular meaning (Chapelle, 2001). For researchers and educators to accurately consider the benefits of incorporating cell phones in their classroom, this research suggests that instead of evaluating the mobile learning benefits in terms of reproduction competence, it might be possible to assess students' output performances in terms of authentic learning.

Most of the literature reviewed presents students as consumers who use the technology to learn English (Stockwell, 2008, 2010; Thornton & Houser, 2005), Italian (Levy & Kennedy, 2005), or to access course documents (Corlett et al., 2005; Stockwell, 2007; Trinder et al., 2005). What becomes apparent from a review of literature concerning the use of handheld devices such as cell phones is that these resources are mainly used as knowledge distribution devices through which students undertake controlled tasks (see Lin, 2007; Vavoula, Sharples, Rudman, Lonsdale, & Meek, 2007). Stockwell (2010), for example, reports that his log data indicated that students primarily completed the assigned tasks on their PCs and expresses this as a potential concern.

Churchill and Churchill (2008) explain that, as content delivery is not content production, students have no vested interest in using their cell phone features to undertake authentic activities. After using a PDA, the informant – a teacher – in their case study, began to think that "perhaps PDA technology is more promising for learning when it offers students some tools to capture, save and process data" (Churchill & Churchill, 2008, p. 1448). The literature confirms that one of the positive characteristics of cell phone technology is the collaborative networking aspect. Therefore, there is a need for a paradigm shift from cell phone users as content receivers to content producers.

In summary, cell phones may have some limitations as learning tools, such as small screen size, awkward keypads, and poor audio and visual reception. Such limitations arose because researchers aimed to deliver and expose students to selected content. This study investigates whether these limitations might be avoided if students are placed in the role of content producers. That is, students use their cell phones to produce audiovisual resources in English. Investigating cell phone audiovisual output quality to produce content has received little attention. The next section explains that it is possible learners could benefit from being in control of the content they generate.

New Cell Phone Features – New Foci

Much of the research conducted in Japan with cell phones focuses on reading, vocabulary acquisition, listening, and viewing comprehension. In contrast, few articles have investigated audiovisual recording features such as the camera for taking photos or recording videos. What ensues is a review of the literature on these features. The aim is to extract areas and approaches that may assist in the construction of this research.

Cell phone photo camera feature

Cell phone technology has become an integral part of life and researchers report on the many ways individuals use them, yet few researchers conducted investigations with the photo camera (McGreen & Sanchez, 2005; Okabe & Ito, 2005). McGreen and Sanchez (2005) believed that cell phone technology afforded students the ability to explore and express their creativity. The blended learning process engaged students to take photos with their cell phones, edit them with iMovie (an Apple software application), include audio files, and share the final product on peers' mobile phones. McGreen and Sanchez point out that this was a better option than using video since the quality was not suitable for viewing on cell phones (p. 243). In contrast, Okabe and Ito (2005) were interested in understanding the relationship between cell phone technology and the individual. Conducted in a Japanese environment, the authors applied an ethnographic study designed to understand the role of the cell phone photo camera feature. The authors discovered that although some of the photos may appear mundane, these are "resources for personal identity construction" (p. 90). The photos were a reflection of the person and assisted in developing an identity to be shared with peers, friends, and relatives (Okabe & Ito, 2005). This is made possible because the owner takes the photos for personal use, not for publication on photographic paper. The photos are intimate and can be carried anywhere to be viewed at any time.

Research from various countries has added a wider interpretation on the relationship between photos and identities. For example, a four-month ethnographic study from Korea revealed that for participants between 18 and 29 years of age, the collection of camera photos ranged from friendly encounters to 'cuter' pictures of the cell phone owner or of pets (Hjorth, 2007). Son (2009) argues that for Korean students, the cell phone and its camera and social networking have the capability to limit direct contact, and using these can devalue one's sense of participation in society. Another study conducted in London reported on females using their camera phones to develop a gallery of photo

memories (Reading, 2008). In addition, Italian youth were observed to use their cell phone photo cameras to document their lives and surroundings beyond personal topics such as pets (Scifo, 2009). Research in China reports that while taking photos with a cell phone has become a common phenomenon, the technology helps individuals construct digital identities and enables them to interpret, reflect, and participate in their world (Gai, 2009). The conclusion amongst the researchers was that photo cameras are utilised to define personal realities and identities and are not necessarily shared on the web, but rather sent directly to friends. Son (2009) seems to question the concept of large scale shared experiences and its effect on individuals.

The research on camera phones was either pilot studies or exploratory case studies on cell phone camera use and identity construction. In contrast, Uzunboylu et al. (2009) asked students to use the cell phone photo camera feature to report and document environmental concerns they observed in their localities. The researchers received and organised the photos on the project's website, and the students accessed that site to view and comment on the photos submitted by their peers.

Examples in the literature assert that the camera phone develops a new form of interaction with peers, bringing them to the experience of the person who took the picture instantly (Foster, 2009; Villi, 2007). Reading (2009) adds that the camera phone has become a tool to witness and capture evidence of carnage. Individuals caught in acts of violence can instantly document their experience and share it globally as a news item. Sometimes the sender no longer needs to add text because a picture can be a sufficient message. Dunphy, Prendergast, and O'Scolai (2003) were concerned that cell phone photo evidence may be used maliciously in Western Europe and in their location under investigation, Dublin. Using cell phones to document one's life is an exciting possibility, but Dunphy et al. warn of some ramifications, such as a court order requesting evidence during court proceedings. Educators need to be aware of requesting students' photos, as this could be considered an infringement on their privacy.

While the cell phone photo camera feature received continued research interest, not much has been written about the potential of the cell phone video recording feature. The next section reports on the research that is available on this feature.

Cell phone video recording feature: a new research area

Video production.

Language teachers regularly rely on videos and other audiovisual resources to expose students to a particular focus on form or engage them to think critically about specific issues. Much has been written about the benefits of exposing students to video content. For example, Gruba (2006) concluded that exposing Australian students to authentic teacher-edited Japanese news broadcasts enhanced the participants' recollections of content. In more recent research Karapanos, Barreto, Nisi, and Niforatos (2012) revealed that video narratives could be used to expose tourists to historical sites and augment the experience of the viewers.

Filmmaking and editing, on the other hand, is a new teaching approach which is yet to receive much attention in the literature, and yet it allows the role of the student to shift from reflective viewer to knowledgeable content producer. Due to an overwhelming technological presence, students are becoming more exposed to various computer skills and are exploring new avenues to communicate and express their opinions and ideas. By capitalising on their prior knowledge of the target language and the technology, film editing enables them to share their view of the world with other learners as well as develop lifelong learning skills, which are more relevant to them (Lowenthal, 2009).

Whilst it could be argued that not every student wants to become a film producer, Dufon (2002) suggests that filming and editing might play a stronger role in teacher preparation to provide them with research data collection skills to improve the outcome of their research. Filming and editing offer students the opportunity to gain exposure to real computer operation as well as offer meaningful language development activities, can turn learners into experts about their own culture, and participants become creators of a product for viewers in other parts of the world.

Literature on filming activities.

Some studies report on the use of filmmaking as a teaching strategy in foreign language classes (Kondo, 2002; Ryan, 2003), as a tool to assist in preparing teachers (Coniam, 2001), or to justify the use of digital video in the language classroom using Second Language Acquisition (SLA) hypothesis (Tschirner, 2001). Other studies provide evidence about appropriate use of classroom video recording for SLA research (Dufon, 2002; Roblyer, 2004), action research on the use of video recording to evaluate both verbal and body language expressions of learners (Hoelker, Nimmannit, & Nakamura, 1999) and the acquisition of cultural information through viewing embedded videos (Herron, Dubreil, Cole, & Corrie, 2000).

Filming and editing has also been used in other environments, such as to develop audiovisual training resources for intensive care unit staff (Brandt, Bjorgvinsson, Hillgren, Bergqvist, & Emilson, 2002). Whilst Gromik (2003) provided an account of using dfilm.com as a writing stimulus, Kamhi-Stein, Bezdikian, Gillis, Lee, Lemes, Michelson, and Tamaki (2002) gave a report on students creating and editing a film for online delivery, and Hada, Ogata, and Yano (2002) documented the potential for improving language correction through video demonstration. Levy and Kennedy (2005) utilised video production to enhance Italian language acquisition through reflective viewing of performances. From the literature it could be deduced that students are increasingly exposed and attentive to visual forms of expression and require more finely tuned viewing skills (Herron et al., 2000), as well as live in societies that encourage efficient and extensive technological aptitude.

Film production as a language enriching computer-mediated activity offers the opportunity to enhance students' acquisition of the target language. For example, students are able to select their best performance during the filming and editing stages (Hoelker et al., 1999; Tschirner, 2001). In addition, the final edit of the students' performances can be an excellent source of authentic material to be used by future students, demonstrating that the task is achievable (Ryan, 2003). However, there seems to be little evidence to reveal the strategies and procedures which students develop to achieve their aim. Very few texts are available which explicitly describe the language acquisition outcomes of such a

teaching approach. From Glass's (1992, as cited in Sharp, 2005) report it is possible to understand that, until recently, video making and editing was the teacher's task and acting was the students' task, whereby only after the teacher had edited the film could students view their performance (see Sharp, 2005). However, this section will reveal that students have much to gain by taking control over the whole process of video making.

Much of the research in this field has been devoted to determining the usefulness of video as a medium for delivering instruction. For example, Bassili (2006) conducted a study of college freshmen in a psychology course in order to determine whether they preferred face-to-face or streamed-video lecture delivery as a learning aid. He found that a majority of the students preferred the online video lectures. These findings imply that videotaped content, far from being a less effective vehicle for instruction, might actually increase learner motivation and interest in course material.

Other articles outline the advantages of taping learner performances and asking students to watch and reflect upon these recordings. For example, some scholars have found that using videos as reflective diaries can promote critical thinking and reflection and thereby enhance learning development. Researchers have found that making reflective videos can benefit both teachers (Barton & Haydn, 2006; Gebhard, 2005) and students (Triggs & John, 2004). As Hoelker et al. (1999) and Liu (1997) assert, the ability to see oneself perform can be beneficial and revealing for a learner. Levy and Kennedy (2005) found evidence for this assertion within the specific context of the language learning classroom. They used computer video capture to record students' behaviour during their audio conferencing study of Italian as a foreign language. The researchers found that these recordings became an effective tool for assisting students in visualising and subsequently correcting their errors (p. 57).

Several other articles have discussed the potential impact of using videos in foreign language study. Herron et al. (2000), for example, offer evidence that showing videos in the classroom allows instructors to expose language learners to authentic cultural information. Moreover, research suggests that internet-based audiovisual resources can be effective language learning tools. Hanson-Smith and Bauer-Ramazani (2004) describe the pedagogical benefits of using online videos as in-class learning resources. In addition, they praise the fact that the internet is increasing access to professional audiovisual resources that are free, authentic, and suitable for language learning development.

Finally, many scholars have noted the benefits of implementing a video production component in language classes. For example, at the university level, Katchen, Morris, and Savova (2005) have explored the possibility of using video production to engage language learners, asking students to produce vocabulary-focused videos. They contend that the benefit of their approach is twofold. First, it allows students to produce videos using grammatical forms and lexical items that are relevant to them, increasing the chance that these forms and terms will be retained. Second, it facilitates the creation of learning resources for future students. There is also research that supports the use of video for younger foreign language students. For example, Sharp (2005) describes a class video project suitable for middle school students. Based on his research, Sharp advises starting out with simple, group-based projects when implementing video production in the middle school classroom. This advice can easily be transferred to the university-level classroom.

Teacher-centred video production has a strong following, although this is a relatively recent phenomenon fuelled by the decreasing cost of equipment. Consequently, teachers are increasingly

researching student-centred video production. As the literature reveals, it is possible for learners to complete simple video production projects such as recorded presentations, news flash broadcasting, video diaries, and other role play type activities (Roblyer, 2004). With the emergence of cell phone videos and the video recording feature, it may be possible to design simple learner-centred activities which capitalise on this technology and integrate it in the language classroom.

Cell Phone Video Production: A New Approach

The cell phone video recording feature has received little research interest even though the video camera has the same potential as the photo camera or movie camera. It can also provide cell phone owners and learners with the opportunity to document their lives with sound, adding audible interpretations to what is seen and experienced. In addition, the video can be sent directly from one phone to another phone or an internet site such as an email account or a blog.

In 1999, the first video phone was designed by Kyocera. "The product's introduction featured a scenario of distant grandparents talking to their grandson while viewing his face" (Okada, 2005, p. 56). In 2001, video phones were introduced as a new cell phone feature. Nippon Telephone and Telegraph (NTT) DoCoMo envisioned a future in which subscribers would have face-to-face communication as if it were a video conference (NTT Docomo, 2003). If digital face-to-face conversation was the intention behind the design of the video phone, then it makes sense to investigate the educational benefits that this feature can offer to learners.

The literature review revealed that the majority of research concerning the integration of MALL focused predominantly on vocabulary acquisition through student cell phone interaction. In order to establish a new field of investigation, this case study reports on student-centred research which investigates the possibility of using the video recording feature of cell phones to stimulate students' verbal performances. The last element, however, is to understand the process for integrating the video recording feature in the language learning EFL classroom, and more specifically to develop and enhance learners' speaking abilities.

In a blended learning intervention conducted at a Japanese university, Gromik (2009a) engaged his students to produce cell phone video diaries to be stored on *blip.tv*, a video storing website. Seven advanced EFL learners used their cell phones to video record their thoughts and opinions about various topics of importance to them. They had to create one cell phone video per week and manage a subscriber's account on *blip.tv*. On this site they had to write why these particular videos were of importance to them.

Using a Moodle platform, Collins and Hunt (2011) investigated the use of video recording as an approach to engage Japanese students to become confident speakers. With a "talking journal," their participants "were required to use free voice recording software to keep record of their speaking practice outside the classroom" and to save their performances on "their flash memories" (p. 323). With "conversation videos," Collins and Hunt do not describe the video recording process. Gromik (2009a) seems to be the only article available at the time of writing that considers using the cell phone video recording feature as a learning medium.

Gromik (2009a) reported that the project required students to be responsible for the activity they completed. Employing action research methods, the project was embedded in a sociocultural theoretical framework. He explained that by engaging the participants in the act of producing videos for online delivery, students would be more motivated and responsible for the content they produced. Gye (2007) concurs that cell phones will increasingly provide subscribers an opportunity to present a view of their world to peers and friends.

Students reported viewing their peers' cell phone video diaries. Fifty percent of the participants explained that viewing their peers' videos motivated them to improve the quality of their own videos. One of the technical challenges reported by the participants was the video recording time limit. Some cell phones' services cannot email long videos. Students would have preferred if their cell phones could cope with producing and emailing longer video clips. Gromik concluded that some of the students' cell phone devices were dated and this affected production. However, when asked if the students would invest in better cell phones to continue to create higher quality videos, five out of seven students responded that they would not. They were mostly concerned with reliable texting and phone services.

This approach provided positive evidence to support the possibility of using the cell phone video recording feature to engage students to produce audiovisual resources of importance to them. The outcome of this project revealed that students not only benefited from the task, but they were also able to develop an understanding of the effect of mass media on the general population. One student explained that empowering individuals to produce and upload video content online offered viewers a different understanding of living in a particular country.

Research reporting on the cell phone photo and video camera features concluded that cell phone technology empowers owners to record events that enable them to develop an identity and a perception of the environment in which they live. Amongst the various features available on their cell phones, students and subscribers value the photo and video recording features and their use for reporting and sharing content over the internet (Baya'a & Daher, 2009; McNeal & van 't Hooft, 2006). However, it is surprising that constant advances in cell phones have not promulgated a wider range of research available for the video recording feature. Unfortunately, Scifo (2009), Gai (2009), and other researchers have not commented on their reasons for investigating the photo camera feature as this may have encouraged further research in this area.

It is the aim of this case study to follow up on and develop further research in the area of cell phone-based student video production. The videos can be used as evidence to confirm that students benefit from performing in their videos. However, before undertaking the case study, it is necessary to understand the participants in this project: second year, Japanese university students.

The Japanese Language Learner

Without recounting the whole history of Japan in relation to language learning, suffice to say that from 1947 onwards, learning English was an elective, but the approach was audiolingual as opposed to placing an emphasis on reading and writing (Gottlieb, 2006). While English was an elective, it was

also a subject tested on the university entrance test, and therefore it was compulsory to learn it for those interested in tertiary education. Gottlieb (2006) explains that the shift from an audiolingual to a reading and writing focus occurred when it was discovered that, after six years of English education, students could not speak and could not perform well on the entrance test or the Test of English as a Foreign Language (TOEFL). "In 1998, Japan's score ranked 180th among the 189 countries in the United Nations" (p. 32). Japan's low score was potentially influenced by the idea that Japanese cannot learn languages (Sullivan & Schatz, 2009). Hinenoya and Gatbonton (2000) claim that Japanese students cannot learn, or have reluctance towards learning languages, because learning a second language is difficult for Japanese citizens.

In 1987, the Japanese government initiated the Japan Exchange and Teaching Program, aimed at importing native English assistant teachers and placing them in all schools across the archipelago. It was at this point in time that the government also initiated the return back to elective communicative classes. But as Gottlieb (2006) points out, as long as the university entrance exam continues to put pressure on students and teachers, English education will always address the need to master reading, writing, and grammatical knowledge. Hence, when students arrive at the university level, they generally have limited speaking abilities and a widespread notion that English and languages in general are too difficult to learn.

Curriculum Design

This section briefly describes curriculum design and purpose in general, followed by a description of English language learning curriculum. Juxtaposing these descriptions with a CALL curriculum, it becomes possible to structure a MALL curriculum.

Curriculum can be defined as the course of activities and experiences that learners will receive in order to develop the skills and knowledge to become active participants in their society (Bobbit, 1918). The curriculum will include details about the activities, projects, lesson content, learning outcomes, and assessment pieces that learners will complete during one academic term. The overall objective is to provide students with formal training in specific or general skills and to provide them with the opportunity to develop these skills through interaction and collaboration and tasks (Dewey, 1897).

While curriculum relates to the overall school or university program offered, the syllabus is a teacher's program or the "pedagogic agenda which defines a particular subject for a particular group of learners" (Widdowson, 1990, p. 127). For this case study, there are two sets of syllabi being integrated into one: the ICT syllabus and the communicative approach syllabus.

In order to explain the need for an ICT syllabus, I will take a personal journey through my own educational experience. When I was at senior high school, I viewed historical movies on a cinematographic camera. During my teacher training at university, I was taught how to use a video player to maximise language exposure. Once I arrived in Japan, the company I worked for used DVD players and I had to learn to use them to provide quick and appropriate visual stimuli that demonstrated either aspects of Australian wildlife or examples of idioms and colloquial sayings.

Then, when I began working at Tohoku University, I was allocated a computer laboratory with 60 computers and full access to the internet. My students no longer needed me to go and find authentic audiovisual resources because they could do that on their own. Now, the majority of my students can access YouTube on their cell phones. Over the past two decades, technological advances have changed the way resources are delivered to learners. Whereas in the past I had to use a card catalogue to access a book, I can now search Google books to access an electronic copy from anywhere I choose and without having to make a reservation.

According to Education Queensland's website "[s]chools are now educating a generation of students who are growing up in a digital world. … The State Government, through the Smart Classrooms strategy, is helping schools meet and exceed the demands of 21st century students by embedding ICT into learning." (Education Queensland, 2010). The Japanese Ministry of Education, Culture, Sports, Science, and Technology (MEXT) website provides a more detailed perception of what education for the 21st century entails:

> In school education, MEXT is implementing information education in order to cultivate the information literacy which is an important element of the "zest for living" of children and is promoting the effective utilization of IT in all school subjects in order to realize "Easy-to-understand lessons." (Japanese Ministry of Education, Culture, Sports, Science, and Technology, 2006)

MEXT is also promoting measures with the full cooperation of the public and private sectors such as development of intra-school networks in ordinary classrooms and promotion of the improvement of instruction ability utilising IT.

In addition, with a plan to build a rich lifelong learning society, MEXT is utilising the Education and Learning Network (el-Net) to provide diverse learning opportunities to the people, and expand opportunities for learning and exchange in local communities. MEXT is aiming to make use of e-learning to create learning support mechanisms to enable job-hopping part-time workers and young people to have easy access to educational content that will help them find a job. Accessing and retrieving information to create and deliver new content is now part of the demands of the 21st century on future employees (Japanese Ministry of Education, Culture, Sports, Science, and Technology [MEXT], 2010).

In summary, the aim of education in Japan is to enrich the life of learners by providing them with lessons that are easy to comprehend and that integrate technology in order to build lifelong learning and active citizens. Indeed the aim of education might no longer be to transmit knowledge but, as the Japanese and Australian educational departments are realising, education needs to focus on the provision of general knowledge that leads to providing citizens with the skills to become active participants capable of coping with constant technological changes, which can affect access and interpretation of information. Therefore, the aim of this section is to provide a review of recommended ICT in education and language learning syllabus design.

The literature reviewed in this section does not actually report any consideration for curriculum or

syllabus design that teachers should be aware of. Rather the articles provide information about the theoretical framework to describe the reasoning for integrating cell phones as a learning tool or they briefly describe the course as the context in which cell phone technology is being integrated. Pemberton, Winter, and Fallahkhair (2010) limit their intervention by only using the Android mobile platform (p. 146). Oliver and Goerke (2008) report on their students' adoption of handheld devices, but provide no information about whether or not handheld technology was responsible for any learning gains. Motiwalla (2007) advances that the benefit of mobile technology is that learners can access and upload information from any location with access to the internet. But this is also true for a well organised learner without technology who can open a textbook at an airport, write down some notes, and mail them to the teacher for review. Although the process would take a long time, it is still the same process.

While Motiwalla reports on students' satisfaction with having convenient access to information on the internet, no information concerning learning strategies with mobile technology is presented. Motiwalla does not report on the pedagogy applied for designing online content or any information about content preparation. Teachers interested in using mobile technology as a learning tool will need to understand the strategies for delivering content online that addresses particular learning needs. Accessing information is one thing, critically evaluating and understanding the content of the information is another. The latter requires further investigation in e-teaching and e-learning. Motiwalla does refer to Ellis' 2003 research to offer some suggestions for further research (as cited in Motiwalla, 2007), but such advice would have been better implemented in the design of the research to give practical teaching strategies for mobile integration. Framing their research with the digital narrative paradigm, McGreen and Sanchez (2005) aim to explore the creative effect that mobile technology and video production affords students. Organised as an extracurricular activity, the project was conducted over seven weeks and promoted group work. While the authors take care to explain creativity and digital narratives, they do not address students' learning gains and their perceptions of the benefits of completing such a task.

Ideally, in the behaviourist teaching practice, learners are presented with a particular stimulus which requires a response (Naismith et al., 2004). Research conducted by Stockwell (2007) falls within this teaching paradigm. Stockwell (2007, 2008, 2010) gives an overview of the types of technology used to enhance vocabulary acquisition and explains why some may not be as efficient as they could be. Stockwell provides a clear justification for the source of the vocabulary items selected for the project before explaining the structure of the task. Students complete the work in class and they have access to supplementary video resources as part of the course structure. The task is fairly simple. Students must learn the vocabulary successfully before moving on to more challenging vocabulary items. One activity is a translation task and the other four require some form of vocabulary comprehension in order to demonstrate the ability to use the word in a sentence. Stockwell positions the research within CALL theory, but does not seem to apply a particular teaching method, supply an explanation for the theory of vocabulary acquisition and best strategies for increasing acquisition, or "investigate learner development with the vocabulary" (p. 100). The outcome of Stockwell's research is that students preferred to learn with computers rather than on their cell phones, basically because the screen was too small. He concludes that mobile technology is not designed for educational purposes.

Further research has cast doubt on Stockwell's conclusions. The literature on mobile technology in the classroom has produced positive results that challenge Stockwell's conclusion. Not only do Churchill and Churchill (2008) explain that teachers need to understand the "educational affordances of this

technology" before the integration process (p. 1440), but Jonassen highlights that some researchers ignore individual learner characteristics (as cited in Chapelle, 2001, p. 30). The goals of e-learning research, according to Hoadley (2007), are "producing theories that explain phenomena with e-learning, producing tools or software … producing activities, materials, curricula, and other non-technical elements … that may be reused, … producing design models that permit construction of improved e-learning interventions" (p. 140). While the LMS meets some of Hoadley's suggested goals, Stockwell does not delve deeper into his students' prior knowledge and educational background experiences, to place students' learning outcomes at the centre of his research and to assess if learners retained any of the vocabulary they were exposed to. Chapelle (2001) warns against such practices, preferring instead that e-learning be set within a pedagogical framework.

This confirms Attewell and Savill-Smith's (2004) observation that "[a]lthough many experts in the field see great potential for the use of mobile devices in e-learning, there are presently very few successful implementations on which to base a study of best practice" (p. 16). What remains to be reviewed is literature that demonstrates best teaching practices with mobile learning.

Examples of syllabus design consideration

Another research intervention based on behaviourism was conducted by Thornton and Houser (2005). These authors first explain the concept of learning a foreign language and acquiring lexical items. They provide readers with the process for retaining vocabulary. Then Thornton and Houser explain the strategies for delivering content to students on their mobile phones, taking into consideration the time frame for exposing students to new words. They report that similar research had been conducted without technology. Therefore, the objective was not only to assess if students would enjoy learning with the technology, but also to assess whether it would be possible to transfer a previous pen and paper activity to a cell phone-only learning approach. They conducted a pre- and post-intervention to assess vocabulary gain. The outcome was that students in general were able to learn and retain vocabulary items.

Lu (2008) refers to Thornton and Houser's (2005) research to test the credibility of their findings and to assess if Taiwanese students would perform with similar success. Lu points out some discrepancies in Thornton and Houser's findings. First, there is a need for a "correlation analysis between students' gains and their frequency of reading"; and second, the authors "did not describe how their participants used their mobile phones to learn vocabulary" (p. 517). These are issues that Lu attempts to address in her research. First, the findings indicate that there is a correlation between reading frequency and vocabulary gain. Second, Lu provides evidence comparing enthusiastic and slow learners to substantiate the claim that most learners benefited from the activity. Basing the findings within a comparative between a paper-based study and a cell phone-based study, Lu is able to argue that regularly delivered selected vocabulary items can be more beneficial than the "traditional manner [which] fails to arouse their interest to study" (p. 523). From Lu's findings, teachers and researchers alike can safely conclude that regular exposure to selected vocabulary items on cell phones can assist teachers and benefit students. It becomes possible for teachers to understand the process for integrating cell phone technology in their classroom with the aim of improving learning outcomes.

Given the exploratory nature of their research, both Thornton and Houser, as well as Lu, fall short of positioning cell phone-based learning within a language syllabus, but the ramifications of their findings and reasoning provides reassurance that, if used effectively, cell phones can be a suitable learning tool.

Conducting research to understand the potential of cell phone technology to develop students' environmental awareness, Uzunboylu et al. (2009) adhered to a socio-constructivist theory. The theoretical framework is the pedagogy that governs the method of instruction and the social networking environment set up for the learners. These authors constructed a collaborative environment where students shared photos of environmental blights on a researcher-managed website. Indeed it must be highlighted that Uzunboylu et al.'s research was able to place learning in the real world and employed mobile technology to bring students' data collection in situ back to the virtual classroom for further review. Using their cell phones, students could visit the website to post and review comments (p. 4). Although the participants were volunteers from different departments, the authors designed a six-week learning syllabus to motivate students to investigate environmental issues within their surroundings. After the intervention, the authors reported that "students realized the potential use of mobile technologies for learning any subject" (p. 5), something not discussed in previous literature. Howard (2002) discusses the issue of transfer of knowledge as something that can occur automatically given the right exposure, and is something that all teachers hope their students will be able to achieve since it is the purpose of learning (Bransford, 2000). Haskell (2001) defines this realisation as the transfer of learning, which is "to apply what we learn in different contexts, and to recognize and extend that learning to completely new situations" (p. 3).

In summary, cell phone technology can be a useful learning tool, but further investigation is required. Most of the literature reports on the feasibility of using cell phones to enhance vocabulary acquisition. It was discovered that regular exposure to vocabulary items led to acquisition but not necessarily retention (Lu, 2008). It was also revealed that, given the right environment, students will not only see the benefits of learning with a cell phone (Lu, 2008; Stockwell, 2007; Thornton & Houser, 2005) but that they could see other situations for using their cell phones in a similar manner (Uzunboylu et al. 2009).

Therefore, one of the objectives of this research is to assess whether or not students can acquire and retain vocabulary by completing a regular speaking activity, and if they will foresee the possibility of applying their new cell phone skills in their other studies. What remains to be understood is cell phone integration in a syllabus design and a communicative teaching environment. The literature on these aspects is reviewed next.

Review of the Literature on Learning and Teaching Methodology

For teachers to understand which learning environments work, they need to "know the principles of learning" (Ally, 2008, p. 18). Naismith et al. (2004) concur by stating that teachers who want to invest their time and energy in developing e-learning activities will first need to understand the concept of learner-centred learning. These authors outline six teaching approaches: behaviourist, constructivist, situated, collaborative, informal and lifelong, and learning and teaching support (p. 2). Patten,

Sanchez, and Tangney (2006) categorise mobile learning in terms of collaborative, location aware, data collection, microworld, interactive, referential and administrative (p. 296). The objective for both Naismith et al. and Patten et al. is to construct a pedagogical model that promotes a simple approach towards authentic learning development. There is an agreement amongst researchers that constructivist, constructionist and situated learning theories are most compatible with mobile learning (Herrington & Oliver, 2000; Patten et al., 2006; Peters, 2005).

It has been argued that not all technology-assisted learning promotes a situated learning approach. For example, some "courseware becomes the learning environment" (Hummel, 1993, p. 15) and removes the activity from a real-life situation. Instead, the strategy is to use the technology as a reflection of real-life activities. For example, instead of students reading a book in a library, a situated learning activity might engage students to visit an online library to retrieve a book and take notes on a particular topic or issue. Another issue is that some activities do not reflect authentic situations. For example, processing vocabulary via text messaging might not reflect an authentic or real world approach to language learning. A different approach might be to engage students to take photos of words they encounter while reading. In real life, students do take pictures of information that is of importance to them, such as bus schedules. From these types of photos, they retrieve the needed data to reflect on available options for travelling.

Because the technology is personal, it allows its owner opportunities to access information in situ, to collaborate with others, and to determine the benefits that the information provides. The constant repetition of using the technology in different ways gives the user the opportunity to develop strategies for developing informal and lifelong learning skills that can be transferred to future activities. In this way, learning occurs over time. It is acquired informally and specifically for the needs of the learner (Naismith et al., 2004).

Based on their evaluation of teaching methodologies that support technology integration, Patten et al. (2006) conclude that data collection, location awareness, and collaborative activities "make appropriate use of the technology and sound educational underpinning" (p. 307). However, based on the evidence they provide, it could be argued that the location aware activity places the learner in the position of consumer rather than producer of content. What can be concluded from Patten et al.'s framework is that the evidence they provide is based on the literature that is available. The majority of the literature reports on projects using simulated environments.

Based on the definitions Patten et al. provided, it would appear that "microworld" (p. 301), "reflective data collection" (p. 302), and "multimedia" (p. 303) make a better combination for a teaching approach. Collaboration remains in the framework since it is part constructivist, constructionist, and situated learning.

"Microworld" refers to the operation of technology and manipulation of software to explore and create new digital media that can be shared. "Reflective data collection" requires learners to access, store, and reflect on the data they have gathered. By sharing the information and discussing its content, learners collaborate to deduce meaning and develop new knowledge. "Multimedia" shares similar objectives with "microworld" and both reflect a constructionist framework. Multimedia approaches involve learners using hardware, software, and online resources to construct new ideas that assist in expressing their opinion. The process of creation necessitates collaboration and the final product can be shared.

Other authors that have proposed a framework for integrating technology in the learning environment include Herrington and Oliver (2000). They suggest situated learning, a model based on constructivist theory, as a suitable alternative. The main features of situated learning are "apprenticeship, collaboration, coaching, multiple practice and articulation" (Herrington & Oliver, 2000, p. 1). These five features share two common elements; authentic learning (Herrington & Oliver, 2000) and problem solving (Naismith et al., 2004).

After reviewing both Patten et al.'s (2006) and Herrington and Oliver's (2000) framework, it is possible to merge them in an attempt to configure a pedagogical framework that guides and supports the use of the cell phone video recording feature as a learning tool, as well as outlines the activities that learners will complete.

Table 1

Conceptual Map of Situated Learning Frameworks and Pedagogical Underpinning for Integrating the Cell Phone Video as a Learning Tool (Adapted from Herrington & Oliver, 2000)

Situated Learning	**Definition**	**Student activity**	**Pedagogical underpinning**
Authentic context	Real life, exploration, natural complexity	Explore and use cell phone video recording feature	Multimedia
Authentic activities	Determine problem and find solution	Use technology to improve speaking skills	Multimedia
Expert performance	Teacher demonstration in class, students modelling via cell phone videos	From video performances teacher collects similar speaking challenges and addresses them in class	Collaborative
Multiple roles and perspectives	Close examination of appropriate performances	Learners observe teacher in class, as well as view peers' video performances, and view authentic videos via YouTube	Reflective data collection
Collaborative construction of knowledge	Predict, hypothesize, suggest solutions	Transcribe one peer video per week View and discuss with peers best speaking strategies Able to find solutions to improve their video performance	Collaborative
Coaching and scaffolding	Teacher provides support and guidance	Teacher views video and provides email	Collaborative

	– engage critical reflection	suggestions for improving performance	
Reflection	Reflect on broader base of knowledge to solve problem	Learners can view peers' videos as well as teacher email feedback to reflect on strategies to improve speaking skills	Collaborative Reflective data collection
Articulation	Tell the story of practice	In class discussion about best speaking strategies	Microworld Multimedia
Integrated assessment of learning	Assessment is integrated as part of learning	Video performances are evaluated weekly and reviewed to understand progress	Multimedia, Self-Reflective Analysis

The conceptual map in Table 1 reveals that effective learning is learner-centred, engaging, and set within a context that can lead to the transfer of knowledge. That is, the students will gain expertise with using the video recording feature to discuss issues of interest to them, and it may be possible to use this skill in their future studies or work environments.

While the conceptual framework gives an overview of the integration of technology, what remains to be understood is the process for integrating the video recording feature as a learning tool to develop speaking ability.

Language learning

The objective of this section is not to provide a full review of the literature about language learning and the Communicative Language Teaching (CLT) approach (which follows), but rather to introduce the basic ideas and components of language learning as they would apply in an EFL classroom in Japan. Further on, the section describes the language syllabus and will expand on language learning and more specifically CLT practices to demonstrate the structure of the overall project as it is embedded in the academic syllabus.

The literature reviewed has supported the assumption that mobile-based learning supports learner-centred learning. Since the technology is portable, personal, usable anywhere, and available at any time, learners are able to access knowledge sources at their convenience. The review also highlighted certain educational aspects such as collaboration, articulation, reflection, authenticity, demonstration, and assessment. These, Brown (2001) asserts, are classroom techniques that teachers utilise to engage students in learning. While these techniques can be utilised in any learning environment, the approaches and methods to implement these can be defined by the teaching rationale for employing certain strategies over others. Certain teaching approaches and methods are based on accepted

teaching practices as they evolved through the history of education.

Tracing the history of language learning from the grammatical to the audiolingual methods, Brown's (2001) recounting of teaching development ends with the Communicative Language Teaching (CLT) approach (p. 42). CLT's ultimate goal is for students to use the language in a spontaneous, authentic manner that reflects outside class time real, verbal interaction. The role of the teacher is to provide learners with the opportunities to develop the skills necessary to consolidate their prior knowledge to the extent that communicative exchanges are no longer prompted and guided.

Brown points out that one fundamental difference between CLT and other teaching methodologies is the covert presentation of forms placing more emphasis on the negotiation of meaning in order to build fluency. It becomes apparent from reading the literature on language teaching that pedagogy is not fixed but is influenced by the conviction of the teacher's beliefs, objectives, experiences, and training. There is no way for the teacher to know the language forms and structures that the students will use, but as a facilitator, the role of the teacher is to engage students in the struggle of communicating their opinions. Therefore, it is possible to merge elements of various pedagogies into an overall teaching structure (Brown, 2001; Nunan, 1999; Richards & Rodgers, 2001).

The review of the literature revealed that in Japan, technology-assisted language learning is primarily concerned with communicative performance and mastery over grammatical forms. E-learning research emerging from Japan focuses on creating and integrating computer-based learning activities that endorse grammar, vocabulary, and form drilling, rather than communicative competences (Gromik, 2009b).

Brown (2001) summarises the communicative approach as learner-centred, with collaborative and interactive learning, and content and task-based instruction. The whole approach is embedded in "whole language education," a term that encompasses all of the above characteristics (p. 46). Savignon (2005) adds that in essence, students "develop their communicative competence" (p. 635).

Language learning strategies.

A review of the literature indicates that little evidence is presented regarding the effect of language learning strategies on cell phone-based learning. For instance, Thornton and Houser (2005) comment that "retention of a new word or concept depends on the quality and frequency of the information processing activity." (p.218). Further on, they explain that some studies have addressed the issue of "spacing effect" and "elaborative rehearsal" (p.221), but these are teaching strategies that can be used to increase vocabulary exposure, not learning strategies that students apply. Stockwell (2010) also does not report on students' language learning strategies. Instead the objective of his research is "not to investigate learner development with the vocabulary but rather to identify how learners used their mobile phones for language learning when they had alternative methods…" (p.100).

It appears that the literature on mobile-based learning is general in its interpretation of learning strategies. Clough, Jones, McAndrew, and Scanlon (2007), for example, extend on Patten's (2006) analysis of the various opportunities that mobile use affords subscribers. Firstly, they identify certain learning areas such as "referential, location aware, reflective,

data collection, constructive, administrative" (p. 364) as broad mobile-based learning affordances. They then extend on these categories by providing certain activities that would be classified under these main learning areas. For example, a type of reflective activity could engage an individual to review text notes, while an administrative activity could engage an individual to store passwords. These categories and activities could be labeled more as tasks that cell phone technology affords rather than learning strategies per se. Jeng, Wu, Huang, Tan, & Yang (2010) explain that "collaborative and cooperative learning" are perceived as the first strategies that mobile users engage in (p. 6), but they fail to go beyond this observation.

Attempting to identify cell phone affordances, Prensky (2005) explains that amongst the learning strategies used by cell phone subscribers, "listening, observing, imitating, questioning, reflecting, trying, estimating, predicting, speculating and practicing" are the most important (p. 2). The list that Prensky offers targets tasks and activities students can complete with a cell phone and is dependent on the type of cell phone that students have access to. For example, students can receive SMS messages with data that they need to process, but not all students' cell phones may have access to the internet to speculate on a given data set.

By contrast, Rubin (2005) suggests learning strategies as "Learner Self-Management" (p. 37). It is through the task that students are able to utilise certain skills such as planning, monitoring, evaluating, implementing, and problem solving (p. 38). However, Anderson (2005) warns that there are no specific good or bad learning strategies. Instead it is the learner's application of a strategy that can be either effective or inefficient. Thus, learning strategies can be a range of activities that learners use as processes to help complete a task (Anderson, 2005; Rubin, 2005). Woodrow (2005) stipulates that language learning strategies are sample-specific, as not all learners are the same or have the same socio- economic or educational background, amongst other variables (cited in Griffith, 2013). While not all learners would be aware of the wide range of learning strategies available to them, there is also no guarantee that they would be using the strategies known to them to complete certain tasks.
In an attempt to define learning strategies, Griffith (2013) presents a long list of possible strategies learners use. The more general skills include "guessing, communicating, managing inhibitions, attending to form, practicing, monitoring one's own and the speech of others, attending to meaning, experimenting, planning, developing the new language into an ordered system, revising progressively, searching for meaning, using the language in real communication, self-monitoring, developing the target language into a separate reference system, learning to think in the target language" (p. 5). Griffith proceeds to identify other types of strategies such as "coping with ambiguity" (p.6), "revising regularly, controlling schedules so that English study is done, studying English grammar, consciously learning new vocabulary" (p. 7), and "using cognates, repeating new language to oneself, to activate memory, using a dictionary, recording new language in a notebook, using new language in order to practice it" (p. 14). Griffith explains that this is only a partial list. Indeed a language learning strategies list could be endless.

A review of the language learning strategies literature conducted by Anderson (2005) suggests that learning strategies can be categorised into 7 groups; "cognitive strategies, metacognitive strategies, mnemonic or memory-related strategies, compensatory strategies, affective strategies, social strategies and self-motivating strategies" (p.760). In relation to

specific language tasks possible as speaking strategies, Anderson includes "planning to use specific vocabulary and grammatical structures, thinking in two languages, using a variety of different strategies in searching for language forms and paying much attention to grammar or to pronunciation" (p.764). It seems obvious that during the planning stage of a speech, a learner may apply some writing and reading strategies to collect and organise their opinions in a cohesive manner. The extent to which a learner will spend more attention on form or pronunciation may be influenced by their own perception of their speaking abilities. Some students may dedicate more time to speaking clearly while others may choose to produce a grammatically flawless speech.

Considering the extensive research conducted on the issue of language learning strategies, this area may be beyond the scope of this research. In addition, focusing on language strategies may distract the focus of this research which is primarily similar to Stockwell's (2010) goal. The main aim of this research is not to investigate learner use of language learning skills, but rather to observe and identify how learners use the cell phone recording feature to speak in the target language. Nonetheless, evidence of students' use of language learning strategies will be collected to ascertain the effect of these strategies. Also, as Wenden (1991) explains, providing students with a range of language learning strategies may assist them in reflecting on the production processes they utilise to complete the task (see also Rubin, 1987). In addition, in terms of teaching language learning strategies, Oxford (1989) suggests that regular strategy practice will reinforce and consolidate students' awareness of these strategies and eventually become automatic. By providing students with a brief list of learning strategies, they may take away the focus on teacher guidance and increase independent or collaborative learning.

Communicative language teaching

The CLT approach emerged in the 1970s amidst the dissatisfaction with audiolingualism and situational language teaching (Bannink, 2002; Richards & Rodgers, 2001; Spada, 2007). Hatch argued that learners did not need to focus on form. Instead, classes should "do conversation" to acquire cognisance of the target language (as cited in Spada, 2007, p. 275). Following Hatch's suggestion, the author argues that based on the educational background of Japanese students (they have six years of prior English exposure before starting university), they have sufficient target language awareness to be entrusted with the opportunity to communicate their opinions spontaneously. Wada concurs in his description of the objectives of MEXT, the Japanese Ministry of Education, Culture, Sports, Science and Technology (as cited in Savignon, 2005). Wada points out that MEXT realised that for learners to cooperate actively in the global economy, they would need to become competent communicators. MEXT "urged Japanese teachers to place much more emphasis on the development of communicative competence in English" (in Savignon, 2005, p. 646). To achieve this goal, Savignon (2005) explains that MEXT shifted from the structured grammatical approach towards a more communicative approach.

According to Nunan (1988) and Savignon (2005), CLT requires a combination of approaches rather than a single method to be effective. Whereas a behaviourist approach centres on providing the lexical items to be learned, CLT lets the learner demonstrate mastery over prior knowledge. It is the role of the learner to determine the content to be discussed and the strategy for using appropriate vocabulary. While some methodologies tend to focus on form and reinforce grammatical knowledge, the CLT

approach is student-centred in the sense that the student negotiates meaning in order to notice the language to be acquired and the forms needed to improve comprehension. Therefore, the use of language is more genuine and reflective of an authentic conversation, during which a speaker is bound to make some errors that can be addressed through negotiation in order to achieve meaning (Chen, 2006; Nunan, 1988; Spada, 2007).

Savignon (2005) explains that the use of clarification and verbal interaction encourages speakers to use skills and strategies in order to be understood. Richards and Rodgers (2001) emphasise that effective communication and meaning is most important, whereby communicative competence is "the desired goal" (p. 156). Chen (2006) adds that without sufficient language input, practice, and use, this desired goal will not be achieved. Davies and Pearse (2000) summarise the purpose of CLT as enabling the "learners to communicate effectively in English outside the classroom for study, work or leisure" (p. 71).

Addressing the misconceptions regarding CLT, Savignon (2005) and Spada (2007) point out that CLT does not exclude exposure to form. While the focus is on communication, the role of the teacher is to negotiate form awareness during performance. Feedback on form and production is welcome since it is through practice and use that the learner is able to improve. CLT teachers are most likely to use feedback to correct student language output through recasting to demonstrate the accurate structure. Through repetition and student awareness, they will be able to understand, remember, and use the correct forms in future conversations. This type of teaching is learner-centred as it is through practice that the learner can understand and recognise his or her abilities and progress. In addition, learner-centred activities stipulate that pair or group work increases the chances for students to negotiate meaning through authentic discussions.

CLT includes all four macro-skills. While the emphasis is on communication, CLT literature acknowledges the benefits of giving students opportunities to read out loud, as well as reading activities to reinforce form awareness. Writing is another form of communication which allows learners to explore self expression, negotiate meaning through collaboration, and develop an awareness of language structure. Finally, Spada explains that CLT does not exclude the use of first language (L1) in the classroom. Rather, the aim is to increase exposure to the authentic use of the target language in order to maximise listening comprehension and form awareness. Hence, the purpose of CLT is to render learners competent communicators, able to understand how to deliver appropriate information specific to a given context and particular audience (Larsen-Freeman, 2002; Roblyer, 2004).

Providing details about the benefits of language input and output, Savignon emphasises that adult learners' "communicative competence as measured in terms of fluency, comprehensibility, effort and amount of communication in unrehearsed communicative tasks significantly surpasses that of learners who had had no such practice" (p. 636). To achieve this significant improvement, Richards and Rodgers (2001) point out that there are two versions of CLT.

> The weak version which has become more or less standard practice in the last ten years, stresses the importance of providing learners with opportunities to use their English for communicative purposes and, characteristically, attempts to integrate such activities into a wider program of language teaching. … the 'strong' version of communicative teaching, on

> the other hand, advances the claim that language is acquired through communication, so that it is not merely a question of activating an existing but inert knowledge of the language, but of stimulating the development of the language system itself. If the former could be described as 'learning to use' English, the latter entails 'using English to learn it' (Howatt, as cited in Richards & Rodgers, 2001, p. 155).

To teach learners how to use the target language in order to learn it, Fotos and Brown (2004) suggest the following options: provide students with opportunities to demonstrate an ability to deliver meaningful utterances as part of dialogues; use real-life content, context, and experiences accessible to the learners; and provide a risk-free environment where learners can work independently, in pairs, or in groups. Research indicated that task-based learning and activities such as in-class and videotaped presentations, poetry or theatrical performances, and other similar projects that encourage learners to speak, give a better qualitative evaluation of learner achievement (Savignon, 2005). The indirect approach gives the student free reign over oral communication, Brown (2001) explains.

The direct approach, however, requires programming lessons around specific skills and strategies. The aim, Brown emphasises, is not to teach but to make learners aware of the various speaking skills (p. 276). Richards and Rodgers (2001) add that reading and writing activities can be integrated in CLT in order to stimulate language competence, and that drill practices are acceptable as long as these are complementary activities (see also Spada, 2007). For Richards and Rodgers the struggle to communicate is more conducive to language learning, because of the learners' desire to express their opinion.

While the above explanation offers an overview of the types of activities that adherents to a CLT approach might select to use, Richards and Rodgers (2001) point out that, as a learning theory, CLT is not fully developed. Nonetheless, the premise of CLT highlights the following three learning theory elements:

1. Activities that involve real communication promote learning
2. Activities in which language is used for carrying out meaningful tasks promote learning
3. Language that is meaningful to the learner supports the learning process (Richards & Rodgers, 2001, p. 161).

In addition, Brown (2001) suggests that teachers provide students:

1. a focus on form mixed with a focus on interaction and meaning
2. design activities that appeal to students' goals and interests
3. stimuli to produce authentic language
4. feedback that is within the reach of the students and that scaffolds their abilities
5. merged listening and speaking activities to reinforce comprehension and interaction
6. opportunities for students to initiate conversation
7. speaking strategies

The CLT approach places the learner at the centre of the communicative activity. While CLT does not direct the learner, teachers of communication can target a few elements that are fundamental to students attempting to be understood.

In the process of learning to communicate, learners need to understand that sentences are uttered not word after word, but clustered as ideas and concepts. Through the process of expressing their opinion, learners can use strategies to make their opinions clearer, such as self-correction and rephrasing sentences. Other important aspects to make their message understood are the use of pauses, stress, pronunciation, intonation, and speed to facilitate content delivery. These are all skills that learners need to develop to become more capable. For advanced adult learners, Brown (2001) suggests the use of extensive monologues that can be either prepared or spontaneous.

In summary, this overview of CLT was not exhaustive and this thesis will refer back to the CLT approach during the description of the research project. What emerges from this review is that CLT is a learner-centred approach that is unstructured in style but places a strong emphasis on interactional information sharing. The role of the syllabus and the teacher is determined by the abilities and needs of the learners, and authentic activities and materials are introduced in the learning environment to respond to the needs and stimulate active language use to learn the language.

CALL places the learner at the centre of the authentic activity. While this section reviewed the literature on CLT, the next section attempts to position this language teaching approach within a CALL framework.

TIP 4 communicative language teaching.

The problem, as Chen (2006) describes it, is that EFL learners (unlike English as Second Language (ESL) learners) do not have the opportunity to use the language during non-contact class time. Therefore, they have limited opportunities to apply what they have learned in class. Chen reports on the benefits of using computer mediated communication (CMC) as an approach to increase authentic communicative exchanges. While CMC is primarily concerned with online text interaction, this research suggests that the video recording feature of mobile devices can increase oral output production. Such an approach would provide EFL learners with increased opportunities to speak outside of class time. In order to support this opinion, this section reviews the literature on computer based education within a CLT framework.

Many learners are conversant in Web 2.0, an environment where computers and online software are utilised to create and transform digital media through the collective intelligence (Mason & Rennie, 2008; O'Reilly, 2005). Web 2.0 supplies learners with access to all the tools and information necessary to construct new knowledge at the click of a button (Friedman, 2005). This reality guides many educators to review new approaches to harness learners' online practices to develop new educational uses (Mason & Rennie, 2008). This section reviews the Technology Integration Planning (TIP) model (Roblyer, 2004) and some of the CALL literature in an attempt to integrate TIP as part of the CLT model.

Technology Integration Planning (adapted from Roblyer, 2004)

Determine relative advantage

1. Compatibility with methodologies
2. Culture, beliefs
3. Complexity within reach of students' capabilities
4. Trialability
5. Observability

Decide on objectives and assessment

1. Performance evaluation process
2. Criterion to evaluate quality of product
3. Rubrics describe the quality of the performance in relation to objectives to be met

Design integration strategies

1. Instructional approach, teaching method
2. Curriculum approach – content or skills
3. Grouping or individual tasks
4. Sequence and steps for integrating technology

Prepare the instructional environment

1. Essential conditions
2. In-class activities
3. Outside class activities
4. Time frame of activities

Evaluate and revise integration strategies

1. Needs analysis
2. Data collection of performance and students' attitude
3. Observations
4. Data analysis to evaluate success of integration

CALL offers many advantages; however, as the literature indicates, the efforts of both teachers and learners may not warrant the time and energy spent on completing the task. Roblyer (2004) recommends that instead of focusing on technology use, teachers should focus on the learning outcome and the educational benefits of learning with technology. In determining the relative advantages, educators should not only evaluate the benefits of learning with technology as opposed to other possible learning approaches, but they must also evaluate the complexity of integration. In relation to Web 2.0 learning, integrating production with technology use and internet publishing may be out of reach for some learners. Finding a blend of learning that can scaffold learners' abilities to complete a task is necessary. Research is vital to determine if any success of integration is possible and teachers should ensure that technology is not integrated at the detriment of learning.

Hence, Roblyer (2004) recommends that teachers evaluate the learning objectives and the types of assessments that are compatible with the types of technology-centred activities. The main purpose of technology integration is to improve students' skills, but it's also to introduce new learning strategies that can intensify learning achievements. Teachers need to develop the right assessment instruments to capture students' improvements in terms of strategy and skill maturity. It is important to highlight Roblyer's emphasis that assessment must match the activity. In terms of cell phone video recording activities, it is necessary for the teacher to collect regular performances and a final assessment piece in order to monitor students' progress.

When exposing students to Web 2.0 based learning, teachers need to be aware that the process of production is only one aspect of the results. Designing a course that clearly evaluates process and

results is vital to present students with an enjoyable experience.

During the design process, teachers should develop authentic activities from which students can transfer the knowledge and skills to other lifelong learning applications. Roblyer (2004) recommends a balance between activities that address both prior knowledge and students' limited experiences in order to structure activities that enhance skills and content acquisition. Roblyer adds that a mix of specific interdisciplinary content enables tasks to become more motivating and meaningful to students as the explorations conducted in the class are extended by outside class activities (p. E-20).

When designing the class syllabus and lessons, teachers need to take into consideration access to all the hardware, software, and media necessary to complete the task (Chapelle, 2001; Roblyer, 2004). A needs analysis will allow teachers to consider approaches for helping students with limited access. Teachers will also need to provide demonstrations and training in how to successfully complete a task. The handouts and resources must include a timeline and clearly outline the necessary steps and procedures to enable all students to participate in the completion of the task.

Part of the needs analysis should affirm that the needs of the students will be met through the course, in its objectives and tasks. Documenting the progress of the course is the usual recourse for teachers to identify if the course is achieving its anticipated aims. Observing students' participation during class and collecting evidence of work completed outside class gives the teachers a better perception of the benefits and challenges of integrating technology in the classroom. In addition, assessing students' attitudes and perceptions of their overall achievements facilitates course evaluation.

From a CALL perspective, Chapelle (2001) points out that appropriate tasks are dependent on the opportunities of language learning through language interaction. Important factors include the amount of interaction with peers and engagement with the task, the opportunity to direct attention to meaning and forms, and authentic activities that reflect the use of computer technology as if in a real work environment and as if in a real communicative interaction. Of course, the overall purpose is to have a positive impact on the learner and ensure that the resources utilised are effective and do not place too much demand on teacher preparation (p. 55).

In addition, Chapelle (2001) outlines some conditions that can influence language learning performance. Interruption during communication can facilitate negotiation of meaning and focus on form. This may lead to reflection or acquisition, allowing learners to consider a potential new linguistic element. Once learners recognise the value of a linguistic form, they can self-correct their errors and with more practice, they can aim for accuracy. Chapelle defines time pressure as a motivating factor. The ability to spend more time evaluating meaning and form can increase acquisition of particular grammatical structures. While writing activities are more conducive to providing control over form, speaking demands more fluency on the part of the learner and performance may be affected. Learners need support to acquire language, and teachers and peers are a good source of information to assist in the construction of meaning and the successful completion of tasks. Challenging learners with unexpected tasks or teaching strategies might invigorate reflection and focus on form or meaning. Obviously learners have a vested interest in the learning process. Sharing the control over classroom procedures and activities promotes greater autonomy and participation in the learning outcomes. Increasing the stakes for accuracy and fluency motivates learners to pay more attention to form (Chapelle, 2001).

Reflecting on the cell phone literature and in particular, the focus on vocabulary acquisition, it would

seem that some researchers did not follow Chapelle's conditions for increasing language learning performance. For example, vocabulary activities used by Thornton and Houser (2005), Lu (2008) and Stockwell (2007, 2008, 2010) did not modify interaction if students simply received vocabulary on a regular basis. The activity had the potential to become boring, thus reducing students' motivation. Chapelle (2001) concludes that "if no goal for the communication is specified learners have no need to push their linguistic resources or to negotiate meaning" (p. 78). Stockwell (2010) does not report on linguistic performance. Therefore little is known about students' self-correction and the process they utilised for correcting themselves. A question that arises is: How did the cell phone engage students to correct their performances?

The activities did not put time pressure on the students. While Thornton and Houser (2005) and Lu (2008) tested vocabulary acquisition, Stockwell (2010) engaged the learners to use words in sentences. Because there is no evidence of learning, there are no parameters to gauge the cell phone features' benefits. The LMS with Stockwell (2010) was structured as a tutor that allowed learners to consider new vocabulary only if they had mastered the previous vocabulary. Hence, the role of the teacher was that of a facilitator. Another question that arises is: Why develop such a complicated system when it is possible for learners to access the internet and learning software for free? Why not test current online resources that might be more interactive, better designed, and provide a wider range of data analysis? For example, it is now possible to access vocabulary game apps for table PC technology.

Defining the term of authenticity, Chapelle (2001) explains that "performance in CALL tasks corresponds to what one would expect to see outside the CALL … classroom" (p. 88). Based on the literature evidence, Japanese students had little vested interest in the outcome of the course and the learning process. The acquisition of vocabulary for the sake of vocabulary exposure does not promote communication, whether it is spoken or written. Returning to the previously established concern about language education in Japan, it would seem that MALL researchers are continuing along the path of CALL as a drill type method, at the detriment of exploring the full capabilities that mobile technology affords learners to produce content in the target language.

Conclusion

CALL is an area of research that emerged during the conception of computer technology in the 1960s (Chapelle, 2001). CALL researchers have given a lot of attention to learning activities that maximise the use of computers at the detriment of other language skills and learning strategies. This preferred practice still persists today. Activities were (and still are) heavily text based and, more recently, heavily video comprehension oriented. According to Chapelle, this preference is due to the fact that text-based tasks are easily analysed with computer software and can now be fully computer processed without the teacher doing anything. In the case of Stockwell's (2007, 2008, 2010) research, computer technology can be used to deliver vocabulary to students' devices, the students then respond to the prompts, and the computer assesses the responses and tabulates them in terms of interpretable data.

In terms of video centred activities, researchers are now investigating the use of video to collect speech performance data. For example, Levy and Kennedy (2005) videotaped learners speaking

Italian. Applying stimulated recall, learners had to explain the reasons for using certain linguistic forms during their speaking performances. Such an approach still emphasises language recall and focus on form rather than allowing learners to speak spontaneously.

Designing lessons to engage learners in spontaneous communication is a challenging area for researchers. Voice recognition software is still in the design phase. Speech analysing software available, such as Praat (Boersma & Weenink, 2010), can only deal with direct voice input. Praat does not yet accept audio resources for interpretation, for example.

Evaluating speaking output is too complex for computer software. Not only is there a challenge of assessing fluency and vocabulary items, but there is also a difficulty with pronunciation issues. Levy and Stockwell (2006) report that organising the technology to deliver real, authentic speaking experiences is a work in progress. Nonetheless, Levy and Stockwell describe the use of computer-based speaking activities as mostly concerned with delivering training pronunciation learning packages. As they report "where [automated speech recognition (ASR)] systems will generally refer to input to a language parser for processing, pronunciation software will generally seek discrete points of pronunciation within the input for the purpose of correcting it" (p. 213).

Levy and Stockwell's (2006) view of the future of speech recognition software confirms this author's opinion that not only computers and software may discourage learners to develop their speaking skills, but that spontaneous speaking skills may not be of concern to researchers.

Therefore, it is the aim of this PhD research project to offer a rigorous research investigation in the area of speaking development through the use of the cell phone video recording feature. Japanese EFL learners will use the video recording feature on their cell phones to produce short weekly videos of themselves speaking spontaneously in the target language (English). The videos will be used as evidence to confirm that students benefit from verbally performing in their videos. While the aim is not to place emphasis on students' verbal output, the data analysis will report on students' abilities to produce comprehensible audiovisual resources.

Chapter 3: Methodology

Historical Perspective

Case study research was established as a method by Thomas and Park from the University of Chicago in the 1900s (Dooley, 2002). More recently, the most frequently cited experts on case study research are Stake and Yin. Stake (1995) explains that case study research is about selecting a focus of investigation, while Yin (2003) prefers to describe case study as a comprehensive research strategy as well as a methodology. Both authors approach case study research from a constructivist framework (Baxter & Jack, 2008). After reading Vygotsky's work, Piaget (1950) was a proponent of the constructivist theory, which asserts that knowledge is dependent on personal experiences. This epistemological influence complements case study research since the participants' experiences provide a view of their situation and in the process assist the researcher in gaining an understanding of their decision-making process and actions (Baxter & Jack, 2008).

While the underlying purpose is similar, both Stake and Yin provide different types of case study design. Stake (1995) classifies case studies as intrinsic, instrumental, or collective. Yin (2003) also provides three case study categories: exploratory, explanatory, and descriptive, and he describes the possibility of conducting single, multiple, or holistic case studies. Of these two authors, Yin advances a more structured method for theory development. His work is also used as a point of reference to define case study research (see Dooley, 2002, for example).

Since Yin's contribution to the field in 1994, case study research has become more widely accepted. Theorists such as Flyvbjerg, Eisenhardt, and Dooley have interpreted Yin's methodology to present rigorous and acceptable approaches for applying case study research to build theory. It is upon this methodological approach that this research is founded.

> …case study methods involve systematically gathering enough information about a particular person, social setting, event or group to permit the researcher to effectively understand how the subject operates or functions (Berg, 2004, p. 251)

Case study research is a research method utilised in many disciplines but most widely recognised in educational research (Merriam, 1988). A case study is an empirical inquiry that aims to investigate a real-life phenomenon (Lichtman, 2009) or problem (American Psychological Association, 2010). As a research strategy, a case study facilitates inquiry of a particular context by using a range of sources, or by developing a chain of evidence (Yin, 2003). Case studies apply the same data collection methods as other qualitative and quantitative studies (Lichtman, 2009). This allows the researcher to collect evidence through various media

and methods, which can then be reviewed in multiple ways in order to extrapolate a variety of reasons that can lead to a better understanding of the phenomenon in context (Baxter & Jack, 2008; Lichtman, 2009).

Methodological and Case Study Challenges

In an article describing the process for building theory from case study, Eisenhardt (1989) explained that data analysis can be daunting due to the volume of evidence gathered. Miles and Huberman stated that it is possible for researchers to "… go from 3,600 pages of field notes to the final conclusion, sprinkled with vivid quotes" (as cited in Eisenhardt, 1989, p. 539). Indeed, while field notes and observations are appropriate data collection methods, it is possible to be over-diligent in the collection process to the point where the evidence and the argument it projects weakens the overall research or becomes unmanageable.

"You cannot generalise from a single case study," Flyvbjerg (2006) reports (p. 240). This belief is still proclaimed as one of the weaknesses of case study research (Gerring, 2006). However, Yin (2003) and advocates of case study research have clearly stated that the aim of a case study is not to solely analyse data from a statistical perspective in the same way experimental design using quantitative analysis does. Rather it is to "expand theories" (Burns, 1997, p. 380). The objective of a case study is to define one topic, to investigate a case, and to report as much evidence as is humanly possible about a particular focus. Such an approach allows other researchers to review the extensive research in order to understand if it is possible to replicate the research and arrive at similar findings. If the findings conflict, then it is possible to generate a new pool of data from which further research can emerge. By reporting the evidence to the academic community, it then becomes the role of the readers to develop their own opinions, interests, and research angles based on the rich contextual information provided (Burns, 1997; Yin, 2003). Similar results from different case studies examining similar phenomena can be aggregated to provide generalisable findings.

If inappropriately structured, case study research can present biased evidence (Yin, 2003). Flyvbjerg (2006) refers to Bacon to assert that bias is not an issue solely found in case study research, but rather is a human trait. Flyvbjerg suggested that through the use of extreme case analysis it becomes possible to avoid researcher bias. There is no clear definition of what constitutes an extreme case. However, by comparing normal cases with other cases, it becomes possible to understand the purpose of extreme cases. Flyvbjerg explains that randomly selected data can provide an average understanding of a phenomenon. In contrast, extreme cases can provide a rich source of narratives and data that can offer a more in-depth view of the causes concerning a particular phenomenon. Selecting extreme cases may bring more validity to the findings generated. Flyvbjerg adds that there is no general method for selecting extreme cases. The only viable option is to observe data that reflect either an extreme agreement or disagreement to a survey or activity. Dooley (2002) added that by providing all of the data to the reader, the researcher is able to avoid reporting biased results since the "readers have access to all the information and can thus draw their own conclusions" (p. 337). Therefore, the research in this case study aims to provide all the evidence collected, within the limits of confidentiality, to the readers so that they can determine the accuracy of the research outcomes advanced during the analysis.

This Case Study's Structure

As mentioned earlier, researchers can over-accumulate data to the point that analysis suffers. Advising PhD researchers, Dunleavy (2003) observes that often too many pages are dedicated to an extensive review of the literature, followed by a broad explanation of the methodology and analysis process, thus leaving little room for a compelling analysis of the evidence and little room for a discussion or argument about the implications of the research.

To avoid repeating the research flaws described by Dunleavy (2003), this case study is designed on a framework proposed by him. He demonstrates that it is possible to structure a PhD design that resembles a more balanced and compelling presentation of a research project. He recommends allocating 20% to the literature review, 10% to theoretical framework, 20% to methodology, 25% to analysis, 10% for the discussion, another 10% for implications, and 5% for the conclusion.

Such an outline "opens out" the research and allows the author to compress the review of the most up-to-date literature, and to compare and contrast it against the evidence (Dunleavy, 2003, p. 74). At its most basic level, a case study follows a similar linear structure to Dunleavy's outline, involving a) defining a topic, b) reviewing pertinent literature, c) describing the methods used, d) outlining the findings, e) analysing the findings, f) presenting the implications, and g) reaching a conclusion (Yin, 2003). By focusing more on the findings and the contribution these make to the field, it becomes possible to report on information that would provide confidence that the analysis is valid and reliable (Eisenhardt, 1989).

Type of Case Study Design Selected

This is an embedded, single case study conducted over 14 weeks. A single case study does not necessarily need to be in a single setting. It can include multiple university sites sharing the same phenomenon. However, as part of the scope of this research, a single case study is defined as a single investigation of cases in a single setting, because the use of the video recording feature can be considered "the critical test of a significant" cell phone feature (Yin, 2003, p. 41; APA, 2010). The study explores the same case over selected points in time. A single case study is used to present a unique case (Tellis, 1997; Yin, 2003). The technology used in this research is relatively new and very few authors have investigated the potential of the cell phone video recording feature as a learning tool. This requires embedded case study research because of the possibility of unravelling extreme cases (Flyvbjerg, 2006). Extreme cases illustrate behaviours that fall outside the norm and these should demonstrate both sides of the argument. In this case, the two sides are demonstrated by the benefits and the challenges of using the cell phone video recording feature as a learning tool. The extreme cases will either provide the perspective of participants who have fully adopted the technology and the benefits it affords language development, or provide the perspective of participants who do not believe that the technology offers any real benefits.

Single case study is also selected when conducting a single intervention (Yin, 2003). Due to the limitations of providing generalisable evidence, it is preferable to present the findings of a single intervention with the expectation of generating academic interest in a new research area. In addition, single case studies can either be embedded (analysing more than one sub-unit) or holistic. Baxter and Jack (2008) define the latter as a variant to understand extreme cases. It is usually applied in situations where there are no logical sub-units (Yin, 2003), with a preference for analysing the case as one broad phenomenon (Rowley, 2002). While a holistic variant to case study can provide the researcher with more flexibility to explore certain cases at greater depth, Yin warns that this exploration can shift the course of the case study. Verschuren (2003) mentions that placing the research within a context or *in situ* may limit the possibility of shifting course during the research.

While there is much research on the benefits of using video production for enhancing students' language practice and learning, there is limited research on the use of personal video recording devices such as the cell phone to enhance students' oral output. Therefore, a single holistic case study fit this in situ, context-specific study.

This research was guided by a simple research question: Is the cell phone video recording feature a suitable learning tool for Japanese students learning to speak English? Yin (2003) suggests that the research examines the objective of the research question. Doing so, he explains, helps the researcher distinguish the methodology and data collection strategies to be put in place, thus affecting the researcher's control over the phenomena under analysis and the focus on the event taking place.

Yin (2003) suggests that the research question should be a "What" type of question. To extend on the research question above: What can be learned from students using the video recording feature on their cell phones? This leads to an exploratory type of research, which aims to develop "pertinent hypotheses and propositions for further inquiry" (Yin, 2003, p. 6). Indeed, the objective of this research is not solely to conduct research for the sake of obtaining a PhD, but rather to contribute towards social and technological development that in the future could influence teaching approaches and methodologies. Mobile technology affords its subscribers the opportunity to share, create, and produce new content anytime and anywhere, for anyone to view. If that is a potential direction for the future of education, then the time for investigating that potential is now and exploratory research is best suited.

Whilst the research question does not use "Why" or "How" explanatory questions, it does have the potential to ask predictive questions such as "Who," "Where," and "How much" (Yin, 2003). For example, "Where are the participants willing to record their videos?", "Are they comfortable recording them in public or in private spaces?" Such questions aim to understand the behavioural preferences of the participants in this particular context.

Data Collection Process

It is paramount that a case study presents all evidence possible for readers to reflect on the research outcomes, including information about the particular context. A case study is a form of research that can merge qualitative with quantitative data (Dooley, 2002; Flyvbjerg, 2006; Gerring, 2006; Yin, 2003). In terms of qualitative data, researchers can collect evidence from any source that is deemed appropriate and necessary to answer the research questions. While Yin outlines a wide range of data collection methods, the documentation

necessary to investigate the use of the cell phone video recording feature by sixty-seven Japanese university English learners emerges in evidence from two surveys, one interview, and 13 cell phone videos per student.

Generalisability

The objective of case study research is not to offer one broad general conclusion based on empirical evidence, as is usually expected with scientific or pseudo-scientific research (Dooley, 2002). Rather, the objective of a case study is to construct and analyse a chain of evidence that can establish general conclusions about a particular phenomenon taking place in a particular setting with specific participants (Berg, 2004; Stake, 1995). Based on the information provided, it is the reader who then determines the credibility of the findings and decides whether or not the research can be replicated in their own setting or if elements of the study resonate with the individual's own experiences. Through the replication of similar research, it becomes possible to structure a more solid chain of evidence which can lead to the agreement that several replicated case studies have yielded similar results in different settings and thus the congruence between findings provides valid generalisation (Yin, 2003).

Since this is one of the only studies to investigate the use of the cell phone video recording feature as a learning tool, the findings can only be generalised within this case study itself, but it may act as a catalyst for further investigations in different contexts.

Validity

Validity refers to the extent to which the data collection tools measure what they set out to measure (Seliger & Shohamy, 1989). The end result reveals whether or not the study answered the questions it intended to answer through the collection and analysis of valid data and whether or not the conclusion and measurements correspond to the natural environment in which it took place. In more precise terms, Fraenkel and Wallen (1996) define validity as the "appropriateness, meaningfulness, and usefulness of the inferences a researcher makes" (p. 152). This indicates validity is not an exact science (Seliger & Shohamy, 1989), but there are approaches for establishing validity such as construct, internal, and external validity (Yin, 2003). These are identified below.

Construct validity.

The purpose of construct validity is to "establish correct operational measures" (Yin, 2003, p. 34) or to "select the correct tools or methods" (Dooley, 2002, p. 340) "needed to examine whether the data collection procedure is a good representation of and is consistent with current theories" (Seliger & Shohamy, 1989, p. 188) for the phenomenon under investigation. For a case study, Yin (2003) recommends three ways for improving

construct validity: to collect data from multiple sources, to allow informants to review and comment on the findings, and to develop a chain of evidence.

This research identifies surveys, interviews, and verbal performances as sources of evidence. The participants completed a pre- and post-intervention survey to identify if they believe that using the cell phone video recording feature to create videos enhanced their cognisance of the target language. The questions selected for the surveys were generated from the literature. For example, the demographic items were collected from Gromik (2009c). Some of the technology survey items were selected from Thornton and Houser (2005) and Wang and Higgins (2006).

The interview process was divided into two parts. First, the participants were invited to demonstrate their process for creating a cell phone video performance. Using speaking out loud protocol (Roberts & Fels, 2006; Seliger & Shohamy, 1989), participants explained the reasons for applying certain strategies for producing a cell phone video performance. In the second part, students were interviewed about various aspects of cell phone use and the cell phone video production process. Ozok (2008) explained that at times researchers cannot generate questions from the literature alone. Researchers may also need to consider other sources for organising a list of relevant questions. The research question and the methodology arose from reflections on the literature to identify and address potential loopholes (Creswell, 2009). Conversations with colleagues and students, as well as presentations at conferences, were also sources of question generation.

Much of the literature reports on one-shot or short studies. For case study research, it is recommended that data be collected over a determined period that is sufficient in length to increase the validity of the findings (Seliger & Shohamy, 1989; Yin, 2003). In this case study, the participants created and provided 13 weekly cell phone video recorded performances. During the process of creating their weekly videos, students needed to document their production process. The decision to collect more regularly created videos over one academic term was tested by this researcher in 2009 during the investigation of the use of the cell phone video recording feature by EFL advanced learners to create weekly online diaries.

Teacher feedback was provided to the students and their subsequent feedback was documented as part of the researcher's notes. The aim of this process was to enquire into the student production process to observe if, as a group, all students agreed with the findings presented to them and to ascertain if any factors could have an influence over the video production process and the language performance.

Once all the data had been reported and organised electronically, they were processed for analysis. By comparing and contrasting the evidence, it was possible to establish a chain of evidence. Triangulation of the findings assisted the researcher in developing a model to answer the research question.

Internal validity.

Internal validity is about the logic, coherence, and consistency of the data collection method (Burns, 1997) and the inferences made from it (Lumley & Brown, 2005; Patton, 2002). While explaining the findings, internal validity helps to confirm that the results are not influenced by external factors (Seliger & Shohamy, 1989). Internal validity intends to establish whether or not the findings represent and replicate the reality of the context in which the research is taking place (Punch & Punch, 2005).

Triangulation is one of the strategies used to understand the correlation between events and to determine whether or not the researcher's inferences are valid (Dooley, 2002; Yin, 2003). Eisenhardt (1989) explains that triangulation is made possible when multiple sets of evidence are analysed and contrasted. Burns (2000) adds that triangulation improves "internal validity" (p. 419) when the objective is to check for consistency of results from different sets of evidence. While Yin (2003) refers to Paton's four potential triangulation options, he suggests that data triangulation is the best option for case study. Yin explains that by collecting data from various sources, through triangulation it becomes possible to corroborate the findings about the phenomenon under investigation.

There are another five strategies used to enhance internal validity: member checking, peer judgement, long-term observations, participatory modes of research, and clarification of researcher biases (Merriam, 1988). As explained previously, participants had the opportunity to contribute their opinions during certain parts of the research and for specific purposes. However, involving all participants in all phases of the research was beyond the scope of this project. Colleagues' and supervisors' opinions were sought over the lifespan of the research. While the project was conducted during one academic term, extreme cases (Flyvbjerg, 2006) were investigated at a later date to cross-check whether or not their perceptions had changed over time. Researcher biases will be addressed later on in this chapter.

A case study endeavours to study real-life contemporary and contextualised events (Dooley, 2002). As a research strategy, a case study needs to address the threats to internal validity. Creswell (2009) identifies a variety of threats to internal validity. These can include asking irrelevant questions or questions beyond the reach of the participants, as well as the irregular implementation of test items. The current research is based on prior research, the literature review, and reported studies (Gromik, 2009c). The test items have been confirmed and amended to meet the linguistic abilities of the Japanese respondents.

Sample selection and testing are other threats to internal validity and these elements were carefully considered for this case study investigation. Seliger and Shohamy (1989) clarify that sampling can affect internal validity. They suggest that the sample group be representative of the general population as well as the population group of the research site. At this particular research site, the participants selected the course, so the researcher did not have any control over the sample selection process. The evidence collected from the first survey indicated the extent to which the sample was representative of the population of the selected site. Time needed to complete the survey can also be another threat to internal validity if some participants are unable to complete the survey within a specific time. It must be emphasised that, with this particular group of Japanese learners, the intention of the surveys was not to test their writing abilities but to collect evidence that will bring meaning to the research question. There should be no cause for concern with participants becoming either familiar with the survey structure or reliant on past test practice to respond appropriately on the survey (Seliger & Shohamy, 1989). Based on prior research conducted by this author at the same research site, it has been concluded that participants would have ample time to complete the surveys successfully. Allowing 90 minutes to complete the survey takes into consideration the participants' reading comprehension and writing abilities in the target language.

External validity.

External validity assesses whether the evidence can be generalized outside the confines of the case studied (Dooley, 2002; Seliger & Shohamy, 1989; Wiersma & Jurs, 2009; Yin, 2003). The issue of generalisation was previously addressed but, briefly, a case study does not intend to provide scientifically generalisable conclusions; rather, it provides an "analytical generalisation" based on the investigation of a particular event in a particular setting (Yin, 2003, p. 37). Other researchers can then build on the findings of a case study to replicate the accuracy of its results and conclusions.

To increase external validity, Eisenhardt (1989) and Seliger and Shohamy (1989) have identified sampling as an important aspect. "Theoretical sampling" is selected based on population representation and not for statistical evaluation (Eisenhardt, 1989, p. 537). Seliger and Shohamy explain that the evidence generated from a particular sample group can only be applicable to other similar sample groups. For example, this case study is set at a Japanese university and second year university students participate in the research. The findings generated will contribute to other findings set within a similar environment and with similar participants. Hence, Yin (2003) emphasises the need to pay careful attention during the case selecting process. This case study was conducted within one Japanese academic term, which is generally 14 weeks long. It would be possible for researchers with a comparable academic term to conduct a similar study.

Research conducted with cell phones has attempted to reveal that this device could be used to enhance students' target language awareness. Seliger and Shohamy (1989) bring out the issue of language acquisition as an important element of external validity. This particular case study was structured with the consideration that language learning occurs over a long period of time. Gromik (2009a) has argued that research conducted in Japan sometimes makes extravagant claims without placing enough importance on the meaning of retention. Ducharme, Wesche, and Bourdages (1999) define retention as language knowledge that is maintained over time. For example, research by Fellner and Apple (2006) reported that blogging was conducive to enhancing Japanese students' writing skills. These authors claim that their students had a "350% increase in the number of words used in students' blog entries" (p. 24). However Gromik (2009c) argued that such findings are of limited value because the study and results were not replicated by either the authors or others. Nor did the researcher investigate the students' abilities to use similar vocabulary items over a long period of time. Therefore, in terms of validity, research needs to be replicated if possible to ensure that, over time, the accumulation of data can lead to a more generalisable understanding of Japanese students' skills and abilities.

Reliability

Research integrity is a fundamental aspect of academic research (Baerlocher, O'Brien, Newton, Gautam, & Noble, 2010) and can only be trusted when the measurements, procedures, and settings are thoroughly documented (Kottner, Audige, Brorson, Donner, Gajewski, Hróbjartsson, Roberts, Shoukri, & Streiner, 2011). The data presented are deemed consistent (Wallen & Fraenkel, 2000), independent from inadvertent conditions (Patton, 2002), and another researcher can replicate the research and arrive at the same conclusions (Goddard & Melville, 2004). There are two pertinent processes for increasing reliability in case study research, according to Yin (2003): "case study protocol" and "case study database" (p. 38).

The case study protocol refers to the structure of the methodology, the data collection process, the establishment of research questions, a description of the evaluation stages, the use of triangulation, a disclaimer of any research bias, and the reporting of the chain of evidence. The convergence of evidence enables the researcher to present a general conclusion based on the evidence gathered and analysed (Yin,

2003). In other words, all the documentation presented and gathered forms a case study database that can assist the reader in understanding the development of the research and the convergence of evidence.

Reporting Bias

Researcher subjectivity is questioned in most qualitative research (Burns, 1997; Seliger & Shohamy, 1989; Wilholt, 2009) and although the lack of rigour in case study design was initially criticised, contemporary forms modelled by Yin are accepted as rigorous and trustworthy (Yin, 2003). Maxwell (2004) stresses the fact that individuals cannot suddenly transcend into unbiased observers. On the contrary, experience, prior knowledge, and human learning enable the researcher to develop the skills and rigour to become a more objective reporter (Flyvbjerg, 2006). It is because of this human involvement, from both the researcher and the participants that the researcher needs to reflect on and report potential bias (Patton, 2002). To reduce researcher bias, it is recommended that the researcher be open to contrary findings, as well as alternative suggestions by colleagues (Berg, 2004). In addition, the researcher should outline to the reader previous experiences, prejudices, and biases that may affect the investigation (Merriam, 1988).

The next section reports on the structure of the research in relation to reducing researcher bias. It also presents the researcher's background to emphasise the efforts made by the researcher to remain impartial during this case study investigation.

Data Collection Method

To generate a database of evidence, participants completed two surveys: one at the beginning of the term and another at the end. The surveys aimed to determine any change of opinion regarding the use of the cell phone video recording feature as a learning tool. During the survey design process, attention was given to ensure that the questions were both closed and open-ended. The closed questions were to either establish an understanding of the demographics or to assemble quantifiable data. The open-ended questions were as unambiguous as possible to avoid any reading comprehension challenges to the students. Attention to tenses and active item descriptors were addressed. The open-ended questions encouraged students to offer their opinions. These opinions were then grouped and organised as such to reveal both qualitative and quantitative evidence. Apart from writing the questions, the researcher had no influence on the responses that the participants provided. Since the surveys did not assess the participants' linguistic abilities, there was no grade for completing them.

The video-recorded interview session was not graded. During the interview, participants demonstrated their process for creating a cell phone video. The purpose was to collect visual evidence of the video production process, which was reviewed after the interview for analysis purposes. Even though speaking development was investigated through the regular production of cell phone video performances, interview responses were not assessed. The interview questions were open-ended to offer the participants as many opportunities as possible to clearly express their opinions. As with the written survey, the interview questions were generated from the literature. However, since the cell phone video recording feature has not yet been extensively

researched, some of the questions sought to understand the technical process of video production and any challenges the students faced with this process.

Finally, the cell phone video recordings were produced outside of class. The researcher had no influence on the production process. This situation had the potential to prove problematic since the researcher was not able to observe what influencing factors might affect video production. Nonetheless, the interview session aimed to understand what and if any influencing factors exist.

In structuring this case study, the data included surveys, interviews, diaries, and student video performances. These data fall within the six sources of evidence identified by Yin (2003): documentation, archival records, interviews, direct observation, participant-observation, and physical artefacts. The description above demonstrates that, through the collection of multiple sources of evidence, the researcher has limited influence on participants' responses on surveys and in their diaries and their video productions. Thus, it is anticipated that the data collected would generate reliable and valid evidence.

The Researcher's Background

As a researcher, I have a strong interest in technology in education. My primary interest is in understanding the process and strategies for integrating technology in the classroom, and for better understanding learner-technology interaction to determine the reasons for learners' adoption or rejection of technology as a learning tool.

Prior to undertaking this research, my preferred research methodology was action research, a methodology suitable to develop and modify an intervention. Briefly defined, action research (AR) is about developing a cycle of research, reflection, and improvement. This was helpful for developing research or inquiring into technology in the language classroom from a novice investigator's point of view. In addition, McNiff (2011, in communication) commented that action research could become a personal endeavour to learn more about oneself and one's world. Positioning research within a philosophical perspective means that an author is conducting research as a venture into one's interaction with the world from a perspective of enlightenment. By the time of structuring this research, I believed that I had matured as a researcher and was sufficiently familiar with the action research method of enquiry. Because I was familiar with various data collection methods and analysis and my prior research experience prepared me to investigate the use of cell phone technology at a greater depth, with the support of Professor Anderson, I decided to learn more about a research method not focused on further development of an intervention but on detailed examination of the phenomenon. Unlike action research, case study is one-time research into a particular phenomenon or event.

Referring back to McNiff's comment, it could be possible to claim that conducting case study research is a personal endeavour to understand participants' engagement with a phenomenon such as an intervention. Connecting and understanding individuals or a single phenomenon can be a source of enlightenment or a way to express one's beliefs about the world.

While case study research was selected as a method for understanding an external phenomenon, it was also the method used because this author believes that dealing with and attempting to understand individuals (as opposed to understanding norms) is his personal objective in life.

Since my early training as a teacher, I have believed that learners acquire knowledge through action and social interaction. I also believe that socio-economic background has a strong influence over results. Therefore, my study of socio-constructivist theory reinforces my conviction about the power of social influences on learning development.

Some critics might argue that my selection of socio-constructivist theory as a theoretical framework reflects a bias towards this theory and therefore teaching methods; however, other authors have endorsed socio-constructivist theory and other related theories as pertinent theorems in the field of learning and ICT in education (Anderson, 2007; Lantolf, 2006). Socio-constructivist theory stipulates that a learner's prior knowledge and abilities can be utilised to enhance new knowledge, abilities, and skills. These skills can be developed so that the learner is better prepared to participate in the community. The use of prior knowledge to develop new knowledge has been defined by other authors as "human capital" (Balatti & Falk, 2002). The Organisation for Economic Co-operation and Development (OECD) defines human capital as "the knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being"(OECD, 2001, p. 2). Indeed through learning, collaboration, negotiation, and production of artefacts, individuals contribute to the aggregate of the social web. As Hill, Stremmel, and Fu succinctly summarised, "the child is not a passive recipient" (as cited in Sorin & Galloway, 2006, p. 378). Selecting socio-constructivist theory as a theoretical framework is not only a reflection of the time in which I live, but also of my experience as a human being in society.

The University located in Sendai, Japan, provides an ideal setting for the case study because the student population is mostly homogenous. Not only is this group of participants racially, but Japanese students are homogenous because of the national educational objectives which are pervasive across the whole country. The government selects and endorses only a few English high school textbooks, so these students are likely to have studied similar vocabulary items and grammatical points prior to their university studies.

Previous research has indicated that second year university students' English abilities were suitable to answer surveys written in English and to participate in interviews. In addition, as I managed my courses, I had more autonomy and control over the implementation of the research project, and had direct access to participants. Further, since my office was located on site, students had direct access to me during office hours and I did not need to travel to other sites, thus reducing any interference with my teaching duties. By being in control of the research site, I was in control of the success rate for completing the research within the time set by the parameters of the study.

In addition, due to its internal consumer market, Japan is in a constant state of technology development. Most people in Japan have access to cell phones and research has indicated that 100% of Japanese university students own a cell phone (Gromik, 2009a), so Tohoku University in Japan was considered suitable places to investigate the impact of cell phone use on language learning.

During my ten years as an English teacher in different parts of Japan, I had become aware that many Japanese learners are not confident speaking in English. I decided to specifically address this issue by researching and trying various teaching strategies (such as role playing, poster presentation, and speed reading, amongst others). I did not discover an acceptable solution because most options endorse a drill and repeat approach that does not seem to challenge or enrich students' speaking abilities. This reflection led me to conclude that these

students would only have a set repertoire that would make spontaneous speaking ability a difficult endeavour to attempt. That is, students' prior knowledge and experiences limited their speaking confidence as they had only 'practice' speaking in classes that may not have engaged them to speak spontaneously. Or they may have had classes that only required them to remember content specific lexical items. I believe that after seven years of English exposure, students possess some prior knowledge of the language that is not being used to its full potential. I was determined to find an approach for transforming this prior knowledge into active spontaneous speech.

In the early stage of my university teaching career, while reviewing the Japan-based literature, I noticed that researchers seldom conducted a students' needs analysis. Noticing a need to collect information about students' backgrounds led me to investigate students' access to technology, educational background, language learning history, and access to an English assistant language teacher (Gromik, 2009b). With this type of evidence, I was better able to develop an understanding of the typical Japanese university student's characteristics. Furthermore, my teaching experience with Japanese university students and my discussions with them led me to believe that they had enough prior knowledge of the target language and that they wanted to be challenged to speak spontaneously. By observing students' behaviour in and out of the classroom and reading the literature on CALL research conducted in Japan, I was able to consider best teaching practices for integrating technology in the classroom. Studies with video production for both intermediate and advanced language learners reinforced my belief that video could play a vital role in enhancing students' speaking abilities. I needed to find an approach that would meet students' preference for a more individualised practice. The cell phone became an option.

Unlike other technologies, such as MP3 players, students are more likely to own a cell phone. Therefore, as a researcher I would not have to purchase any devices to conduct the research. In terms of expenditure, the Journal of the American Medical Association (http://jama.ama-assn.org/) has a section on conflicts of interest and financial disclosures. To conduct this research, I received no financial support from cell phone companies, or from either Tohoku University or James Cook University, apart from a PhD student allowance and conference travel from JCU. Because the student participants subscribed to individual cell phone services, they were responsible for any expenses incurred to participate in the project. They did not receive any financial compensation. All expenses, such as printing the surveys, purchasing videotapes used for conducting the interviews, and the costs for entering the data into a digital form, were borne by the researcher.

Researcher/facilitator

"Bias communication" refers to the researcher reporting only certain parts of the research and concealing others (Wilholt, 2009, p. 93). It is anticipated that all the evidence collected will be reported in this dissertation. In case study research practices, the aim is not to offer a generalisation but to report all information so that the readers can determine for themselves whether or not the findings are valid, reliable and relevant to the situation. Therefore, it would be counterproductive for this research to conceal any evidence.

Concerning the issue of bias and objectivity, Guba and Lincoln (2005) summarise their opinion as follows (see Wilholt, 2009 for a similar conclusion):

> … it is enough to say that we are persuaded that objectivity is a chimera: a methodological creature that never existed, save in the imaginations of those who believe that knowing can be separated from the knower (p. 208).

Even if I adopted a critical stance, all beliefs and opinions are open to being questioned. In terms of methodological structure, this section has explained and justified that mixed research data collection was most suitable for both the context and investigator. The researcher has made efforts to define the selected method, case study research, to explain the reasons for selecting the participants and the study location, as well as report all conflicts of interest that may have influenced the outcome of this research in any way. While I acknowledge that the major concerns were addressed, it is possible that some minor subconscious influence may prevail and guide me towards making certain decisions regarding, for example, data analysis.

Sampling

The purpose of sampling is to construct a group of participants from which correct and relevant evidence can be generated (Eisenhardt, 1989; Ravid, 2005), thus sampling or selecting a group of participants must be done (Henry, 1998). In quantitative research, sampling can often be purposeful and statistically founded, but in qualitative research, the sampling is based on theoretical grounds (Silverman, 2005) and the socio-economic situation at the time during which the case study takes place (Maxwell, 1992), because the evidence will then reflect the behaviour of the general population at that time. Therefore, it is up to the researcher to critically consider the various attributes that the sample group must possess in order to provide reliable evidence (Silverman, 2005). Each participant can contribute to the research findings. Consequently, Morse (1999) explains "[i]t is this selecting that ensures that the theory is comprehensive, complete, saturated, and accounts for negative cases" (p. 5). There are two approaches for selecting participants. The first is to conduct a literature study as it may assist in establishing boundaries, such as selecting participants with the same age, educational background, or computer literacy skills. The second approach is to determine the sample by close examination of the research questions (Marshall & Rossman, 2010).

In addition, when selecting suitable sample groups, language ability is a determinant. In order to answer the research question, the participants need to have writing and speaking abilities that would enable them to respond to the survey or interview questions in the target language. Unlike random selection, in which all participants have equal chances of participating in a study (Babbie, 2009), this research applies a convenience sampling approach (Creswell, 2009). An attrition rate is likely because a number of students may withdraw from the course due to various personal or academic reasons.

ICT in education and gender differences

The gender ratio in this case study research was undetermined before the course began and beyond the control of the researcher. Nonetheless, this is a variable worth considering when analysing the data. The ratio of males

to females in the sample was 59 (88%) males and 8 females (12%). No difference in access to technology was observed in Gromik's (2009b) research. Both male and female respondents were reported to have the same access to technology, including cell phones, computers, electronic dictionaries, MP3 players, and internet access. Gromik also reported that male and female respondents perceived themselves either has beginners or intermediate users of technology. Consequently it does not appear that any differences in access and ability to use technology could influence the research outcome.

While Gromik (2009b) reported minimal difference between male and female students regarding their use of technology, Wang and Higgins (2006) pointed out that female students were more likely to have a higher tendency to use cell phones for text messages than their male counterparts. Wang and Higgins' observation is worth considering since prior experience with using cell phones might have an impact on the perception of the benefits of this tool for learning. It would also be useful to consider the implications that potential existing differences have on language learning acquisition. Gender differences in ICT use have been investigated (Anderson, Klein, & Lankshear, 2005 for example), but apart from studies by Thornton and Houser (2005) and Wang and Higgins (2006), the specific area of cell phone use and gender differences has not received a lot of attention, and further research into this area is warranted.

Ethics and Research Approval

Prior to commencing the research, the ethical research conditions for both Japan and Australia were addressed. While the research site did not have an ethics committee or requirement at the time of the initial investigation, efforts have been made to obtain permission from the Head of Department (HOD) and to inform the HOD of the intentions and progress of this research.

Simultaneously, the JCU ethical clearance was submitted and cleared on 11November, 2010. Since the Japanese site had limited research ethics guidelines, the research adhered strictly to JCU guidelines. The JCU information sheet and consent forms were translated into Japanese and both the original English version and the Japanese translation were presented to the HOD and participants before the research commenced. The documents were provided to students during in-class time and a translator was available during that time.

MEXT established guidelines to protect students' cell phone identities from being revealed to third parties. While no documentation was found to reference this new guideline, this researcher was aware of it, and thus applied the necessary confidentiality rules to preserve cell phone identities from becoming public. The students were informed that they would have to share cell phone details and that if anyone did not want to share this information, they would need to mention it on the consent form. At no time did the researcher keep a list of students' cell phone details.

Confidentiality

In case study research it is possible to either reveal or conceal the identity of the informants (Yin, 2003). For the purposes of this case study, it has been concluded that revealing informant details may "affect the

subsequent actions of those that were studied" (Yin, 2003, p. 158). In order to keep track of students' responses and performances, they needed to write their name and student number on all of the documentation they completed. Paper-based evidence was kept in a locked filing cabinet at the researcher's office. All electronic copies were kept on the researcher's computer. The evidence collected will be kept for 15 years and then will be destroyed.

During the data analysis process evidence was de-identified, and details such as age, gender, and educational background were quantified, removing any possibility to identify participants. While confidentiality preservation is possible, anonymity during project participation could not be fully guaranteed, as some of the sample groups were small and throughout the project students may have been able to identify their peers and their performances. Once the project was completed, confidentiality and anonymity were assured.

Evidence projected by this case study alone cannot establish a generalisability of student behaviour, but it can lead to a better understanding about individual preferences for learning with mobile technology. As Yin (2003) and Caramazza (1986) argue, the role of the case study researcher is to explore potential results to expand current theories, methods, and approaches in order to provide more evidence that could enlarge the foundation of broader theories. In this way, the research attempts to add to the existing collection of articles investigating cell phone-based education. The study contributes to the general academic community's understanding of the benefits or challenges of integrating cell phone technology in the EFL classroom by reporting on the benefits or challenges of using the cell phone video recording feature to consolidate students' oral performance confidence.

This chapter established the theoretical background to the methodology used in this project. Further information regarding the sampling process, the data collection method, and data analysis considerations are outlined in the next chapter.

Chapter 4: Data Collection Method

Introduction

The purpose of data collection is to gather evidence that addresses the research questions. Data collection involves planning the collection process as well as defining and structuring the best data collection methods to generate a pool of reliable evidence from which analysis can be performed. The data collection method section allows the reader to judge whether or not the collection process was appropriate for generating valid and reliable evidence (Egbert, 2005; Murray & Hughes, 2008). There are many methods available to collect evidence. Therefore, part of designing a data collection process is to think ahead about how the information could be organised, analysed, interpreted, and then reported.

Empirical research offers two types of data collection approaches, qualitative and quantitative. Creswell (2009) suggests that it is possible to conduct mixed data collection, combining both approaches. Mixed research is a preferred approach for CALL and case study research as it increases the source of data to construct a chain of evidence, and provides a multiple view for analysing data (Egbert, 2005). Strauss and Corbin (1998) add that using either or both data collection methods is a reflection of the research question and the data it aims to collect. The aim is to divulge substantial evidence on a topic about which little is known and that can contribute to the field of research.

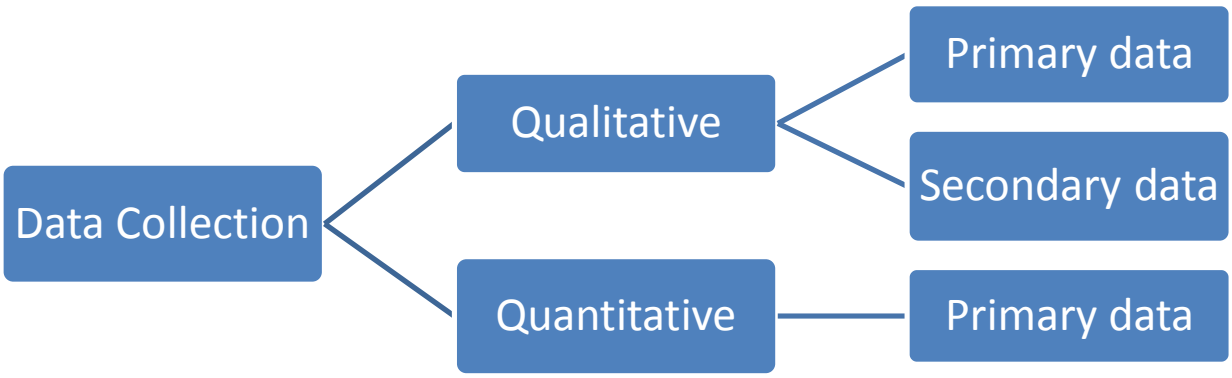


Figure 2. Data Collection Method

Data can be generated from two sources of evidence. As can be seen in Figure 2, data can be gathered firsthand from participants (primary data) or from previous investigations (secondary data) (Burns, 2000; Kothari, 2004; Kumar, 2008). Case study research reviews both sources of data in order to elucidate meaning at a deeper level. Secondary sources could comprise a review of academic literature and government or corporate documentation to provide a view of current practices and future influential policies. Primary sources gathered from a population sample provide a view of the

respondents' perceptions in relation to a particular issue or task. For example, cell phone technology was designed by corporations to provide greater mobile telecommunication opportunities to consumers; however, consumers may or may not utilise the technology to its full potential as was anticipated by manufacturers. Therefore, both primary and secondary sources complement research outcomes.

According to Kumar (2008), reviewing secondary data relevant to the subject under scrutiny is vital since it provides access to data collection strategies, survey items, and potential questions (Ozok, 2008; Yin, 2003). This chapter first reviews the general methodology structures adopted in the literature. It then extrapolates more specific information useful for designing a suitable research methodology. Finally, it outlines a research method conducive to undertaking a valid and reliable investigation.

Review of the Limitations Emerging in the Literature

For exemplary research to be conducted, Creswell (2009) recommends that researchers evaluate the "deficiencies in past literature" (p. 106). The methodology in the literature displays some data collection discrepancies. For example, Stockwell (2007, 2008) did not conduct pre- or post-test to evaluate students' perceptions of the benefits of using an LMS over time. Instead he applied a post-test data collection method that merged pre- and post-use of LMS access on cell phones in one survey. Stockwell states that this approach was deemed appropriate as the "correlation between pre-use and self-reported use could be seen for each learner" (p. 259). He continues by explaining that since students change their minds during the course of research, asking for their opinions in a pre-test would not generate an accurate measure (p. 265). The results advanced in this research are questionable since Stockwell investigated the hypothetical situation of students' potential use of cell phone for study purposes. He claims that students expressed an interest in studying with cell phones in the future, but there is no way to evaluate students' use of cell phones in the future unless Stockwell conducts a longitudinal study. This is problematic as respondents might not be able to recollect their early decisions for choosing cell phones over PC use, for example. This approach affects test reliability because the feedback provided by the respondents depends on their ability to accurately recollect an action conducted in the past.

Other questionable findings were reported by Wang and Higgins (2006). They base their argument against using the cell phone as a learning tool on a survey of 32 undergraduate and graduate students. Even though the questions they ask are relevant for designing a survey, the findings are less indicative of Japanese students' general beliefs of the value of cell phone technology as a learning tool. Wirth, Von Pape, and Karnowski (2008) explain that defining norms is becoming more challenging because, during a lifetime, individuals and social groups will perceive and experience the benefits of technology differently over time. Therefore, it might have been more beneficial for Wang and Higgins to report on a more rigorously conducted survey with specific group samples. For example, Gromik (2009b) reported on a historical survey conducted over three years with second year university students. The findings are more convincing and reliable as the sample size was large and the participant cohort consistent.

One last observation that can be drawn from the summary of collected articles concerns the general structure of the methodology. Most apply either a qualitative or quantitative approach, but apart from Motiwalla (2007) who reports on the outcome of a pilot study, the majority of researchers do not situate their research within a particular research framework, such as case study, action research, or ethnographic research. The majority of research reviewed is explorative, investigating certain aspects of cell phone use with limited considerations for literature from other research areas. For example, Stockwell (2007, 2008) and Thornton and Houser (2005) aim to investigate students' opinions about the educational benefits of studying with a cell phone. Their literature reviews did not include articles from the field of human-computer interaction. This is a field of research with a vested interest in studying the effect of technological design on consumer use. Conducting a literature review in this particular field of research may have assisted Stockwell as well as Thornton and Houser in addressing aspects of their construct validity.

On the one hand, Wang and Higgins argue that, for certain identified reasons, cell phones are not ready for mainstream learning. On the other hand, Thornton and Houser argue that learners are ready for cell phone-based education. Due to this ambivalence, this article selects a case study research method to investigate the feasibility of integrating the cell phone as a tool in the language classroom.

Review of Methodology in the Literature

The review of the literature revealed that cell phone-based learning focused primarily on reading and vocabulary recognition activities and the possibility of viewing videos. The review also emphasised that technology constraints limited the extent to which cell phones could be learning tools. Research design and researcher bias could influence the research outcome and advances made towards demonstrating the benefits of technology based learning (Huh & Hu, 2005). This section reviews the literature relevant to mobile-based learning that could assist in establishing a reliable and suitable data collection process. Table 2 below summarises the reviewed literature in terms of participants involved in the projects, the task and resources that were employed, the duration of the project, the data collection process, and the purpose of the project.

Table 2

Summary of Research Methodologies Conducted for Cell Phone-Based Learning

	Participants	**Resources / Task**	**Period**	**Data Collection**	**Purpose**
Gromik (2009a)	7 university advanced language learners	- Students' cell phones - Produce cell phone video diaries	15 weeks	Observations, blogs, cell phone videos, needs analysis, post-test	Assess students' productions of cell phone videos
Lu (2008)	30 randomly	- Students' cell	2 weeks	2 group swap	Assess students'

	selected high school students	phones -Vocabulary from entrance examination paper for college		technology study Pre-test, post-test, delayed post-test Quantitative and qualitative	vocabulary recognition and retention. Report on students' opinion of MALL.
Oliver & Goerke (2008)	54 out of 500 students randomly selected	- Students were given iPAQs - Engineers were required to participate in group blogs Business students were required to communicate with peers All students required to communicate with peers via instant messaging, blogs, VOIP	1½ years	Pre- and post- test survey	Review undergraduates' adoption of cell phones as learning tools
Stockwell (2008)	75 first year university students	- Students' cell phones -Vocabulary from textbook	13 weeks	Computer logs, post-intervention survey Quantitative and qualitative	Assess students' use of cell phones over PCs
Uzunboylu et al. (2009)	41 university students	- Students' cell phones - Expenses reimbursed by telecommunication company - Manage project website	6 weeks	Pre- and post-intervention survey	Assess students' use of cell phones to document environmental issues
Motiwalla (2007)	63 graduate and undergraduate university	- PC simulator - Provide access to course content via	Phase one is 2 weeks Phase	Pilot study Post-intervention survey and	Assess students' use of system and their opinions

	students	cell phone	two is 3 weeks	interviews	
Pouezevara & Khan (2007)	- 20 Bangla and mathematics teachers - 10 schools	Participants provided with laptops and 13 mobile handsets	2 weeks training and 6 weeks for trial	Observations, teleconference, post-test administration, discussions, and interviews	Assess mobile-assisted teacher distance education
Stockwell (2007)	11 university advanced language learners	- Students' cell phones - Vocabulary from text material	13 weeks	Computer logs, post-intervention survey Quantitative and qualitative	Assess students' preference for MALL or PC-based learning platforms
Thornton & Houser (2005)	1 – 333 female university students 2 – 44 female university students 3 – 31 female university students	- Students were provided cell phones 1 – survey 2 – definitions of five words for acquisition 3 – video of idioms	1 – survey 2 – two trials over 8 weeks 3 – one day	Survey, questionnaires, pre- and post- tests	1 – Assess students' cell phone use 2 – Opinions of MALL 3 – Cell phone usability for viewing visual resources
Kiernan & Aizawa (2004)	120 (± 4) first year university students	- Students' cell phones - Assess acquisition of pragmatic phrases	3 weeks	Pre- and post-intervention vocabulary test Cell phone usage survey 4 tasks	Evaluate the use of cell phones as task-based learning tools

Timeline

As Table 2 displays, six research projects ranged over a period of six to 15 weeks. Three conducted shorter research projects between two and three weeks in length and one study was conducted over a year and a half. The length of a project usually reflects the context in which the project is conducted.

For example, Gromik (2009a), Stockwell (2007, 2008), Thornton and Houser (2005), and Uzunboylu et al. (2009) conducted their research during university academic terms.

Sample

Lu's (2008) is the only research project reviewed that was conducted at a high school. In addition, with the exception of the exclusively female participants in the research conducted by Thornton and Houser (2005), all other researchers had access to mixed groups of participants. It is important that the group of participants be representative of the general population (Burns, 2000). Thus, while Thornton and Houser's findings contribute to the understanding of cell phones in education, the project is only applicable to female use of cell phones and does not contribute to the study of male students' experiences with this technology.

In terms of sample size, Burns (2000) states that while size is important, it is not as important as "representativeness" (p. 93). Larger groups are better than a small sample size, but a larger group does not reduce researcher bias (Burns, 2000). Therefore, it is necessary to keep in mind that a sample group must be large enough so that evidence can be compared and contrasted in order to address the propositions brought up by the research questions.

There is another challenge when discussing the issue of sampling, and that is of the correlation between sample size and population. "Two different samples from the same population will not be identical," Fraenkel and Wallen explain (1996, p. 206). Hurlburt (1994) adds, "it is too difficult or too costly, or impossible to measure all the elements of a population" (p. 59). So, Hurlburt suggests it is best to select the elements to measure and to accept the sample size for what it is: a possible yet imperfect representation of the ultimate population.

The objective of this case study is to observe the procedures students use to produce videos with the video recording feature on their cell phones. A case study does not aim to provide generalisations that can confirm that all people will behave in the same manner under the same condition. Instead, a case study aims to look at the phenomenon and participants' specific responses to a particular event. Therefore this research adheres to Fraenkel and Wallen (1996) and Hurlburt's (1994) prognosis that attempting to correlate sample behaviour to population is futile and counterproductive.

Observable similarities in behavioural patterns in relation to cell phone video production may emerge. While this is not an attempt to generalise, it is possible that students will develop similar strategies to use their phones to produce videos in the target language. It is also possible that after participating in this project, students will arrive at the same conclusion regarding the educational benefits of using the cell phone video recording feature as a learning tool. It is only after examining the data and analysing the results that such inferences will be made.

It could be deduced from the evidence summarised in Table 2 that advanced language classes and adult groups generate smaller sample sizes. First year classes are generally larger, allowing for more reliable evidence. This research project aims to collect data from second year Japanese undergraduate

students, and this group sample seems to be suitable to juxtapose the findings against previous research.

The selected participants are Japanese university English students. The participants will not be randomly selected because the students select the course. Therefore, none of the participants are excluded from the sample group. Based on the literature reviewed, it has been determined that excluding students based on age of cell phones, poor video quality, or poor vision (as in Lee, Jeon, Ahn, Cho, Jung, & Kim, 2011) is inappropriate as this would reduce validity and reliability.

It appears from the literature that students did not receive any rewards for participating in any of the research projects in Table 2. Similarly, students participating in this case study will receive no rewards for completing the projects. At the beginning of the term when students receive the course outline and list of video production themes, they will also be informed that this is not a graded task. The objective of the course is to provide students with Microsoft PowerPoint presentation and public speaking skills. Students deliver two in-class presentations and are scored on these performances only.

The teacher provides feedback for the video performances. It is made clear to students that the feedback is provided to assist them in improving their speaking abilities, and is not a reflection of their performance for a final grade. The feedback includes areas of strengths and weaknesses to observe and improve upon in subsequent video productions.

Yin (2003) suggests that it may be suitable to disclose the identity of the participants. While this is a case study, it is the opinion of the researcher that, since the participants are university undergraduates who value their privacy, it is vital to keep participants' identities separate from the research analysis. Knowing individual students' names and backgrounds is not likely to provide more information beyond what is necessary to establish reliable and valid data.

Participants.

All students had an equal opportunity to join the English Communicative course, and all who elected to stay in the course were invited to participate in the research. Based on university policy for English course allocation, all students must select an English course that best meets their needs. The students opt to participate in a course based on their schedule, personal and extracurricular commitments, and their comfort level with the lecturer and course outline. After the two-week decision period for final course selection, the researcher invited the remaining students to participate in the research. The research did not exclude participants based on gender or abilities. Any participant wishing to join this project was welcome to do so.

The demographic background of the participants in this research project were second year undergraduate students (n=69) aged between 19 and 22 years. Students were divided into classes and each class contained students from the same major, with four different majors represented. For the purpose of observing if students from different academic fields behave similarly or differently, all classes were provided with the same course outline and learnt from the same textbook. All participants were aware that the course objective is to increase their exposure to communicative skills in order to improve their speaking abilities. All surveys, video recordings, and documentation were the same.

More information about the participants' background is provided in the data analysis section. Such analysis attempts to ascertain whether or not the participants' background can be an influencing factor on their perception to endorse using the video recording feature to enhance their English speaking abilities.

Technology

Six of the research investigations outlined in Table 2 required students to use their cell phones to complete the tasks. Three projects provided students with cell phones and one encouraged students to use a PC-based cell phone simulator. Corlett et al. (2005) conducted research to observe the PDA features preferred by university students. Seventeen graduate students were provided with a Compaq iPAQ 3760 to use as they pleased (p. 163). At the end of the project these authors explained that since their subjects had to return the learning device, students did not feel compelled to buy newer PDAs after the studies (see also Gromik, 2009a). Jones and Marsden (2006) explain that the tasks should be as authentic as possible to avoid limitations on the reliability of the project conducted. For the purposes of this case study and for participants to experience the full potential that their own technology affords them, it is more practical for students to use their own cell phones.

Task

The review of the literature and the summary provided in Table 2 reveal that most tasks required students to review vocabulary that they had to learn in preparation for future tests, express their opinions about videos displayed on their cell phones, or acquire specific phrases or vocabulary items. It was argued earlier that most research in Japan places an emphasis on reading, writing, or listening rather than on speaking tasks.

Case study research allows the researcher the opportunity to investigate a simple phenomenon. In a case study the individual, the technology, and the task can each be units of analysis (Yin, 2003). In order to define the task and units to be analysed, Burns (2000) describes two variable values to keep in consideration. Independent variables can refer to manipulation of the environment. Location is an independent variable that can influence the task performance. Dependent variables can be measured and depend on the behaviour of the participant (Burns, 2000).

In contrast to previous research, there are three variables under scrutiny in this case study. The first variable is the influence of technology to assist in oral performances. The second variable is the student's abilities to develop the skills needed to improve their video productions. Finally, the influence of the location where students choose to create their cell phone videos can be considered a last relevant variable. The unit of analysis will be the oral performance. Location and technology will be considered as influencing factors.

As the oral performance is the major source of unit of analysis, it is important that consideration be given to this task. As the literature demonstrated, the task must be within the reach of the participants. Bachman and Palmer (1996) add that the measured task must correspond to the type of behaviour that would be expected of participants in non-testing environments. Also, the task must take into consideration students' abilities and knowledge base. While this case study is testing the cell phone video recording feature, the purpose is to evaluate students' speaking abilities and learn more about the correlation between technology use and performance. This is different from prior research as students need to rely on their prior knowledge of the language to complete the task. Efforts are made to ensure that task requirements are not beyond the participants' capabilities and understanding.

Teacher guidance.

Week 1 is the only time during the project when the teacher monitors students' performance. This is to ensure that all students have the skills, knowledge, and technology to complete all future video recordings successfully without any technical challenges. After the first week, the teacher provides no further training for the cell phone video recordings.

The project is based on Vygotsky's theory of socio-constructionism which stipulates that it is through interaction with peers and tools that learners collaborate to negotiate understanding and to construct knowledge. As Chapelle (2001) explains "the experience [is] crucial for individual cognitive development [that] takes place through interaction with others, and therefore key evidence for the quality of learning activity should be found in the discourse that occurs in the collaborative environment." (p.32). In line with this explanation, the video production project is the experience that engages the learners to develop cognitive linguistic awareness that indicates learning activity.

In addition and as stated previously, all Japanese students receive 6 years of English language exposure plus one foundation year at university. Therefore it is assumed that after 7 years of English exposure, these students should possess sufficient language awareness to communicate basic opinions spontaneously. Richards (1990) supports this assumption by stating that "the relationship between conversation and second language learning is that the conversation class should primarily provide opportunities for learners to engage in natural interaction through the use of communicative tasks and activities." (p. 78). It is through the interaction with peers and through the production of the videos that students have the opportunity to reflect on their speech production and thus develop the learning mechanism to modify their output (Pica, 1987). Long (2009) also adds "that students cannot learn (as opposed to learn about) target forms and structures on demand, when and how a teacher or a textbook decree that they should, but only when they are developmentally ready to do so." (p.378). Thus it is the opinion of this researcher that since these particular Japanese students have 7 years of prior English exposure, it may be more beneficial if they consolidated their prior knowledge of the target language and demonstrated their capabilities. If they experience some challenges with their speech production, they can approach their peers for support, guidance, and meaning negotiation.

By encouraging students to learn on their own, they have the opportunity to develop independent learning skills. They can further develop these learning skills by keeping a

record of their performances on the weekly diary provided to them by the teacher (Riley & Harsch, 1999), they can discuss with their peers the application of useful learning skills, or they can view their peers' videos to determine which productions they perceive to demonstrate the best speaking strategies. Thus this research aims to engage learners to use technology in order to either consolidate their current prior learning skills or to develop new learning behaviours. Students gain more control over the quality of their performances if they are provided with the liberty to express their opinion in the target language and reflect on the effectiveness of their skills and abilities. Warschauer and Meskill (2000) are of a similar opinion, for as they state "cognitive approaches to communicative language teaching are based on the view that learning a language is an individual psycholinguistic act." (p.304). Hence in the production of content, language learners focus on form and meaning which is beneficial for their understanding of language structure.

According to Richards (1990) the decision to let students be in control is neither right nor wrong, since as he states there is not one "super method" of teaching (p.36). Instead, he advocates that teachers should be engaged to observe and reflect on learners' behaviors and outcomes in order to determine effective teaching (p. 37). Thus the role of the teacher is not to train students, but to observe how students interact with technology to gain control over their language performance.

Testing

From the collection of research reviewed (refer to Table 2 above), some projects applied either a pre- or post- test followed by a post-delayed test. Four of the research projects conducted only post-test surveys or test methods for collecting data. Two studies collected evidence from observations and computer logs. Amongst other research methods, one conducted interviews and discussions with participants and one collected cell phone video evidence of students' oral output as well as observations from their blogs. While some of the researchers applied one data collection approach, such as Lu (2008) who solely relied on pre-, post- and delayed post-tests, the remaining researchers applied a mixed approach to data collection. Mixed method research is a recommended strategy for increasing the internal validity of a research study (Creswell, 2009). Burns (2000) expands upon this suggestion by recommending that triangulation be implemented since the collection from mixed sources of evidence corroborates and validates the evidence advanced.

Research Methods

The literature review revealed that some researchers do not define their research methods. For example, Thornton and Houser's (2005) research does not stipulate whether they are applying a qualitative or quantitative approach to data collection. First they report on the results of a survey and provide statistical evidence. Then they conduct a study based on a literature review of memory

performance (p. 211). The study is structured as a repeated task and the evidence is reported as pre- and post-test participant performance (p. 228). The evidence is also reported through quantitative analysis. Finally, the testing of videos of idioms is an in-class timed test. The evidence for this study is reported quantitatively. While the overall assumption would be to consider this research as using a quantitative method, the whole structure resembles a pilot study as all studies are either short or conducted during one class session.

Uzunboylu et al. (2009) utilised Motiwalla's Usefulness of Mobile Learning System (UMLS) as a pre- and post-project questionnaire as well as relied on quantitative analysis to report the data. Like the other research reported, Lu (2008) conducts her investigation using quantitative methodology. This would also seem to be the case for Oliver and Goerke (2008) and their pre- and post-test surveys. Lu and Oliver and Goerke are the only researchers who outline research questions to direct their studies.

Huh and Hu (2005) report that a problem with quantitative studies designed to test the technology is that the "statistical results do not provide the in-depth explanation and evidence, which are effective in understanding human phenomena, behaviours and experiences, that helps us to understand the learner in depth." (p. 18). It is with this specific opinion in mind that this research project applies a case study research method to collect necessary data that will contribute evidence about students' behaviours and their perceptions of using mobile technology to consolidate their cognisance of the target language.

Research Methodology

What differentiates case study from other research methods is the extent to which it attempts to gather sufficient evidence from a wide range of sources to provide an understanding of human phenomena. For example, when evaluating the correlation between literacy and laptop use, Warschauer (2008) conducted a multi-site study to ensure that the findings reported were consistent and reliable. In his article he describes the locations, the ethnic background of the students attending the selected schools, the level of the schools, the programs they offer, the funding each participating school receives, and the computers students have access to in class. The culmination of the study provides an explanation of the success rate of gaining literacy skills through laptop operation.

Not only is it necessary to provide a clear description of the phenomena under scrutiny, but it is also necessary to design a reliable data collection process. In order to conclude that literacy skills can improve when students use technology, Warschauer (2008) relied on a wide range of approaches to collect data. First he relied on basic data collection strategies such as observations, interviews, and surveys. But Warschauer also delved deeper by accessing "school documents, teaching materials, student assignments and student test scores" (p. 55). Such information can empower a researcher to draw reliable and valid conclusions (Yin, 2003).

To conduct a reliable and valid case study, Yin (2003) recommends that researchers rely on previous studies to either validate previous findings or describe an innovative and functional approach which provides new compelling evidence. The limited research available provided a partial view of the educational benefits that can be generated via the use of cell phones.

As the review of current cell phone-based research revealed, there are few studies investigating cell phone integration in the classroom and even less on the issue of cell phone video camera use as a learning tool. Therefore, a case study approach was selected because it allows research of an individual or a whole class as a phenomenon worthy of study. It is through establishing case studies that the researcher is enabled to understand the causes and effects that direct a particular individual to operate technology in a preferred manner. The aggregate of individual case study evidence provides a view of social behaviour and leads to the observation of a potential pattern of performance.

Collecting Data from EFL Speakers

Assessing students with limited language abilities can be problematic for researchers (Jones & Marsden, 2006, p. 148). Goddard and Melville (2004) add that it would be foolish to expect total honesty from participants who might prefer to provide a "socially correct" response (p. 48). Japanese students are renowned for providing neutral responses. To reduce the likelihood of misunderstandings or indirect responses, Goddard and Melville (2004) suggest organising short questionnaires in which items can be clearly understood and easy to answer. They also recommend that the researcher emphasises the need for fair and honest responses as these will help participants and future peers to be better understood and educated by teachers.

Accessing a group of participants interested in demonstrating their capability to perform in the target language is beneficial for the reliability of answers provided. Based on observations and prior experience conducting surveys with Japanese second year university students, this group of students was selected because they have sufficient prior knowledge of the language to answer English-based tests. They also have an interest in learning to speak English. In terms of conducting interviews, students' prior knowledge of the target language and their ability to express their opinions in English is important for responding to verbal questions and to answer text-based questions outside of class time. In terms of technology, all students owned a cell phone and were familiar with the basic features. As the statistical evidence reveals, most students use their cell phones to make calls or to send text messages, but few use other features such as the video camera or the voice recording option. This researcher proposes to investigate whether or not the technology engages students to communicate in the target language and to observe how students interact with the technology. Therefore, it is essential that students have sufficient interest in the technology and the target language to participate.

Contributions from prior research

In order to decide what data collection methods best suit a particular research objective, it is recommended that researchers first conduct preliminary investigations, if possible (Axinn & Pearce, 2006). The data collection method applied for this case study was developed and tested in previous investigations by this researcher (see Table 3). Table 3 outlines the various articles that were either presented at international conferences or published in academic refereed journals.

Table 3 Researcher presentation and publications

Publication dates	Title	Topic / Issue	Paper and Conference Presentation
2010	Do you know who we are? Undergraduate students' access to technology: A survey report	Reports on a longitudinal needs analysis survey	*JALT CALL Journal*, 5(3), 57–66
2009	Producing cell phone video diaries	Socio-constructivist pilot study investigating the possibility of integrating social networking systems with language learning and cell phone video production	In Michael Thomas (Ed.), *Handbook of Research on Web 2.0 and Second Language Learning*
2009	Cell phone technology and second language acquisition in Japan	Research investigating the possibility of using cell phone technology in large class intervention	Conference presentation with Neil Anderson at *QS-Apple, Kuala Lumpur, Malaysia*
2008	Lights! Camera! Action! A video project for the Web 2.0 Classroom	Research to integrate video production in the language classroom	In Melinda Dooly and Diana Eastment (Eds.), *"How we're going about it": Teachers' Voices on Innovative Approaches to Teaching and Learning Languages*
2008	EFL learner use of podcasting resources: A pilot study	Pilot study investigating use of mobile technology as learning tools and for autonomous learning	*JALT CALL Journal*, 4(2), 47–60

The needs analysis survey was tested to ensure that the questions in the survey would not pose any great challenges to non-English speaking participants (Jones & Marsden, 2006) and that they had enough time to complete the survey without feeling stressed (Burns, 2000). The integration of video

digital media was tested to ensure that students would be able to use the technology as well as gain educational benefits from the activities. Finally, preliminary use of cell phone technology was tested with advanced EFL speakers to ascertain if any educational gains would emerge and to delineate the best teaching practices for integrating such technology in the language classroom. The above investigations required the researcher to review the literature, conduct interviews with students to understand the causes of any challenges they may have faced, and make observations to visually appreciate the process students applied when completing a survey, producing oral output or creating a film.

Publishing prior research was instrumental in receiving feedback from colleagues with various research interests and backgrounds working in various settings and institutions. Publishing the preliminary findings in refereed journals increases the reliability and the validity of the foundation upon which this project is structured.

As the list of publications above reveals, the development of this project was a slow process. At the onset of this research, efforts were made to understand the participant population to ensure that they would benefit from the activity and the use of technology. In addition, completing prior research enabled the researcher to construct a research method that would suit the local environment as well as take into consideration various suggestions from renowned researchers such as Burns (2000) or Professor Neil Anderson. Figure 3 is a representation of the suggestions arising from the literature and colleagues to ensure the progress and success of the research.

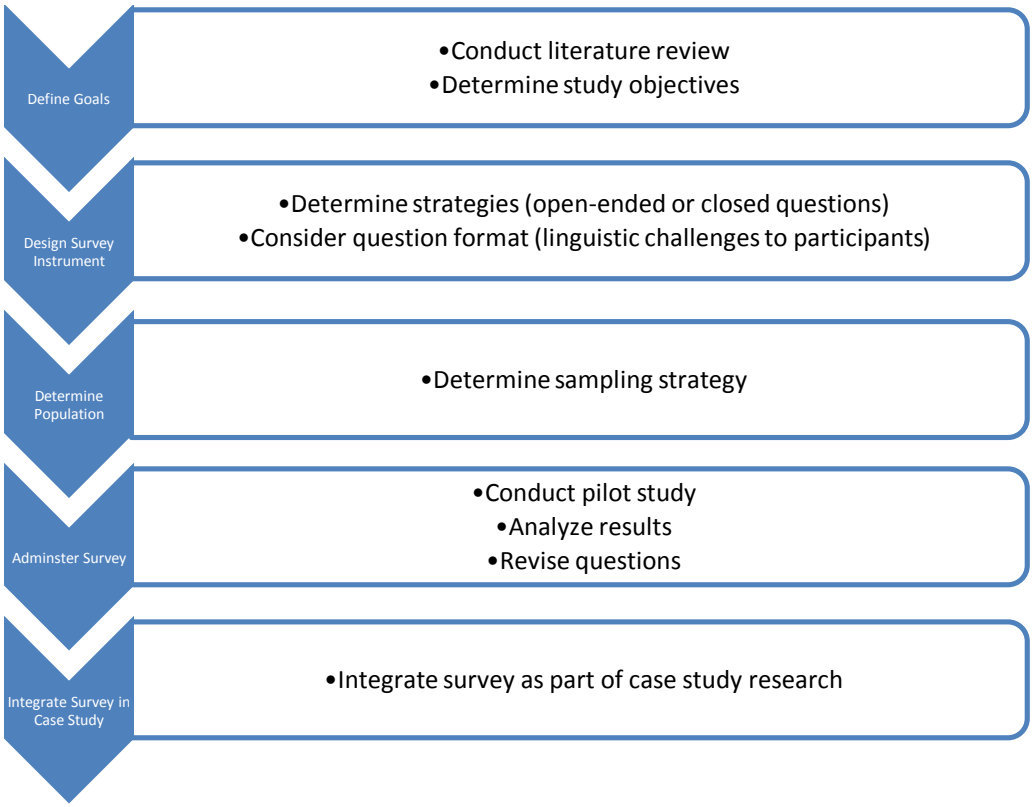


Figure 3. Research Method

The outcome was that a prospective design (Axinn & Pearce, 2006) would best suit this research because it would offer the opportunity to observe participants' performances from the standpoint of their prior knowledge and how they would use this knowledge to complete the task.

Data Collection Strategy

Structured as a case study, the data collection process aims to collect a chain of evidence (Yin, 2003) about the use of the video recording feature on cell phones by Japanese university students. Burns (2000) states that the data collection method in a case study can be derived from interviews, observations, and documents (p. 470). These may be collected from written documents, diaries, or audiovisual recordings.

As was explained earlier, the first step to organise this case study research was to collect secondary resources to gather an understanding of previous research conducted, the settings, methodologies, technology, and the manner in which it was used to evaluate language learning acquisition. In addition, research was conducted in order to better understand the cohort of potential participants. Armed with this information, the next step was to design a rigorous data collection method reflective of a case study method. The purpose of designing a data collection strategy was to collect reliable and valid evidence that would also offer genuine and authentic feedback from participants. The objective was to get feedback that was as realistic as possible. To achieve this objective, triangulation, the act of collecting various sets of data to corroborate the outcome from the data analysis, was at the forefront of this data collection design.

In order to observe and understand the potential benefits of integrating cell phone video-based production as part of an oral language performance project, the data collection strategy below was integrated into the language learning curriculum. As Figure 4 displays, the data collection was divided into two parts: the cell phone video performances and the surveys. The data were then divided into three stages: pre-intervention, intervention, and post-intervention. Based on the literature, applying this method not only allows the data to be analysed as individual parts, but the evidence can be triangulated to augment the validity and reliability of the responses provided by the participants.

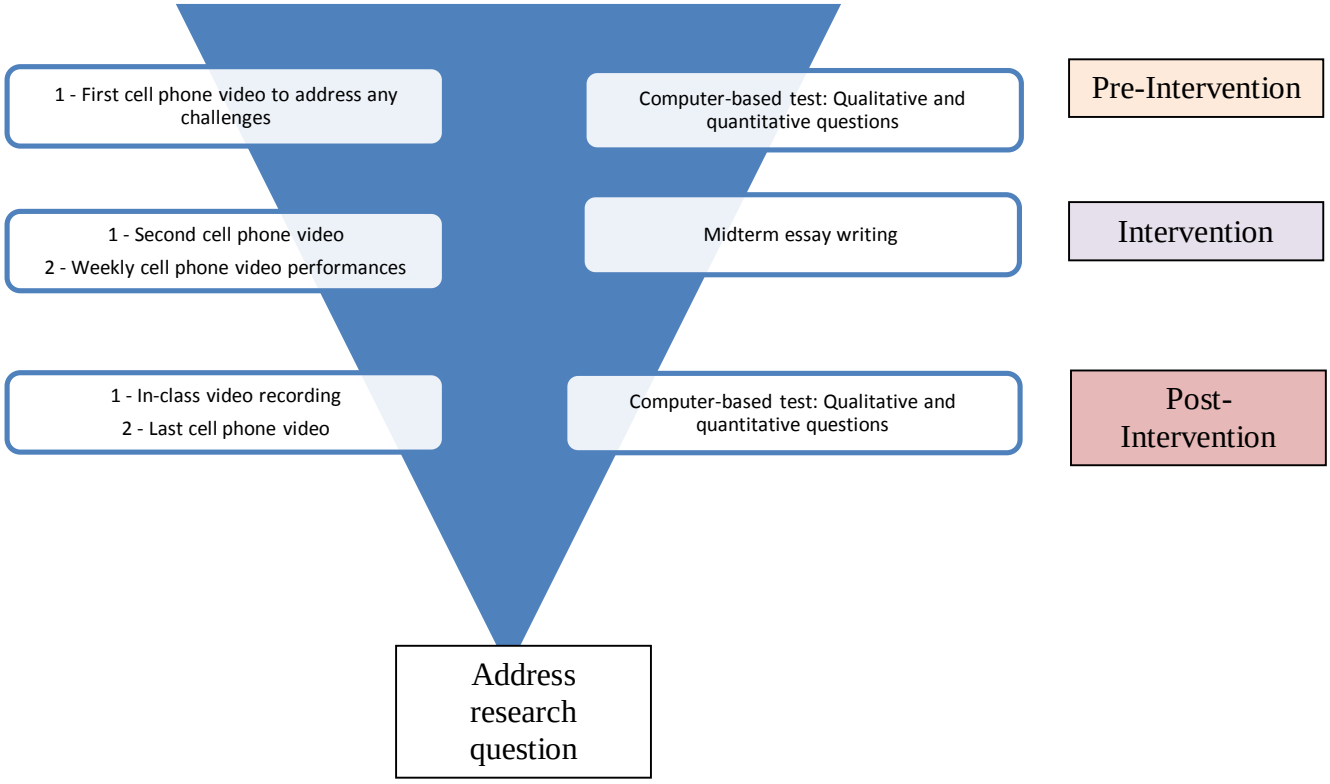


Figure 4. Data Collection Method

A structured approach to data collection empowers the researcher to delineate signposts that can deal with any contradictions, challenges, or problems during the research (Burns, 2000). Therefore, from the information depicted in Figure 4, it becomes more apparent that the whole data collection process is progressive and builds up from the previous stage. In addition, the data collection process is designed to collect information from different participants completing the same task, as well as collecting data from repeated measures (Pallant, 2007). Tables 4, 5, and 6 describe the data collection stages, the purpose of each stage and the tasks participants needed to undertake in order to provide evidence concerning their use of the cell phone video recording feature to enhance their speaking abilities.

The pre-intervention aimed to collect evidence of students' spontaneous speaking and general speaking abilities before they engaged in the task and began to learn and use strategies and methods to improve their speaking abilities. (see Table 4). The purpose was to evaluate students' prior knowledge of the target language and their ability to speak without using visual assistance, such as palm cards, electronic dictionaries, or peers. Based on the conclusions that emerged from the literature review, it was decided that repeating the task (introducing themselves in class and then doing the same activity on their cell phones in the comfort of their homes) could generate evidence to support the proposition that students perform better when they have more time to think about the comments they wish to produce in the target language.

The computer-based survey aimed to collect general information about the students' educational and technological background. This was a vital part of the project as the information revealed students' access to and comfort with technology, which in turn might affect their ability to complete the work on time. Some of the questions gathered students' opinions about the idea of producing cell phone videos in English prior to their experience with the actual task. The objective was to evaluate if students' perceptions change over time.

Table 4

Pre-Intervention Data Collection

Pre-Intervention Stage	Purpose	Task
In-class video recording	Collect audiovisual evidence of students' spontaneous speaking abilities	Oral self-introduction
First cell phone performance	1 – Collect audiovisual evidence of students speaking at home 2 – Collect evidence of cell phone video file formats 3 – Compare and contrast in-class video recording with first cell phone performance	Oral self-introduction
First computer-based survey	Collect demographic data about students' access to and familiarity with technology	Complete survey

The intervention data collection process collected all the weekly audiovisual oral performances from students. This stage was a teacher-centred activity. The researcher managed the class Yahoo! email account, checking and recording students' completion of the weekly activities. The researcher provided feedback to the students about their video and performance. All the email correspondence was stored and reviewed for analysis.

Table 5

Intervention Data Collection Process

Intervention	Purpose	Task
Second cell phone video	Collect audiovisual evidence of students' opinions of the course This task will be repeated at the end of the term	Verbalise opinion of the course
Weekly activity	Collect weekly audiovisual evidence of students' speaking abilities with the aid of a cell phone Provide teacher feedback to students Evaluate vocabulary recycling	Video performances on various topics covered in class

Midterm essay	Collect evidence of students' perceptions of the course	Respond to a research question

The midterm essay directed the participants to write a short narrative about their initial experiences with creating and sending their cell phone videos. The purpose of the essay was to discover if any of the students were experiencing extreme difficulties with the project and to ensure that their learning experience was not suffering.

The post-intervention was structured similarly to the pre-intervention. It included the final cell phone video performances, an in-class video recording, and a computer-based post-intervention survey.

Table 6

Post-Intervention Data Collection

Post-Intervention	**Purpose**	**Task**
Final cell phone performance	Collect audiovisual evidence Evaluate speaking ability (words per second, lexical item range used)	Verbalise opinion of the course
In-class video recording	Collect audiovisual evidence of students' spontaneous speaking ability Evaluate vocabulary recycling	Verbalise opinion of the course
Final computer-based survey	Collect evidence of students' perceptions of the course	Complete survey

The purpose of collecting and classifying the final cell phone performances separately from the others is because the task was repeated for the in-class video recording. The topic required students to express their opinion of the overall cell phone video project. Participants were not informed that this would be the same topic for the in-class video recording. The objective was to evaluate if the last cell phone video recording would inspire students to create their best production.

The final in-class video recording was conducted in a separate room from the classroom to provide students privacy from their peers, just as they would have if they recorded the video at home. The objective was to evaluate if the participants recycled any of the vocabulary from their final cell phone video. It was also to observe if students had improved their ability to speak spontaneously.

The final computer-based survey collected primarily qualitative evidence from both closed and open-ended questions.

In-class video

The video collected at the beginning of the course provided a view of each student's potential at the onset of the course. This in-class activity was conducted during the first class of the term. The prompt was written on the board and consisted of students introducing themselves. Participants were not informed of any time constraints, they could speak as long as they chose and were able. If a student was faltering because they were unable to speak fluently, then they were directed to close their speech. If they could not close the speech then they were thanked for their performance and asked to return to their seat. Based on prior studies, it was anticipated that students should be able to produce a 15-second monologue successfully.

The teacher brought a video camera placed on a tripod and controlled the video recording device. The teacher did not speak with the student or offer any prompts. Students in the classroom were requested to remain silent out of respect for the speaker.

The recording session was conducted at the back of the class so other students did not make the speaker self-conscious. This strategy was utilised to remove any embarrassment the speaker may have felt. While other participants were waiting, they were required to complete the pre-survey. This ensured that they were occupied and that their time was being used constructively. It may be argued that the survey could be considered a warm-up activity, exposing students to English; however, due to the structure and focus of the survey, it is unlikely that the survey affected performance. Engaging participants to focus on the survey removed the temptation to listen to the content of their peers' self-introductions.

The aim of this project was to collect and analyse samples of students' cell phone video productions to reveal how this cell phone feature influences language learning, development, and production. It also aimed to evaluate the integration of this device in the language classroom and its use as a learning tool to stimulate students' oral performances.

In order to assist in collecting relevant data that will provide reliable and valid data analysis, video performances were recorded under two different conditions. Students completed a pre- and post-intervention video recording conducted in class in addition to presenting weekly cell phone videos that they created outside of class.

The in-class video recordings aimed to record students' abilities to speak spontaneously without any assistance for a minimum of 30 seconds. This time specification was based on the Test of English for International Communication (TOEIC) test, which requires students to speak for 30 seconds, as well as the fact that some cell phones cannot record videos longer than 30 seconds. Amongst the cell phones that can record events longer than 30 seconds, the files are usually too large to email to the teacher (Gromik, 2009a).

The data generated from the first in-class video were contrasted against the final video recordings collected during the last class of the term. This evidence reveals whether or not students were able to make any improvements with their oral abilities. The in-class video recordings and the outside of class cell phone video productions were collected to assess any linguistic improvement that could be due to the weekly production of cell phone videos. Both the pre- and post-interventions covered a similar topic in order to evaluate if students' perceptions of the project changed throughout the term and to see if their speaking ability improved.

Computer-based survey

It was previously mentioned that survey items need to be calibrated to meet EFL students' reading comprehension abilities as well as their ability to respond. Pallant (2007) has suggested that survey items should not be ambiguous and should not include double negatives, unfamiliar words and abbreviations, or leading, emotional, or culture-specific questions (p. 10). The survey was designed and tested in prior research, and revisions were made in order to comply with Pallant's suggestions.

The survey was conducted during the first class, at the start of the course. It was conducted at the same time as the video recorded self-introduction, so an assistant teacher was present to assist students having any difficulties with survey item comprehension. Prior research has indicated that students need an average of 60 minutes to complete the survey. Table 7 is taken from the actual survey that students completed in class.

Table 7

Survey Items in Line With Literature Review

Survey items			**Categories**
Before you start, read carefully. Type a "1" to indicate a positive answer. Leave blank or type a "0" to indicate a negative answer. Please write your answer in the coloured box only.			Clear directions (Burns, 2000)
Confidential document – The information you give is used for research. Your privacy will be respected. Do you allow Nicolas Gromik to use this information for research?			Privacy
Name	Student number	TOEFL/TOEIC score	Demographics
Male	Female	Age	
Below type a "1" to indicate since when you have studied English, since…			English background
Elementary school	Junior high school	Senior high school	
Have you ever had a native English teacher?			
What type of computer do you own? Laptop XP Desktop XP Laptop Vista Desktop Vista Laptop Mac Desktop Mac No PC			Technological background and familiarity Thornton & Houser (2005) Gromik (2009b)
Do you have a web-cam (a camera attached to your computer)?			
How long have you had your computer? Less than 1 year 1 to 2 years More than 2 years			Gromik (2009b)
When did you start using a computer? Junior high school Senior high school Starting at this university			

Never	
Do you know how to use the spell and grammar check on Word?	
Do you have internet at your house/apartment?	
Indicate your internet emailing habits, do you… a) Send internet e-mail b) Send English e-mail c) Write in Japanese d) Visit English websites e) Write to friends in other countries f) Visit Japanese sites g) Send internet emails from university h) Send internet emails from home	
How many times a day you send internet emails? 1-5 internet e-mails per day 6 - 10 e-mails per day More than 10 per day	Thornton & Houser (2005)
Indicate why you use the internet. a) To read/write blogs b) To research c) To chat online d) To download software e) To study f) To watch movies	
How many hours a day you use your computer? Less than 1 hour Less than 2 hours More than 2 hours	
Write down the brand name of your cell phone (e.g.: Samsung, Nokia)	
Explain why you selected this particular cell phone.	
What is your favourite cell phone feature? (choose only 2 features) a) Note taking b) Shape c) Emoticon d) Calling e) Photo camera f) Calendar g) Colour h) Texting/emails i) Watch movies j) Schedule k) Size l) Ketai is easier than PC m) Internet n) Alarm o) Compact p) Video camera q) Light r) Music s) Cash card t) Cost u) TV v) Company service w) Other features	
Did you receive any training to learn how to use your cell phone?	
Who helped you learn how to use your cell phone? a) Cell phone b) Company c) Friends d) Family members e) Books/Magazines f) By myself	
How old were you when you first started using a cell phone? 0 to 5 years old 5 to 10 years old 10 to 15 years old 15 to 19 years old	
Why did you decide to get a cell phone at that age?	
Do you have a “land line” telephone at home?	
Do you ever use public telephones in the streets?	
Explain why you use (or do NOT use) public telephones in the streets.	
Indicate your cell phone emailing habits, do you...	Thornton & Houser

a) Write cell phone mail in English b) Write in Japanese c) Write to friends in other countries d) Visit websites on your cell phone e) Send cell phone emails from university f) Send cell phone emails from home	(2005) Wang & Higgins (2006)
Indicate how many times a day you send emails. a) 1-5 per day b) 6-10 per day c) More than 10 per day	
Do you carry your phone with you everywhere you go?	
Why do you like to carry your phone with you everywhere?	
Do you agree with using cell phones to study English?	
Explain why you agree (or disagree) with studying English with a cell phone?	
Circle the type of iPod you have a) iPod Nano b) iPod video player c) iTouch (iPod) d) iPhone e) another MP3 player	
Would you like to use iPod technology to listen, read, view and learn English?	
Do you have an electronic dictionary?	Loucky (2005)
Which skill is most important to you? Rate from 0 to 5. 0 = least important, 1 = sometimes important, 2 = important, 3 = often important, 4 = very important, 5 = most important 0 1 2 3 4 5 Reading Writing Speaking Listening	
This test was in English. Was it difficult for you to complete? Select one option from below. a) Very difficult b) Some parts were difficult c) Not very difficult d) Easy e) Very easy	
Did you have any problems understanding any of the questions in this test?	
If you did have any problems, in the space below write the number of the question you had problems with.	
Thank you for taking the time to answer these questions. Greatly appreciated, Mr. Nicolas Gromik	

The questions on this 38-part survey were formulated based on the literature. To facilitate relating the literature to the questions, Table 7 includes article references. For example, questions concerning access to computer and cell phone communication habits were based on suggestions from Thornton and Houser (2005) and Wang and Higgins (2006). Not all questions were generated from the literature. The literature was instrumental in identifying some research questions, but lack of information or concerns from reviewing the literature warranted further investigation in certain aspects of technology use or ownership.

The research conducted by Gromik (2009b) revealed that researchers in Japan did report on their students' access to technology. Therefore, based on this document, it was decided that learning the types of technology students have access to is beneficial for a course that incorporates technology and for this research since it provides a better understanding of the students and their ownership and use of specific technology.

Questions concerning computer skills aimed to evaluate students' prior experiences in order to determine whether or not they would be able to complete the tasks and requirements of the course.

Students' use and opinions of their cell phones is central to the survey and this research. Therefore questions inquired about the central role and use of cell phones in their daily activities.

In order to understand students' educational needs, one survey question focused on the skills they would like to develop. Even though the course description explains that the course promotes development of speaking aptitude, this question ensures that students are not frustrated by taking a course that places greater emphasis on communicative learning. Should students indicate that they place greater importance in developing their reading or writing skills, then these students would be approached to explain the objectives of the course and to identify their reasons for taking the course.

The remaining questions provide students with the opportunity to rate the survey and to identify parts with which they had difficulties or challenges. Based on student feedback, the questions can be revised to improve reading comprehension and response reliability.

The aim of the survey was to gather information concerning students' prior experience learning English and using technology and cell phones. Some of the questions in the first survey were repeated in the last survey. The purpose of repetition was to compare and contrast students' opinions at the beginning and end of the course, particularly to reveal students' opinions about using cell phones to speak English.

Cell Phone Video Production

The purpose of this research is to determine the potential that the cell phone video recording feature provides language learners. In reaching this goal, understanding students' attitudes, beliefs, behaviours, and opinions about cell phone video production is paramount. The use of multiple sources of evidence allows the researcher to increase the validity and reliability of the evidence generated and presented in order to provide a broader explanation (Yin, 2003). The cell phone video recordings were

collected in three stages: pre-intervention, intervention, and post-intervention. These are described below.

Pre-intervention

The pre-intervention stage consisted of a two-part data collection approach. First, participants were asked to produce a self-introduction cell phone video outside class in the first week, soon after completing their in-class video performance. The objective of collecting this evidence was to report any differences or similarities that emerged between the two performances. The vocabulary, duration of video, and performance were evaluated.

Second, the second week cell phone video topic was similar to the final cell phone video topic, as well as the last in-class video performance. The aim was to record any progress in terms of vocabulary, duration of video, and speaking strategies and confidence.

Intervention – theme-based task

After completing the pre-intervention stage, all cell phone videos were collected to evaluate students' performances over the length of the course. The purpose of this stage was to record individual progress in terms of vocabulary selection and speaking time. This evidence was contrasted against the weekly themes covered in class to evaluate any correlations between topic and performance. Individual performances were also contrasted against the overall class performance to see if a correlation between major and performance exists. This final set of evidence was contrasted between each group. The aim was to understand if students from different majors behave differently in their video performances.

Table 8

Weekly Video Theme Titles

First in-class video recording Self-introduction	**Week 1** Self-introduction	**Week 2** What do you think of the course?	**Week 3** What did you do during Golden Week?
Week 4 What did you think of your peers' speaking styles?	**Week 5** What did you think of your peers' opinions during their presentations?	**Week 6** How will you improve your next presentation?	**Week 7** Describe your favourite shop in Sendai.
Week 8 Describe your favourite painting.	**Week 9** How would you save the environment?	**Week 10** Describe your favourite invention.	**Week 11** Explain why you agree or disagree with your peers' opinions in their presentations.
Week 12	**Week 13**	**Final in-class video**	

What will you do during the summer holidays?	What do you think of this course?	**recording** What did you think of this course?	

As Table 8 exhibits, the topics required participants to learn about and demonstrate their abilities to use various tenses. Attempts were made for students to use past, present, and future tenses in their speeches. In line with the research objective to ascertain whether or not students could rely on their prior knowledge of the target language, the course does not focus on exposing students to new grammatical points. The purpose of the course is to expose students to content that will facilitate their ability to use reflection and express their opinions.

Word count evidence

All of the students' videos were transcribed and coded in terms of number of words, speaking time, and words spoken per second. The lexical items utilised in their speech were also coded in terms of first 1,000 words, first 2,000 words, and academic words from the academic word list (AWL) described by Nation and Waring (1997) and Cobb (2011). The data were collected every week for the duration of the project.

Words spoken per second was the data set that attempted to measure if students were benefiting from using the video recording feature. The final score to observe if students are benefiting from the use of the video recording feature was the difference in number of words spoken per second between time 1 and time 2; that is, the videos produced in Week 2 and Week 13.

The collection of cell phone video performances could be evaluated per student, per group, and across classes. Flyvbjerg (2006) suggested that extreme cases should be considered when collecting data. Extreme cases are defined as phenomena that fall outside the norm. For example, some participants might not enjoy the task and have a hard time completing the video productions, while others might perform extremely well. Recognising, selecting, and reporting on extreme cases is one method to concentrate the research findings in order to extrapolate more specific data.

Post-intervention

The post intervention task aimed to collect evidence of students' final performances to report on their cumulative abilities and progress. The last cell phone video was contrasted against the performance in the Week 2 video as well as the final in-class video recording.

Figure 4 showed the process for collecting converging evidence that can be triangulated. The Week 2 and Week 13 assignments required students to create cell phone videos on the same topic. The topic is also the same for the last in-class video. It could be seen that using the same topic for the final cell phone video and the last in-class video is a repetitive task that might not elucidate any further evidence. However, it was deemed a relevant data collection strategy because the activity and theme

might reveal whether or not participants recycled any of the vocabulary used in previous video performances, if they changed or expanded their opinion from previous speeches, and if they gained more speaking confidence after their repeated opportunities to express their thoughts on the same topic.

Weekly Diary

In addition to collecting data from in-class surveys and outside class interviews (discussed next), it was deemed necessary to collect weekly feedback from students about aspects of cell phone video production. A self-report diary was conceived for the purpose of this research. As can be seen in Table 9, the weekly diary was devised to be easy to use. The diary had to be completed quickly without imposing any burden on the students' time or external needs. The information provided in the diary guided the students to simply circle or tick the appropriate boxes. Space was provided for students to add more information if needed, such as an unlisted strategy they thought was important to improve their performance. But the worksheet was also designed with the researcher in mind. Once the researcher collected the diaries, the information was recorded on a Microsoft Excel spreadsheet. A tally-type worksheet was deemed appropriate for both researcher and participants as it would potentially reduce the likelihood of making errors when transferring data from the diary to an Excel document.

After the participants created their weekly cell phone video performance, they completed the video diary tracking sheet (see Table 9). Participants were informed that this information was useful for them since it helps them to track their performances and progress. As part of understanding students and their video production process, the data were presented to them regularly during class time to encourage them to discuss their strategies.

Table 9

Weekly Diary Report

Cell Phone Video Diary									
Date				Male			Female		Class
1 – Did you enjoy making this video?									
2 – What did you do that was different from your previous video?									
3 – Speech preparation time.									
Minutes	Less than 5	5 to 9	10-15	16-20	21-25	26-30	31-35	36-40	41–45
50	55	60	65	70	75	80	85	90	95+
4 – What strategy did you use to prepare your speech? a) think & speak b) used a dictionary c) friend checks d) write in English no dictionary e) write in Japanese & translate to English f) speak directly to video without thinking g) no strategy									

5 – What strategy did you use to help you remember your speech?
a) think, practice before speaking b) speak clearly c) practice in front of mirror
d) memorise speech by myself e) practice with friend f) try to relax g) practice, view, send
h) concentration i) memorise speech j) view video many times k) no strategy

6 – What strategies did you use to improve your speech production?
a) practice many times b) pronunciation c) not speak in Japanese d) fluency
e) content f) volume g) eye contact h) relax i) speaking j) speed k) volume l) logical m) story
n) learn more about topic o) pauses p) body language q) location

7 – What errors did you make?
a) pronunciation b) L – R sound c) grammar d) adjectives e) speak fluently f) forget speech
g) wrong vocabulary h) could not send email i) volume j) background noise k) run out of time
l) pauses m) no errors n) eye contact

8 – How many seconds long is your video?

Seconds	5	10	15	20	25	30	35	40	45
50	55	60	65	70	75	80	85	90	95+

9 – Number of times recorded before selecting best video?

Once	twice	three times	four	five	six	seven	eight	nine	ten
11	12	13	14	15	16	17	18	19	20+

10 – How many words did you speak (word count average)?

0 – 5 words	10	15	20	25	30	35	40	45	50
55	60	65	70	75	80	85	90	95	100+

The objective of the weekly diary was to collect data about students' production process. The weekly diary formed a source of evidence that if necessary was used during the interview session to discuss with participants the progress of their performances.

The structure of the weekly diary aimed to collect information conducive to understanding students' cell phone video production process, as well as their process for organising and formulating their opinions. Therefore, students were required to keep track of the time taken to prepare and perform their speeches. In addition, students needed to reflect on the challenges they experienced during the process of speech preparation, speech delivery, and video production. The last part of the weekly diary required students to observe and report any progress they had made since their last production and to report any errors they may have made during production. The overall objective was to evaluate if, over time, completing the worksheet had any influence on students' progress, and if that reflection was an influencing factor during the last in-class video production.

As can be seen on the weekly diary form (Table 9), some items required students to keep track of their production process time and length of recordings. This evidence was used as quantitative data to observe if all students performed similarly.

Questions 4, 5, 6, and 7 required students to reflect on the strategies they used in the production process. Learning strategies are activities students employ to acquire, retain, retrieve or perform an

activity more easily and effectively (Griffith, 2003). O'Malley, Chamot, Stewner-Manzanares, Kupper, and Russo's (1985) research revealed that successful learners reported an ability to apply higher metacognitive learning strategies. Therefore the list of strategies provided to students in this research are organised in order of low to greater metacognitive strategies. More advanced metacognitive skills refer to a student's ability to study and perform a task independently and to seek out better methods for improving their performance. Anderson (2005) categorized learning strategies into 7 groups, which are: cognitive (retention), metacognitive (planning), memorization, vocabulary use, anxiety reduction, relaxation, and "social strategies" (p. 760). Based on this list, four groups of questions were presented to the students as options and were organized in terms of writing strategies (question 4), memorization strategies (question 5), speech improvement strategies (question 6) and reflection on performance strategies (question 7). Some of the strategies in the lists outlined below were based on Hong-Nam and Leavell (2006), others were based on the literature review from Japan-based research (see literature review) and from this researcher's experience. These questions and strategies will be described in further details below.

Students were encouraged to write down any other strategies that they decided to use. It was possible that the list of options provided would grow as students provided more details. Nonetheless, the items selected in the questions were organised in terms of strategy application efficiency. This is explained in greater detail below. The numbers in brackets refer to the code used to identify but also to qualify the strategies in order of sophistication or level of effort and improvement made during the statistical analysis.

Question 4 – Strategies to write script

Students may have utilised a variety of strategies to prepare their speech. These strategies range from basic to advanced. Responses indicating "no strategies" would be interpreted as an indicator that the student is making little effort to identify strategies that may assist them in improving the quality of the speech and would be coded as (1).

Basic speech preparation strategies may include, "writing my speech in Japanese and then translating it into English with or without any aid" (aid could be dictionaries or other books) (2). Students could also note that they wrote their script with the assistance of a friend who checked the final work (3). Similar to Code 2, students indicating that they seek out external assistance can gain more confidence by discussing with others some strategies to improve the content of their speech. Students collaborate in order to analyse the content of their speeches. They may discuss grammar or lexical item selection.

More advanced strategies would be "writing only in English" (4) or "think and speak" (5). In these cases, the student has a good grasp of the English language and is able to deliver a speech more spontaneously. The student may view the video before sending it, to ensure that they are satisfied with the content.

Question 5 – Strategies to remember speech

Students may have used a variety of strategies to remember their speech. Some students may report strategies that could be classified as basic. These may include relaxing before making the video which was coded as (2), or listening to English radio or other similar resources (3) and focusing on volume (4). "Memorising the speech by myself" (5) was also considered a basic strategy. These are deemed basic efficient strategies, because these activities are completed alone, in the comfort of one's home. In addition, strategies such as "volume" would indicate that the student is working on making sure his voice is heard, but it does not ensure that the modulation is clear, or that the pronunciation makes the speaker comprehensible. Speaking loudly does not necessarily lead to better listening comprehension.

Intermediate strategies would be "practicing in front of the mirror" (6), "practicing with friends" (7), or "improving pronunciation" (8). These indicate that the student has gained confidence and is willing to seek out external assistance to help with pronunciation. Improving pronunciation means that the student understands the need to speak more clearly and is willing to practice pronunciation beyond the concept of volume.

"Practicing and viewing before sending" (9) would mean that the student was applying all of the above and then was reflecting on the performance to identify areas that needed improving. In other words, the student was using the technology to self-correct the performance before it was assessed by the viewer. This would be classified as a more advanced skill.

Question 6 – Strategies to improve speech

Students may have used a variety of strategies to improve their speech performances. However, some of these strategies may be considered basic while others may be considered more advanced strategies. Therefore when analysing the data, these items will be coded in terms of efficiency from basic to more advanced strategies. First, responses indicating that students did not use strategies were considered the least effective strategy and were coded as (1). When actively learning and participating in the task of making a weekly video, students will apply some strategies to complete the work and therefore they should be able to identify some of these. "No strategy used" would indicate that the student was not putting a great deal of effort in identifying effective strategies to improve.

Basic strategies included "maintaining eye contact" (2), "trying to relax" before recording the video (3), "memorising the speech" (4), or "practicing many times" (5). While these strategies may be necessary to improve one's performance, they may not assist in improving the speech performance to a more advanced standard.

Intermediate speech production strategies included "viewing the video many times" (6), which indicates that the student assessed their performance before sending it. "Learning more about the topic" (7), or writing a "logical story" (8), would indicate that the student was organising the story-line so that it made sense and this in turns helped them to remember the speech and led to a better performance because they could then focus on other strategies to improve their speech. Other intermediate strategies included "not using Japanese accidently" (9), a recognition of code switching, or "concentration" (10).

More advanced strategies to improve speech production were attempts to improve "speaking speed" (11), or "volume" (12), speaking clarity (13), and pronunciation (14). These strategies indicate that students could write a logical story and that they were making an effort to make their delivery understandable by the audience. "Speaking fluently" (15) and "pauses" (16) were classified as advanced strategies because the speaker is beginning to think about the speech as an abstract concept rather than just reading words on paper. Paying attention to pausing indicates that a student is thinking about rhythm and breathing. The most advanced strategies were "spontaneous speech" (17), and "all of the above" (18).

Question 7 – Errors identified

During the production process or while viewing their video before sending it to the teacher, some students may identify errors. The human ability to think and reflect allows us the option to correct our errors. Recognising errors could be considered part of critical thinking. "No errors" identified was interpreted as the student not utilising their full capacity to recognise errors and was coded as (1).

Some errors may be technical, such as "background noise" (2), "location" (3), "running out of time" (4), or "could not send email video" (5). Other errors may relate directly to the speech performance.

Basic errors made during a speech performance included "no eye contact" (6), "body language" (7), or "volume" (8). The student can identify audio or visual cues that affect the delivery of the message, but if corrected they still may not improve speech cohesion or listening comprehension.

Intermediate error identification included "forgetting the whole content of the speech" (9), "forgetting parts of speech" (10), or "using wrong words" (11). Other intermediate errors that could be identified were "production of L/R" sounds (12), and "pronunciation" (13). While it is easy for a student to notice that they may have forgotten a sentence or used a wrong word, the student needs to be more alert with pronunciation and take more opportunities to listen to their speaking.

Advanced error identification included noticing the use of "wrong adjectives" (14), using inappropriate "grammar" (15), "fluency" or flow of speech (16), or ineffective "pausing" (17). Of course it was possible for some students to recognise that errors are not finite and may have chosen "all of the above" (18).

To collect information from participants relating to the influence of multiple video productions and reflections, the interview process and the post-intervention survey aimed to target this issue.

Interviews and Observations

Basing an understanding of the benefits of the cell phone video recording feature as a learning tool solely on numerical facts may not provide a full appreciation of the participants' experience with this feature. Green (2001) suggests that case-by-case interviews enable the researcher to observe detailed occasions of interaction between individuals and technology. Interviews offer the opportunity to discuss issues pertinent to the participants' experiences with the project. Yin (2003) explains that observations are important because they offer the opportunity to collect data in a casual setting. For interviews and observations to reach successful outcomes, Yin recommends that the researcher be familiar with the video recording device and that it be placed in a non-threatening location. In order to avoid biased responses, Goddard and Melville (2004) suggest that the researcher be aware of his or her voice and the structure of the questions, which may direct the respondent to provide a particular answer supportive of the research outcomes.

Interviews allow researchers the opportunity to probe deeper into an answer and to explore potential influencing factors (Goddard & Melville, 2004). Table 10 demonstrates that the questions are both open-ended and closed, requiring the researcher to delve deeper into the results. The whole interview process was open and flexible, allowing the respondent time to answer and provide as many details as possible, without prompting (Burns, 2000). The interview and observation session was divided into two parts and took approximately 60 minutes to complete. Students were first informed that the interview would be one hour long and that it was a volunteer activity. Thereafter the researcher made an appointment suitable to their schedule, one or two weeks in advance, giving students ample time to prepare for the interview.

Observation

Due to current Japanese government regulations concerning student privacy, it was not possible for the researcher to conduct an observation at the participant's home, or to follow a participant during their daily routine to observe their process of video creation. Therefore the best option available was to invite the participants to an observation session during which they created a video. The first part was the observation, during which interviewees' in situ cell phone video production was video recorded. There was no time specification for this task; however, based on the weekly diary data, it was anticipated that participants would need around 30 minutes to produce their video. Participants were required to produce a video around the theme covered in class. This task reflected the weekly task that participants completed each week and, apart from performing this task in the researcher's office, nothing else in the task was different from what they would undertake at home. The purpose of this observation session was to collect evidence about the creation process.

Interview

Once the participants had completed and sent their video to the researcher's email address, the second part was the interview session. Prior studies concluded that the interview process would be approximately 30 minutes long (Gromik, 2009b).

During the observation session, the researcher took notes about the students' video production process. Based on the observation findings, the researcher used these notes to elicit more information from students regarding the production process. It was not possible to predict the type of issues that may have emerged, as it depended on the participant's experience at the time of the observation.

The interview questions emerged from the literature review as well as from the interest of the researcher in attempting to understand the benefits and challenges of using the cell phone video feature as a learning tool. As Creswell (2009) explained, in order to investigate a phenomenon further, it is important that researchers seek out potential areas not covered in previous literature. The set of questions in Table 10 explores areas not covered in the Japanese education with mobile technology literature. Such issues are covered in human-computer interaction literature and were considered invaluable as they attempted to understand participants' logic during their cell phone video productions. Of course, these are not the only questions since depending on a respondent's answer, more questions may have arisen.

Table 10

Interview Sheet for Data Collection Purposes

Name	Gender	Time in	Time out
1 – When you are writing your script, do you think in Japanese and then write in English?			
2 – Explain how you make your videos at home.			
3 – Tell me how you practice your speech at home. Eg: Do you use a mirror?			
4 – Why do you / don't you make creative videos?			
5 – Why do you / don't you record your videos outside your apartment?			
6 – When you finish making your video, do you check the quality of the video?			
7 – Have you ever used your cell phone video to film friends or relatives in Japanese?			
8 – Have you ever received a cell phone video from a friend?			
9 – Since making the cell phone videos for your homework, have you sent any videos to your parents or friends in Japanese?			
10 – Is the homework easy?			
11 – Is the task of making a cell phone video easy?			
12 – Is the activity interesting?			
13 – Is it easy to email the video?			
14 – Do you ever review your old videos?			
15 – Does viewing your previous videos help you improve?			
16 – Does viewing your peers' videos help you understand how to improve your speaking skills?			
17 – Does viewing the videos help you develop friendships with classmates?			
18 – Do the videos help you understand your peers' opinions?			
19 – In the future will you continue to make cell phone videos?			
20 – Do you think it is a good idea to use the cell phone video to study other courses?			

The questions outlined in Table 10 primarily investigate the creation aspect of video production. Prior research from Gromik (2006) indicated that at first students produce their videos in the comfort of their homes. Once they gain more confidence and because the themes require that students discuss matters about their community, students begin to produce their videos outside their homes.

Summary

At the beginning of this chapter it was established that some limitations had emerged from the literature and these needed addressing if possible. Some of the issues were lack of prior research, which limited the ability of the researcher to understand participants' behaviours, as was the case for Kiernan and Aizawa (2004). In addition, the review of literature guided the structure of the data collection method to ensure that as many task limitations were reported early in order to ensure a fair experience for all participants. The data collection process outlines that, at the beginning, efforts were made to know as much as possible about the participants and the anticipated rate of their success to complete the task without any external impediments. The intervention data collection section aimed to ensure that none of the participants were at a disadvantage and that they were progressing well during this experience. Finally, the post-intervention survey aimed to collect evidence that could be utilised to compare, contrast, and correlate any of the information gathered throughout the project.

Post-Intervention Survey

For the sake of assisting the readers, Table 11 clearly organises the objectives of the post-intervention section, which included a final cell phone video performance, an in-class video recorded performance, and a computer-based survey.

Table 11

Post-Intervention Process

Post intervention	Purpose	Task
Final cell phone video performance	Collect audiovisual evidence of topic to be discussed during post-intervention, in-class video performance Evaluate retention	Verbalise opinion of the course
In-class video recording	Collect audiovisual evidence of students' spontaneous speaking abilities Evaluate vocabulary recycling	Verbalise opinion of the course
Last computer-based survey	Collect evidence of students' perceptions and opinions of the course	Complete survey

The overall objective of the post-intervention section was to collect information that could be compared and contrasted against prior collected data. Yin (2003) not only states that there is a need to collect a chain of evidence (as this data collection method attempts to do), but that this accumulation of evidence can then be used to triangulate any of the findings to increase the reliability of the results advanced and the interpretation drawn from the findings.

Final cell phone video performance

As the title states, this was the last cell phone video that students produced outside class. This task was completed prior to the last in-class video recording and computer-based survey. In order to triangulate the data, the activity of the last video is the same as the activity for Week 2 (see Table 8 for the list of tasks and topics) and it encouraged the students to express their opinions about their experience with the course. Thereafter, participants completed the in-class video and computer-based survey.

In-class video recording

A video camera was located in a separate room adjacent to the computer laboratory where the survey was to be completed. In alphabetical order, students were invited to the room where they were left alone to video record their last speech. The camera video recording was on. No time limit was set for this task, as the purpose was to evaluate if students were aware of time and if they were capable of speaking spontaneously. Once the participants had finished, they returned to their desk to continue with the computer-based survey and the next participant went to the room to undertake the video task.

Similar to the underlying objective of the last cell phone video, the purpose was to evaluate students' abilities to speak spontaneously. The theme was similar to that used in the Week 2 task and the last cell phone video. The aim was to triangulate these three videos to report if any progress had taken place, and if the participants were able to recycle any of the vocabulary used in prior videos. The data from these three videos were also compared and contrasted to evaluate cell phone video production in terms of creativity, location, body language, and student confidence. These videos were evaluated based on a category sheet that aimed to classify and report the production process.

Final Computer-Based Survey

The last computer-based survey followed a similar design approach to the first computer-based survey. As explained previously, the items selected on the last survey were generated from the literature and had been tested with a previous group of Japanese EFL university students to ensure that the task was within the reach of this particular group of participants.

The survey first sought students' consent to ensure their willingness to participate in the research and explained briefly that the information was confidential.

While attempts were made to interview all students, this was not possible. The first few interview questions enquired about participants' prior experiences with the cell phone video camera recording feature. The next few questions enquired about the learners' experiences with creating cell phone videos for the purpose of expressing their opinions in English.

Next, students were asked to respond to items about viewing their peers' videos and the concept of having peers view their videos. Okabe and Ito (2006) reported that their Japanese participants indicated showing photos taken with their cell phones only to close family members or friends. Knowing whether or not students are willing to share their videos with others and knowing their opinions about peers viewing their videos could contribute to the current literature on cell phone use.

While watching their peers' videos, participants were required to write transcripts of the videos. This task was incorporated in the project to enhance listening aptitude. Some questions enquired about students' opinions of the effectiveness of this particular approach.

One of the survey items required that participants rate the topics chosen for the cell phone videos. This evidence will assist with evaluating if a correlation exists between the theme and participants' performance.

As the aim of the project is to argue that creating cell phone videos in the target language on a regular basis does improve students' speaking abilities, it is vital to ask for the participants' opinions of the task. Some questions targeted strategies that students utilised to improve their speaking skills. Most of the teacher feedback was provided via email. Some questions investigated students' opinions regarding this process and whether or not they thought video feedback from the teacher would be more useful. This section encouraged students to contemplate possible benefits and challenges based on their experiences, a similar approach applied by Stockwell (2008).

Table 12

Post-Intervention Survey

Q1 – Your answers in this questionnaire will be part of a research paper. Your name, identity, and information will not be revealed. All details are anonymous. Do you allow Nicolas to include your answers in his report?
Q2 – Before this course, did you ever use your cell phone video camera?
Q3 – Now that you have used your cell phone video camera, do you feel more confident using it?
Q4 – Did you enjoy making cell phone videos to study English?
Q5 – Explain why you did (or did not) enjoy making cell phone videos.
Q6 – Did you experience any technical problems with the cell phone videos or the Yahoo! email account?
Q7 – Explain what types of difficulties you experienced.
Q8 – Was it helpful that your peers watched your cell phone videos?
Q9 – Why did (or didn't) you like that your peers watched your videos?

Q10 – Was it helpful for you to watch your peers' cell phone videos?
Q11 – Explain why you did (or did not) like watching your peers' videos.
Q12 – Which video did you dislike making the most? Explain why (write the title and the week you produced it).
Q13 – Rate the 13 cell phone video themes.
Q 14 – Do you think your speaking ability improved by making a cell phone video every week?
Q15 – Explain why this weekly homework did (or did not) improve your English ability.
Q16 – Do you think that using the video feature improved your speaking ability?
Q17 – How did you use your cell phone to improve your speaking ability?
Q18 – Mark the speaking skills that you were able to improve with the cell phone video project.
Q19 – Did you have difficulties speaking within the time limit set by your cell phone?
Q20 – What strategies did you learn to improve speaking within the time limit?
Q21 – Was the teacher written feedback effective to help you understand and correct your errors?
Q22 – Explain why the teacher written feedback was (or was not) effective.
Q23 – Do you think that teacher video feedback could be more effective?
Q24 – Explain why teacher video feedback could (or could not) be effective.
Q25 – Do you think that the cell phone video feature is a good learning tool?
Q26 – Explain why you think the cell phone video feature is (or is not) a good language learning tool.
Q27 – Was it helpful to listen to or watch your final video before sending it to your teacher?
Q28 – Now that you have made 13 videos, is it easier for you to make a cell phone video?
Q29 – Did you ever use the “pause” option when recording your video?
Q30 – Rate the audio quality of your cell phone.
Q31 – Rate the video quality of your cell phone.
Q32 – Was the cell phone video quality good enough to view and hear your peers' performances?
Q33 – Was it helpful to write the transcript of your peers' cell phone videos?
Q34 – Explain why you enjoyed (or did not enjoy) writing the transcript of your peers' cell phone videos.
Q35 – Rate the cell phone (screen size, keypad size, cost, suitability, overall device) for learning.
Q36 – Describe the structure of a good cell phone video speech.
Q37 – Did you increase your speaking speed by the end of the term?
Q38 – Explain why you were (or were not) able to speak faster by the end of the term.
Q39 – Were you motivated to be creative with the content and/or location of your videos?
Q40 – Explain why you were (or were not) motivated to be creative with the content and/or location of your videos.
Q41 – In your opinion, in what ways do you think cell phone video telecommunication will

be used in the future?
Q42 – Did you enjoy completing this project?
Q43 – At the beginning of the term I asked if you agreed with studying with cell phones. Now that the term is over, do you agree with studying with your cell phone?
Q44 – Explain why you agree (or disagree) with studying with your cell phone now.
Q45 – In the future, Nicolas would like to ask you some follow-up questions about your opinion of cell phone technology. Do you allow Nicolas to contact you by email?
Thank you very much for completing this survey. I wish you good luck with your future studies and experiences with English. I hope this course was useful. Sincerely, Nicolas

In line with the literature, requesting that participants rate the technology is necessary in order to ascertain how technological advances are experienced by cell phone subscribers. Such evidence can then be contrasted against data reported by Thornton and Houser (2005) and Wang and Higgins (2006). Participants rated the technology in terms of use as a video production and learning tool and for viewing material.

The cell phone video recording feature allows participants to review their performances. Thus, questions pertaining to whether or not participants utilised the option to review and improve their performances generated evidence about learning strategies and use of technology for self-improvement.

In relation to speaking abilities, participants were directed to gauge whether or not they believed that the task was conducive to improving their speaking speed. They were also requested to reflect on an example of good speech structure. This question assisted in determining if regular video production can enhance speaking production.

In relation to confidence and creativity, some questions encouraged participants to reflect on the correlation between the mobility of the device and its ability to facilitate producing videos in varied environments.

Towards the end of the survey, one question engaged participants to reflect on the future of technology. The purpose was to evaluate whether or not using the cell phone video recording feature enabled learners to consider the greater potential that the feature and device could offer. Another question enquired if participants enjoyed completing the project, to determine if they felt the task was educational and interesting for them. The next question was related to the first computer-based survey. It enquired whether or not, after making cell phone videos, participants changed their opinion of learning with cell phones. The last question enquired about the possibility of participating in future surveys after the course finished.

While the majority of the questions attempted to reveal students' perceptions and experiences with the technology, the task, or their learning progress, the next step is to categorise the questions so that they can be used to extend analysis beyond rating (something missing from the literature).

Table 13

Post-Intervention Survey Question Grouping

Questions	Categories
Q4 – more confident using the video feature Q6 – experienced technical problems Q19 – speak within cell phone video's time limit Q25 – cell phone video feature is a good learning tool Q30 – rate audio quality Q31 – rate video quality Q32 – cell phone video quality good for viewing peers' performances	Technology
Q14 – English ability improved because of regularity of project Q18 – rate skills that have improved because of using cell phone Q28 – it is easier to make a video Q35 – increase speaking speed Q16 – project helped improve speaking ability	Perceived improvements
Q8 – enjoyed peers viewing your video Q10 – enjoyed viewing peers' videos Q21 – enjoyed teacher feedback Q27 – watching final video before sending is helpful Q33 – enjoyed writing transcripts	Self-evaluation Peer and teacher feedback
Q13 – rate the themes	Theme evaluation

The research question asks if the cell phone video recording feature is an appropriate tool to enhance English language learning. By the time students complete the final survey, they will have had extensive experience with using their cell phone video recording feature to create videos in the target language. Therefore, they should be able to reflect on the factors that may have led to their ability or inability to improve their speaking skills via the use of the cell phone video recording feature.

In order to answer the research question fully, the four categories extrapolated from the post-survey question were utilised in the data analysis process. Each category was analysed against students' final words per second output to observe if any of these categories influence students' perceptions of the benefits of using the cell phone video recording feature as a learning tool.

Instead of assuming that language learning occurs by chance via the use of the video recording feature, the objective was to identify a collection of influencing factors that may assist in determining the benefits of using the cell phone video recording feature.

Summary

Case study research aims to investigate cases of a particular phenomenon. It is possible to use multiple sources to formulate a data collection method and to rely on interviews, surveys, or observations to collect the necessary data.

This section has explained that all surveys and questionnaires used were based on previous literature and attempt to either validate previous findings or generate new evidence that could contribute to a better understanding of learning with technology.

Efforts were made to develop a chain of evidence that could be analysed independently or in correlation with other sets of evidence. The data collection method attempts to triangulate some of the evidence in order to demonstrate that, in certain cases, the use of the cell phone video recording feature was conducive to learning, while for other cases it appeared to have been a challenge. The overall purpose of the data collection method is to document and report the experiences of each case in order to understand the educational potential of using cell phone technology as a learning tool.

Chapter 5: Data Analysis

The previous chapter explained the process and reasons for collecting reliable and valid evidence that elucidates the understanding and appreciation of integrating the cell phone video recording feature as a language learning tool. As was discussed, there are two main parts to this research project. The first part deals with understanding students' perceptions before and after completing the task. The second part is the completion of the task, which requires participants to produce one cell phone video per week over the course of one academic term.

The purpose of the research is to report evidence that can assist with understanding the benefits and challenges of using the cell phone video recording feature as a language learning tool.

One important aspect of case study research is to present the context in which the research is taking place. In this chapter, information concerning the students' academic backgrounds, the university's history, the city's history and demographic structure, and the current national telecommunication environment are presented. This overview helps allow for an appreciation of conducting research with cell phones in a country where digital tools have become ubiquitous.

Also, a review of the literature was conducted to extrapolate the data analysis methods used by other researchers in a similar context or using a similar tool to extend students' learning. Attempts were made to apply these analysis techniques either to concur with or challenge prior evidence presented.

Data were collected from four sources: pre- and post-intervention surveys, outside class cell phone videos, transcripts of the cell phone videos, and students' weekly cell phone production reports. Due to the large data set and the need for triangulation, applying one data analysis method was not sufficient. Therefore both qualitative and quantitative analyses were conducted. Before presenting the findings, the methods for analysing the data are defined (see Figure 5).

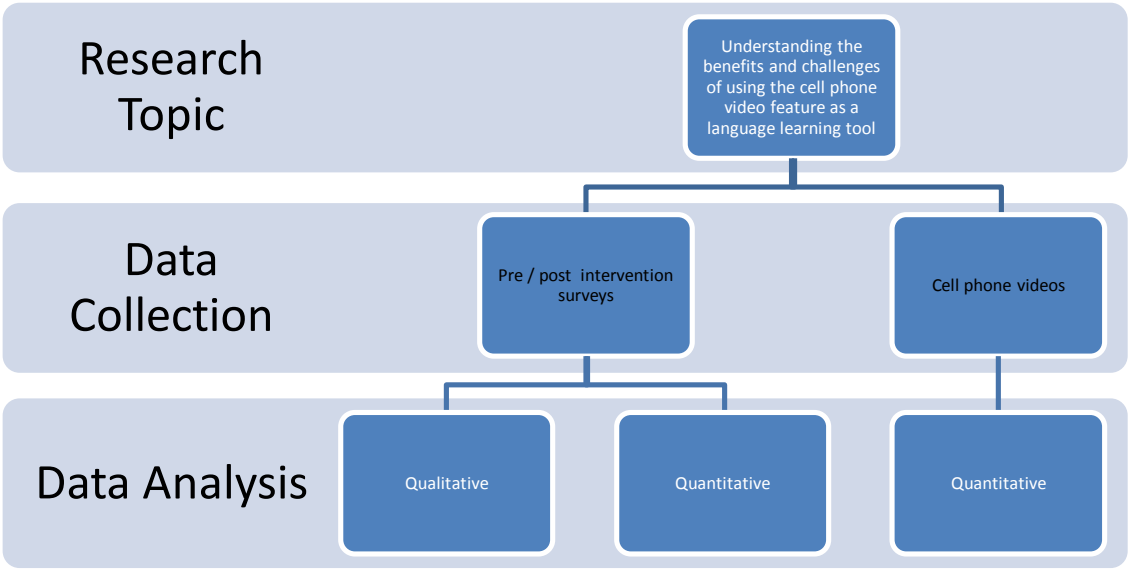


Figure 5. Data Analysis Component of Research

Context

The rationale

Although Japanese students have a minimum of six years of language education before they enter university, they are not usually confident speakers of English and "proficiency achievements are consistently among the lowest in Asia" (Hinkelman & Grose, 2005; Rivers, 2011, p. 115; Sullivan & Schatz, 2009). Sullivan and Schatz (2009) explain that students' aversion towards English could be caused by a wide range of variables and this has "spawned a bourgeoning research literature investigating predictors" (p. 487). Investigating these variables is beyond the scope of this paper. Suffice to say, Japanese students typically do not want to speak in English (Carney, 2006; Johnson & Heffernan, 2006; Natusch, 2005). In addition, research in preparatory courses conducted at junior and senior high schools only provides general overviews. For example, during the six years of English exposure, students develop writing and reading comprehension skills more than listening and speaking skills (Johnson & Heffernan, 2006), with a traditional preference towards grammatical aptitude (Yamada & Akahori, 2007). Kawauchi (2006) mentions that once students are ready to enter university, very little is known about their vocabulary cognisance (see also Nakata, 2008). Regarding study preferences, Johnson and Heffernan (2006) report that non-English majors required to study English as a prerequisite to graduate do not appear to be committed to the learning outcomes generated by the course. Carney (2006) adds that Japanese learners tend to have a negative perception of their own English abilities. In terms of topics, students feel more comfortable discussing topics that are not confrontational. Murphy (2007) observes that these students perform much better in pairs or groups, but no reason for this occurrence is elaborated. Oral communication classes are not endorsed as many native-Japanese speaking teachers express discomfort speaking in the target language in front of their students. Teaching grammar does not usually include the opportunity for students to practise speaking English.

This pattern does not stop at the university level. At the research site, students have reported that Japanese teachers tend to focus more on translation skills, which are grammar and reading comprehension intensive. This research aims to develop a new teaching method that would encourage Japanese students to speak in the target language. The rationale is that if Japanese students are too shy to speak in public, then using cell phones to video record themselves speaking in private settings could encourage them to speak and increase their confidence with speaking English in public. In this case, the video recording feature becomes a tool and support source for developing speaking ability and confidence.

Analysing oral output can be a complex process due to the fact that Japanese people tend to use language differently than their western counterparts (Miller, 1982). Not only is the grammatical structure different, but so are the sounds and the verbal cues. To help understand the differences that exist between western and Japanese communicative strategies, Nishiyama (2000) provides two examples, the manner in which one expresses an opinion, and the importance of "face."

Japanese people tend to be uncomfortable when expressing their opinions because the typical cultural process of communication does not allow for a direct approach. Instead, the listener is supposed to provide non-verbal cues that indicate to the speaker that they understand (Nishiyama, 2000). This led to a view that Japanese students do not seem to become engaged in activities. This would also explain why there is a teaching preference towards oral drills, whereby students simply go over a specific speaking pattern to practise a particular grammatical form. Such an approach, although necessary in the early stages of language learning, is not ideal for more advanced learning, since advanced students may possess all the necessary grammatical and lexical items to perform adequately.

The CALL literature also mentions that Japanese students prefer to participate in an activity as a group. By participating as part of a group, there is less chance of "losing face," or becoming embarrassed about one's inability to perform. While group participation is a suggested method for encouraging more inhibited students to perform, it does not necessarily encourage the more advanced learners to experience the target language or to take risks. In addition, CALL-based learning is also not without its challenges. Redfield and Campbell (2005) observe that since the teacher's explanations are similar to the content of the computer-led activity, students either decide to skip the CALL activity or complete the task in Japanese. Pinkman (2005), Kawauchi (2006) and Gromik (2006) explain that unless CALL projects are graded, students will not complete them. Therefore there is a need to design activities that are engaging and motivating for students to engage with a more authentic or real-life activity.

CALL research in Japan displays an inclination towards continuing to improve students' reading, writing, and listening comprehension skills. In contrast, this research uses a project-based approach and the cell phone as a tool to engage all students to practise speaking in environments where they feel safe. Cell phones are mobile tools that can be used ubiquitously and this mobility could be a motivating factor since it may help avoid "loss of face" and may increase independent learning and performance.

Higher education in Japan

There are 756 higher education institutions in Japan and approximately 1.5 million students between 18 and 22 years old who attend these universities (Euromonitor International, 2011b). The Japanese Ministry of Internal Affairs and Communications (MIAC) has embarked on an initiative to introduce digital media in higher education to increase the use and development of information technology (Euromonitor International, 2011b). MIAC hopes that not only will consumption of such products increase, but also that future employees will be better educated when they become active members of the workforce.

The university

Seven imperial universities were founded by the Empire of Japan between 1877 and 1939, and they were run by the imperial government until the end of World War II. These universities are collectively

known as the National Seven Universities. Tohoku University is one of the seven and it was established in 1907 in the city of Sendai in the Tohoku region, north-east of Tokyo.

Tohoku University was first a medical school, and under the Meiji government it became part of the national seven universities. Now Tohoku University includes departments ranging from Agriculture, Arts and Letters, Economics, and Education, to Engineering, Dentistry, Medicine, Pharmaceutical Sciences, and Science. According to QS (2011) an international university ranking agency, Tohoku University was ranked fourteenth amongst the top universities in Asia. As of May 2009, the Tohoku University student population comprised 8,292 (76%) male and 2,675 (24%) female students (Tohoku University, 2009a). From a total of 345 registered Arts and Letters majors, 225 (65%) were male and 120 (35%) were female. Among the 208 registered Law majors, 165 (79%) were male and 43 (21%) were female. Of 965 Engineering students, 884 (92%) were male and 81 (8%) were female. While there is little evidence available in English concerning the student population's demographic background, the majority of the students come from the northern area of Japan while the remaining group comprises transient students from all over Japan.

Starting in 2004, the university spent considerable funds to establish three large CALL laboratories to offer students access to computer literacy in language learning. However, these facilities must be shared between the English, German, French, and Spanish departments and so the CALL labs are not readily accessible to all teachers. The fact that there was no guarantee to have access to a CALL lab meant that other options had to be explored. First, studies with iPods were conducted (Gromik, 2008) and due to the lack of financial support for a whole class set, cell phones became a more realistic option (Gromik, 2009b).

Sendai

As was learned from the literature review, the majority of research in Japan is conducted either in the capital, Tokyo, or in the major business city, Osaka. Apart from Gromik's (2009a) research in Sendai, research conducted in minor cities is not readily accessible. Therefore, conducting research in this area was an influencing factor, since it would provide a less mainstream/typical view of Japanese students' use of technology.

Founded in 1600 by Masamune Date, a Japanese warlord, Sendai blossomed into an urban city caught between the mountains and the sea. It is growing rapidly and it is considered as a designated city. That is, to reduce the overwhelming population size of Tokyo, Sendai gained administrative powers of prefectural governments. Located in the Tohoku region in the prefecture of Miyagi, it is one of Japan's 14 major cities with a population size of more than one million inhabitants (Tohoku University, 2009b). Also known as an academic city, Sendai holds 82 higher education institutions, 15 of which are universities.

Sendai is one hour and 45 minutes from Tokyo by bullet train. Its railway system reaches out to all surrounding cities, making it possible for students and employees to travel to and from their homes and work or educational institutions on a daily or weekly basis. Travelling long distances or having a

family residence in addition to a working residence is an accepted situation in Japanese culture. Therefore, it is possible that students living in the Tohoku region may commute on a daily basis to study at Tohoku University.

Data released by the Ministry of Internal Affairs and Communications (MIAC, 2010) indicate that in 2009 the total number of young adults in the Miyagi prefecture was as follows: 115,000 males between 15 and 19 years old and 139,000 males between 20 and 24 years old. The data reveal that there were 56,000 females between 15 to 19 years old and 68,000 between 20 and 24 years of age.

As of March 2009, the population of Sendai comprised 50,000 young adults aged between 15 and 19 years of age, and 60,000 adults between 20 and 24 years old. While these data do not provide a clear distinction on the ratio of males to females, the data released by the MIAC (2010) indicate that for young adults between 15 and 19 years old, 32% are females and 68% are males. Similarly, the percentage of adults between 20 and 24 years old is also 32% female and 68% male. Such evidence is necessary to gain an understanding for the selection of a reflective sample group.

Telecommunication

Japan is renowned for its affection for technology, ranging from robots and portable game consoles to advanced cell phone devices. The early adoption of mobile technology in Japan started in the early 1990s with the introduction of pagers (Goggin, 2006). Ito and Okabe (2006) explain that the Japanese youth hijacked this device and increased pager subscription. These authors state that the use of pagers peaked in "1996, 48% of Tokyo middle and high school students had a pager" (p. 243). They continued by explaining the cause of the shift from pagers to mobile phones. Because of this phenomenon,

> Mobile phone providers took note and began piloting inexpensive text messaging services for mobile phone handsets in 1996 through 1997. Young people soon jumped onto the short message services purveyed by the Personal Handyphone System and then moved to cellular phone-based messaging (p. 243).

The MIAC reported that the number of cell phone subscriptions increased by 3.8% from 112.05 million in March 2009 to 116 million at the end of March 2010 (MIAC, 2010).The Euromonitor International (2011a) confirms the MIAC's figures by reporting that in March of 2011 there were 118 million cell phone subscribers in Japan. Ownership of household durables revealed a 12% increase in mobile phone subscriptions compared to a 3.13% and a 2.62% decrease in video camera and videotape recorder purchases, respectively (Euromonitor International, 2011b).

At the time of writing, no data reporting the gender ratio of cell phone subscriptions were available from the Japanese MIAC. One could argue that since 95% of the population subscribes to cell phone services, there is actually no reason to report data in terms of age to gender ratio.

Future of communication and the internet

As of 2011, “Japan’s telephone industry was the second largest globally behind the USA” (Euromonitor International, 2011b, p. 78). Japan’s cell phone industry is recognised as “the most technologically advanced and dynamic in the world (Euromonitor International, 2011b, p. 78).The MIAC recognises that telecommunication and information technology will play an important role in the development and growth of Japan’s future, increasing its role in mobile-commerce. Given current trends in information technology and mobile technology, and Japan’s attempts to advance voice over internet protocol, investigating the potential of cell phone technology beyond text messaging is paramount.

In summary, the study takes place at a renowned national university located in a government designated city, also recognised as an academic city. The demographic data would indicate that conducting research to understand university students’ use of and familiarity with cell phone technology is welcome and offers the potential for further contributions to the research area of integrating cell phones in educational environments.

Review of Data Analysis Methods Selected in Literature

The aim of the literature review was to categorise and present the data analysis methods applied in previous mobile technology-focused research. Based on the literature review, current and relevant data analysis strategies were applied as well as other methods not previously suggested.

Table 14

Data Analysis Methods Reviewed in Literature

Author(s) / date	**Purpose of research**	**Data collection method**	**Data analysis method**
Kiernan & Aizawa (2004)	Assess usefulness of mobile phones as learning tools	Survey, pre- and post-test (n = 50)	-Word count and speaking turn data -Speaking sample analysis -Descriptive statistics
Thornton & Houser (2005)	Promote regular vocabulary study via cell phones	Pre- and post-test (n = 44) questionnaire	-Descriptive statistics -One-tailed paired *t*-test -Quantitative data
Wang & Higgins (2006)	Feedback from mobile users	Sample survey (n = 32)	-Descriptive statistics
Motiwalla (2007)	Explore integration of mobile technology in distance learning or traditional classrooms	-Observations (n = 19) -Students' opinions -Survey 1 (based on Wang, 2003)(n = 19) -Survey 2 (n = 44) -Interviews	-Quantitative data (mean, standard deviation) -Qualitative data from interviews
Stockwell (2007)	Evaluate prototype mobile-based intelligent vocabulary tutor system	-Computer system logs -Post-intervention survey (n = 11)	-Quantitative data -Qualitative survey responses
Churchill & Churchill (2008)	Case study of educational affordances of PDAs	-Pre- and post-intervention interviews	-Qualitative data from interviews
Lu (2008)	Explore application of	-Pre- and post-	-Two-tailed *t*-test -

	short message service (SMS) to learn vocabulary (Thornton & Houser, 2005)	intervention test (n = 30) -Pre- and post-intervention questionnaire -Interviews	SPSS v. 10 -Pearson's correlation -Qualitative data from interviews -One-tailed *t*-test
Oliver & Goerke (2008)	Undergraduate adoption of handheld devices as learning tools	-Pre-intervention survey (n = 500) -Device: iPAQ (n = 44)	-Quantitative data -Qualitative data
Stockwell (2008)	Determine usage patterns between PC and cell phone-based language learning	-Computer system logs -Post-intervention survey (n = 75)	-Quantitative survey data
Uzunboylu et al. (2009)	Using mobile phones to increase environmental awareness	-Pre- and post-questionnaire (UMLS) (Motiwalla, 2007) (n = 41)	-Quantitative analysis of UMLS questionnaire -Paired *t*-test -*t*-test of independent samples -One-way ANOVA -Tukey's HSD test to identify source of significant difference
Chao & Chen (2009)	Complement textbook learning with mobile phone to facilitate verbatim note-taking	-Observations (n = 40) -Interviews -System logs -Diaries -Tests -Post-intervention questionnaires	-Quantitative frequency analysis -Qualitative data from interviews
Gromik (2009a)	Producing cell phone video diaries online	-Observations -Interviews -Post-intervention questionnaire (n = 7)	-Quantitative data -Qualitative data from interviews
Stockwell (2010)	Identifying the effect of mobile platform	-Server log (n = 175) -Author developed software to organise data	-Quantitative data

The literature review of selected data analysis methods revealed that most researchers are likely to select general quantitative data analysis methods, primarily revealing mean and standard deviation scores. Most report qualitative data in terms of participants' comments during interviews. These are not coded or quantitatively organised; they are simply reported as raw responses. Four out of 13 articles applied more strenuous data analysis methods such as one-tailed, two-tailed, or independent sample *t*-test analysis. Only one article applied an ANOVA data analysis with a Tukey's HSD test (see Uzunboylu et al. 2009). Lu (2008) was the only researcher to conduct Pearson's correlation analysis (see Table 14 above).

It must be pointed out that to conduct more comprehensive data analysis for certain techniques, the sample size must be large enough and reflective of the sample population for statistical analysis to produce reliable results. The issue of sample size was addressed in the Data Collection chapter, and a description of the undergraduate students registered at Tohoku University was reported earlier in this chapter. In addition, dealing with missing values or participant responses will be addressed further in this chapter. The researcher had no control over students' decisions to participate in the course or not, but efforts were made to have "as large a sample as [a researcher] reasonably can" (Fraenkel & Wallen, 1996, p. 104).

Data Analysis Process

The purpose of data analysis is to sort, code, and group data in a clean format so that the evidence can be analysed and transformed into useful information to enhance understanding, formulate conclusions, and justify implications for further research. In case study research, the objective is to develop a chain of evidence, and Yin (2003) suggests the following helpful analytical manipulations that will be employed by this study:

1. Putting information into different arrays
2. Making a matrix of categories and organising the evidence within this matrix
3. Tabulating the frequency of different events
4. Putting information in chronological order or using some other temporal scheme
5. Examining the complexity of such tabulations by calculating second-order numbers such as means and variances (Yin, 2003, p. 111)

Putting the information into different arrays

All participants completed the pre- and post-intervention surveys on a computer. In addition, participants created their cell phone video recordings and sent these by email to the teacher on a

weekly basis. All the videos were transcribed and analysed to collect information such as number of words spoken and the amount of time it took students to complete their speech. The number of words spoken was then divided by the speaking time and this figure became the final data set: words spoken per second. Students' speeches were also analysed to retrieve the types of words they used. These were organised according to the first 1,000 words, the second 1,000 words, and academic words from the AWL (Cobb, 2011). During the course of the term, students were invited to participate in a video-recorded interview that also included an observation of students in the act of producing a cell phone video.

All data were recorded on a weekly basis on a Microsoft Excel spreadsheet. Individual responses were digitally organised as individual files. Then these files were converted into a class file to report group data. Finally, all classes were organised in one single digital file.

Making a matrix of categories and placing the evidence

The next step was to code and transfer these responses into the Predictive Analytics Software (PASW) Statistical Package for the Social Sciences (SPSS) version 19, from now on referred to as SPSS. SPSS documents were organised for the pre- and post-intervention surveys and for the weekly diaries. The latter was organised as per the weekly diary report. Evidence was categorised as preparation time, recording sessions (the number of attempts to generate the best final video), and strategies to produce the speech, strategies to remember the speech, and strategies to improve speaking abilities. Also included in this group were the error identification list and the rating of the whole production process. The video transcripts were categorised as explained in the above section. All of these data were recorded on a Microsoft Excel spreadsheet and then transferred to one SPSS sheet for analysis. While the Excel files provided an overview of the responses in terms of general percentages, SPSS was able to provide the ability to calculate descriptive and inferential statistics.

Tabulating the frequency of different events

As explained previously, each data collection event is analysed separately. The pre- and post-intervention survey responses provide descriptive and frequency analysis at specific points in time. Frequency evidence is also reported for the weekly performances.

Putting information in chronological order or using some other temporal scheme

The data were collected over 13 weeks and were stored on a weekly basis. Scales of measures used for the data analysis include nominal, ordinal, and interval data sets (Elifson, Runyon, & Haber, 1990; Osborn, 2008).

Nominal data included class groups and gender from which neither mean nor median can be defined since these are not data points, but rather organisational information for the purpose of sorting out the data.

Ordinal variables included rank ordering data collected from participants' responses on the pre- and post-intervention surveys and the weekly diaries.

Interval data was retrieved from the transcripts and categorised as the total number of words spoken per second, the number of first 1,000 words used, the number of second 1,000 words used, and the AWL used. The data were stored as raw scores and were organised in a ratio type of measurement because a student could speak zero words from the AWL, for example (Osborn, 2008).

The data reported below are presented in chronological order. The data from the pre-intervention survey are presented first, followed by the weekly performances. The last data set concerns the post-intervention survey responses.

Examining the complexity of such tabulations by calculating second-order numbers such as means and variances.

The means and variances are presented after the frequency section of each data collection event. As the literature review indicated, paired and independent samples *t*-tests, one-way ANOVA, and correlation analysis were conducted. Similar statistical techniques were applied during the analysis process. In addition, multivariate analysis of variance (MANOVA) was utilised to provider a deeper data analysis.

Statistical Method

Descriptive statistics

The purpose of descriptive statistics is to organise and summarise important responses in a meaningful, understandable, and usable form without making any inferences (Elifson et al., 1990; Vogt, 1993). This method helps to organise the specific sets of data in a logical order to establish a general pattern amongst the evidence gathered (Ary & Jacobs, 1976).

Inferential statistics

This set of statistics helps the researcher to "explore hypothesis of a general nature" (Elifson et al., 1990, p. 12). It enables the researcher to predict if any of the findings can explain the reasons why certain phenomena occur.

In this case study, the hypothesis explored the general interaction between the various phases of cell phone video production and the language learning outcome. The aim was to form a convincing conclusion about whether or not the use of the cell phone video recording feature is associated with or predicts speaking improvements.

The inferential statistics used for this data analysis are correlation and MANOVA.

Correlation analysis.

Correlation analysis measures the linear association of a relationship between two or more variables, but it does not equate cause and effect between the selected variables (Cangelosi, Taylor, & Rice, 1979).

MANOVA.

MANOVA is a technique that measures the differences between treatment groups where there are two or more dependent variables. As a technique, it is concerned with revealing significant differences between individuals and groups across a range of other variables, as well as identifying the potential interaction between variables (Hair, Anderson, Tatham, & Black, 1998). It does not report the potential influencing factors that may affect the participants' behaviours.

For example, the participants in this research produced 13 videos and returned 12 weekly diaries. The weekly diaries cover feedback on six categories. The benefit of using MANOVA is that it can help the researcher determine whether or not pronunciation was an influential variable from the error identification category to motivate individuals to perform better than their peers and better than students in other groups during their production process over time. Eventually and naturally, a student may decide that noticing and improving pronunciation is crucial to improve speaking ability and listening comprehension.

Dealing with missing values

While most students were able to complete all weekly cell phone videos, some were absent or forget to return their homework (either a video or a weekly diary). Participants or cases can be either

included or excluded from the research. But in this case study all responses were included and a missing value analysis was conducted

Missing values can prove problematic since they can reduce generalisation (Shara, Umans, Wang, Howard, & Resnick, 2007). Keeping this in consideration, there are a variety of methods for dealing with missing values. In statistics, listwise deletion is a preferred method for dealing with missing data and may prove less problematic during analysis. Hawthorne and Elliot (2005) warn that while listwise deletion is readily available in data analysis software packages, researchers should understand that this method will reduce the sample size. Hawthorne and Elliot evaluate various methods for dealing with missing values and conclude that hot deck imputation seems to be the most reliable method for dealing with missing values. Nonetheless, they also report that "[f]or listwise deletion with MCAR [Missing Completely At Random] data the group means and variances are likely to stay the same. Hence, the *t*-value will decrease as the sample size reduces, primarily because of the reduced degrees of freedom" (p. 588) (see also, Shara et al., 2007, for a similar conclusion). Listwise deletion can still be a good and uncomplicated option to deal with a few missing values (Yenduri & Iyengar, 2007).

For the purposes of this research, listwise deletion was an appropriate method for dealing with missing values since they were classified as Missing Completely At Random (MCAR). While this method reduces the sample size, it does not affect the results since the *t*-value reduces accordingly (Hawthorne & Elliot, 2005). In addition, data analysis software packages such as SPSS automatically compute data sets accordingly and can provide reliable results. Case study research does not aim to generate generalisable data, and this is another reason why listwise deletion is an acceptable option. The data set reflects individual performances and the results are reported as such.

Pre-Intervention Survey Descriptive Statistics

The purpose of the pre-intervention survey was to collect information about student demographics, academic background, and access to and familiarity with technology.

Demographic data

While 69 participants completed the survey, one student decided to withdraw from the course and another indicated that he did not want his survey data included in the analysis process. Their responses were removed from the statistical analysis presented below.

The data revealed that of the 67 participants who completed the survey, 59 (88%) were male and 8 were female (12%). The number of Arts & Letters students registered in the course were 22 (88%) male and 3 (12%) female students (n = 25). From the Law department, there were 18 (82%) male and 4 (18%) female students (n = 22). While there were no females in the Engineering A group (n = 11), there were 8 (89%) males and 1 (11%) female in the Engineering B group (n = 9). The majority of the students were 19 years old (59%). The remaining age categories were 18 (30%), 20 (9%), and 21 years old (2%).

Educational background

In regard to their educational background, all students were educated in Japan under the national educational plan and policies. Five students started to learn English from elementary school onwards (7%), 60 of the participants started to study English in junior high school (90%), and two received English lessons from senior high school onwards (3%). Forty-six students indicated that they had learned English with a native English instructor (69%), while the remaining 21 had not (31%). Finally, 35 students started using computers from junior high school onwards (52%), while 19 started from senior high school (28%), and the remaining 13 began using computers at the start of their university studies (19%).

Access to computers

The pre-intervention survey inquired into students' access to computers and cell phones, as well as various components connected with technology such as web cameras, internet connection, and email/ text messaging habits.

Thirty-three students owned a laptop with Windows Vista (49%). The remaining students reported owning a Windows Vista desktop PC (n = 11, 16%), a Windows XP laptop (n = 10, 15%) and a

Windows XP desktop PC (n = 10, 15%). Three students indicated having no access to a computer (4%). None of the students had access to an Apple Macintosh computer. Among the students, 57 indicated not having a web-camera on their computer (85%), compared to 10 students who did have such a device (15%). In terms of length of ownership, 30 students reported having had access to their computer for less than a year (45%). Seventeen students indicated owning a computer for one to two years (25%), and twenty had a computer for more than two years (30%). Thirty-eight students reported using their computers for less than an hour a day (57%), compared to 24 students who used it for less than two hours (36%). A small group of students (n = 5) used their computer for more than 2 hours (7%). Sixty-two students had access to the internet at their domicile (93%), while five had no connection (7%).

Overall, given their computer access and familiarity, 47 students rated their computer skills at the beginner level (70%). This group could use their computers to type documents, view CD-ROMs, or listen to music. Sixteen students thought they had intermediate skills (24%), and four students perceived themselves as advanced (6%). The advanced group could download and install software in multiple languages, use a wide range of software, and use the internet to search and study. With regards to internet emailing, 61 students sent 1 to 5 emails per day (91%), three sent 6 to 10 emails per day (4%), and three reported sending more than 11 emails per day from their computers (4%).

The data regarding students' computer backgrounds, access to computers, and computer expertise would lead one to think that these students should be able to undertake the task of creating a cell phone video and emailing it to their teacher, and with some guidance, they would be able to view their peers' videos online.

Access to cell phones

Fifty-two (78%) students indicated not having a landline telephone at their place of residence, while 15 indicated they did (22%). All students (n = 67) had access to a cell phone. Sixty-four students carried their cell phone everywhere (96%), compared to 3 who did not (4%). Among the students who carried their cell phones with them at all times, some explained that without it they would feel nervous or uneasy (n = 4), others stated that it was useful to communicate with friends (n = 9) and family (n = 3), while others explained that they needed access to a cell phone to receive calls and emails (n = 9). While the cell phone is useful (n = 9), it is also convenient (n = 7) since it allows students to call and send messages anytime at their convenience (n = 12). Still, some students mentioned that it was a necessary device in case of emergencies (n = 3) and that the features could be used to manage their daily life, with features such as the clock and calendar (n = 2). Obviously, the cell phone for these students is necessary (n = 2) and portability is important (n = 3). By contrast, four students stated that while the cell phone was necessary, they did not enjoy having one.

While five students had their first access to a cell phone between of 1 and 5 years old (7%), one had access to a cell phone between the age of 6 and 10 (1%). Twenty-three students received a cell phone between 11 and 15 years old (34%). Thirty-seven had access to a cell phone between the age of 16 and 19 (55%). One student reported receiving a cell phone after 20 years of age (1%). Among the 37 students who received their cell phones at 16 to 19 years old, 23 indicated that going to high school

was a major reason they received a cell phone at that age (62%). In addition, five students explained that their parents had suggested that they begin to use a cell phone (14%), and three students reported that their parents gave them a cell phone without their involvement in the decision process (8%). Finally, six students indicated that since all their peers and friends had one, they ought to get one as well (16%). Amongst the other responses, some students indicated receiving a cell phone because they had no other communication options (n = 1) and they needed something to communicate with their friends (n = 8) and family (n = 3) and to send emails (n = 4). While two students stated that a cell phone was necessary for them when they were young (age 1-5), four students indicated that a cell phone in general was necessary.

Sixty-five students received no training upon purchasing their cell phones, compared to two who did. Most learned to use their cell phones by themselves (n = 38, 57%), while the rest either perused books or magazines (n = 6, 9%) to learn more about their cell phone, or spoke with family members (n = 4, 6%), or friends (n = 17, 25%).

Texting

Cell phone texting habits revealed that while 32 students preferred to text between 1 and 5 text messages per day (48%), 22 students sent between 5 and 10 text messages per day (33%) and the remaining 13 students sent more than 10 text messages per day (19%).

Table 15

Emailing and Texting Habits by Gender

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Emailing habit per day	1 male	59	1.14	.472	.061
	2 female	8	1.13	.354	.125
Cell phone texting per day	1 male	59	1.64	.737	.096
	2 female	8	2.25	.886	.313

An independent sample *t*-test was conducted to compare male and female emailing and texting habits. There were no significant differences between male (M = 1.14, SD = .472) and female students (M = 1.13, SD = .125) concerning emailing habits; t (65) = .06, p = .952.

There is a significant difference between male (M = 1.64, SD = .73) and female students (M = 2.25, SD = .88) with cell phone texting habits; t (65) = -2.13, p = .037. It would seem that female students tend to send more cell phone text messages than male students.

Studying with technology

Students indicated that while 100% had access to cell phones, only 70% of the students had access to MP3 players. Students were also asked if they would agree to study English with an MP3 player. Thirty-four students agreed to study with an MP3 player while 33 disagreed.

When asked if they agreed with using cell phones to study English, 41 students responded positively (61%) and the remaining 26 indicated that they disagreed (39%). An open question asked students to provide a reason for their agreement or disagreement to study English with a cell phone. These answers were recorded and coded into categories. Amongst the 41 positive responses provided, 33% of the students indicated that they would benefit from learning to use their cell phone to communicate in English. Some answers include: *Using a cell phone will improve my English, I can study English anytime anywhere, I can send emails in English, I can learn more words, it can help me speak in English and improve my understanding of English*. Twenty-three percent indicated that the technology was conducive to good learning. Students remarked: *A cell phone is easy to use, it has many functions, it is small and light, it is convenient*. While 20% indicated that there were no particular reasons to disagree with such a learning method, 10% of the students thought that it was an interesting and new concept. Eight percent of the students reported general benefits, such as: *I can study anywhere anytime, I can learn new skills, in case I need to use it when I work overseas*. Amongst the remaining 6%, 3% indicated that using a cell phone might be a better alternative to computers and the other 3% pointed out that everyone has access to a cell phone.

On the other hand, 26 students highlighted some reasons for disagreeing to study with a cell phone. The largest group (38%) placed emphasis on the perception of the role of cell phones, claiming: *the cell phone is a private tool, it is for entertainment purposes, I don't want to study with my phone, it would be inconvenient*. While one student commented on the high cost of sending data via cell phones, three provided no reasons for not agreeing to study with such a device.

Chi-square

The chi-square statistical analysis was conducted to determine if students' preference for iPods is independent of students' preference to study with cell phones. In other words, a student's preference for studying with an iPod would not have an influence on their preference to use a cell phone to learn English.

Table 16

Ipod and Cell Phone Use to Study English

	Cell phone to study English	Total

			1 yes	2 no	
Use of iPod to learn English	1 yes	Count	23	11	34
		% within iPod to learn English	67.6%	32.4%	100.0%
		% within cell phone study English	56.1%	42.3%	50.7%
		% of Total	34.3%	16.4%	50.7%
	2 no	Count	18	15	33
		% within iPod to learn English	54.5%	45.5%	100.0%
		% within cell phone study English	43.9%	57.7%	49.3%
		% of Total	26.9%	22.4%	49.3%
Total		Count	41	26	67
		% within iPod to learn English	61.2%	38.8%	100.0%
		% within cell phone study English	100.0%	100.0%	100.0%
		% of Total	61.2%	38.8%	100.0%

Table 16 above reveals that 34 (50%) students reported a preference to use an iPod to learn English while 41 (61%) students expressed a preference to use a cell phone. The aim was to determine if their preference for iPods versus cell phones was independent of each other. A Chi-square analysis revealed a $\chi^2 = 1.210$ with a corresponding p-value of .271, so it can be concluded that a student's preference to use an iPod versus a cell phone to learn English is non-related (see Table 17 below).

Table 17

Chi-Square Test for Prior Technology Experience

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-square	1.210[a]	1	.271		
Continuity Correction[b]	.722	1	.396		
Likelihood Ratio	1.214	1	.271		
Fisher's Exact Test				.322	.198
Linear-by-Linear Association	1.192	1	.275		
N of Valid Cases	67				

[a] 0 cells (.0%) have expected count less than 5. The minimum expected count is 12.81.

[b] Computed only for a 2x2 table

Learning objectives

To ensure that students would benefit from participating in this communicative class and the cell phone video project, one of the survey items asked about students' perceived learning objectives. The item comprised four variables (reading, writing, speaking, and listening) which students had to rate from least important to the most important skill they wanted to improve. As Table 18 indicates, amongst the four macro skills, students leaned towards wanting to improve their speaking (M = 3.99, SD = 1.02) and listening (M = 4.10, SD = .837) skills.

Table 18

Student Study Needs

	N	Minimum	Maximum	Mean	Std. Deviation
Reading	67	1	5	3.84	.994
Writing	67	1	5	3.42	1.017
Speaking	67	1	5	3.99	1.022
Listening	67	2	5	4.10	.837
Valid N (listwise)	67				

Students then had to explain what they would like to learn from the course. Forty-seven students (70%) provided responses that indicated a general preference for wanting to improve their speaking and communicative skills (including presentation skills, communication/speaking, speaking/listening, listening, communicating with and understanding a native English-speaking teacher). While four students (6%) wanted to improve their computer skills, five students (7%) wanted to improve all their skills, including the ability to express their opinion. Four students wanted to improve their reading abilities (6%), and five students reported wanting to improve a combination of skills (speaking/writing, reading/writing, writing/listening, and listening/reading) (7%).

Analysis of important skills identification

There is a significant correlation between reading, writing, and speaking skills (see Table 19). There is a positive correlation between reading and writing, R (.324), p = .008. There is a negative correlation between reading and speaking, R (-.330), p = .006. This means that if either reading or writing increases in rating of preference, then their correlation is likely to increase as well. By contrast, the negative correlation indicates that as the selection of reading as a preferred skill increases, then speaking would seem to decrease accordingly.

In addition, there is a positive correlation between speaking and listening, R (.568), p = .000. This would seem to indicate that as students identify speaking as a preferred skill, the identification of listening as a preferred skill would also increase. It must be emphasised that correlation analysis does not indicate causality, but rather relationships between items. The positive correlation between speaking and listening could mean that students' desires to improve these skills may influence the outcome of this project.

Table 19

Four Macro Skills Correlation

		Reading	Writing	Speaking	Listening
Reading	Pearson Correlation	1	.324**	-.330**	-.125
	Sig. (2-tailed)		.008	.006	.315
	N	67	67	67	67
Writing	Pearson Correlation	.324**	1	.079	.001
	Sig. (2-tailed)	.008		.525	.991
	N	67	67	67	67
Speaking	Pearson Correlation	-.330**	.079	1	.568**
	Sig. (2-tailed)	.006	.525		.000
	N	67	67	67	67
Listening	Pearson Correlation	-.125	.001	.568**	1
	Sig. (2-tailed)	.315	.991	.000	
	N	67	67	67	67

** Correlation is significant at the .01 level (2-tailed).

English education background – statistical analysis

An ANOVA was conducted to determine if English education background or exposure to a native English teacher would have any influence over the students' decisions when rating the skills that were important to them.

Table 20

ANOVA Analysis of Participants' Prior Exposure to English Study Influence on Their Need Study Reading

Dependent Variable: Important Skill Reading

Source	Type III Sum of Squares	df	Mean Square	F	Sig.

Corrected Model	6.714[a]	4	1.678	1.779	.144
Intercept	171.019	1	171.019	181.313	.000
English Education Background (preq3)	4.102	2	2.051	2.175	.122
Exposure to a native speaker (preq4)	1.205	1	1.205	1.278	.263
Interaction between (preq3 * preq4)	1.146	1	1.146	1.215	.275
Error	58.480	62	.943		
Total	1051.000	67			
Corrected Total	65.194	66			

[a] R Squared = .103 (Adjusted R Squared = .045)

A two-way ANOVA was executed and produced no significant results for English education background. The F statistic was 2.175 with a p value of .122, and for exposure to a native English teacher the F statistic was 1.278 with a p value of .263. The interaction variable was also not significant (F = 1.215, p = .275).

Once the analysis between English education background and exposure to a native English teacher was conducted, the next step was to conduct a two-way ANOVA to determine if there is a significant relationship between English education background and exposure to a native English teacher and a preference for selecting their most important skills.

Table 21

ANOVA Analysis of Participants' Prior Exposure to English Study Influence on Their Need Study Writing

Tests of Between-Subjects Effects

Dependent Variable: Important Skill Writing

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	2.013[a]	4	.503	.471	.757
Intercept	144.462	1	144.462	135.122	.000
English Education background (preq3)	1.504	2	.752	.703	.499
Exposure to a native speaker (preq4)	.138	1	.138	.129	.720
preq3 * preq4	.246	1	.246	.230	.633
Error	66.286	62	1.069		
Total	851.000	67			
Corrected Total	68.299	66			

[a] R Squared = .029 (Adjusted R Squared = -.033)

As Table 21 reveals, there is no significant relationship between English education background, exposure to a native English teacher, and students' rating of writing as the most important skill. A two-way ANOVA was executed and produced no significant results; for English education background the F statistic was .703 with a p value of .499, and for exposure to a native English teacher the F statistic was .129 with a p value of .720. The interaction variable was also not significant (F = .230, p = .633).

Table 22

ANOVA Analysis of Participants' Prior Exposure to English Study Influence on Their Need Study Speaking

Tests of Between-Subjects Effects

Dependent Variable: Important Skill Speaking

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	12.830[a]	4	3.208	3.541	.011
Intercept	217.124	1	217.124	239.725	.000
English Education Background (preq3)	6.003	2	3.001	3.314	.043
Exposure to a native speaker (preq4)	9.028	1	9.028	9.968	.002
preq3 * preq4	12.252	1	12.252	13.527	.000
Error	56.155	62	.906		
Total	1133.000	67			
Corrected Total	68.985	66			

[a] R Squared = .186 (Adjusted R Squared = .133)

As Table 22 reveals, there is a significant relationship between English education background, exposure to a native English teacher, and students' rating of speaking as the most important skill. A two-way ANOVA was executed and produced significant results; for English education background the F statistic was 3.314 with a p value of .043. A significant relationship was also noted for exposure to a native English teacher and students' rating that speaking is the most important skill. The F statistic was 9.968 with a p value of .002. The interaction between these variables was significant (F = 13.52, p = .000).

Table 23

ANOVA Analysis of Participants' Prior Exposure to English Study Influence on Their Need Study Listening

Tests of Between-Subjects Effects

Dependent Variable: Important Skill Listening

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	5.150[a]	4	1.287	1.941	.115
Intercept	217.812	1	217.812	328.420	.000
English Education Background (preq3)	2.4t77	2	1.239	1.867	.163
Exposure to a native speaker (preq4)	4.437	1	4.437	6.690	.012
preq3 * preq4	4.974	1	4.974	7.500	.008
Error	41.119	62	.663		
Total	1175.000	67			
Corrected Total	46.269	66			

a. R Squared = .111 (Adjusted R Squared = .054)

As Table 23 reveals, there is a significant relationship between English education background, exposure to a native English teacher, and students' rating of listening as the most important skill. A two-way ANOVA was executed and produced no significant results; for English education background the F statistic was 1.867 with a p value of .163. However, a significant relationship was noted for exposure to a native English teacher and students' rating that listening is the most important skill; the F statistic was 6.69 with a p value of .012. The interaction between these variables was significant (F = 7.5, p = .008).

Prior experience with technology – correlation analysis

A correlation analysis was conducted to determine if there were any linear associations between age and the other variables. For a correlation to be accepted as valid, there must be a significant level of 0.01 (Pallant, 2007). As Table 24 reveals, there is no significant association between any of the variables.

Table 24
Prior Experience Correlation Analysis

Correlations

		phone access age	cell phone training	carry cell phone everywhere	cell phone study English	listen to music on cell phone	phone training provider	phone text/day
phone access age	Pearson Correlation	1	-.219	-.188	.040	.163	.092	.155
	Sig. (2-tailed)		.075	.128	.747	.187	.460	.209
	N	67	67	67	67	67	67	67
cell phone training	Pearson Correlation	-.219	1	.038	.020	-.018	.093	-.217

	Sig. (2-tailed)	.075		.760	.874	.883	.456	.078
	N	67	67	67	67	67	67	67
carry cell phone everywhere	Pearson Correlation	-.188	.038	1	-.024	.111	.057	-.108
	Sig. (2-tailed)	.128	.760		.845	.370	.647	.385
	N	67	67	67	67	67	67	67
cell phone study English	Pearson Correlation	.040	.020	-.024	1	-.043	.002	-.184
	Sig. (2-tailed)	.747	.874	.845		.731	.988	.135
	N	67	67	67	67	67	67	67
listen to music on cell phone	Pearson Correlation	.163	-.018	.111	-.043	1	.014	.001
	Sig. (2-tailed)	.187	.883	.370	.731		.910	.991
	N	67	67	67	67	67	67	67
phone training provider	Pearson Correlation	.092	.093	.057	.002	.014	1	.127
	Sig. (2-tailed)	.460	.456	.647	.988	.910		.307
	N	67	67	67	67	67	67	67
phone text/day	Pearson Correlation	.155	-.217	-.108	-.184	.001	.127	1
	Sig. (2-tailed)	.209	.078	.385	.135	.991	.307	
	N	67	67	67	67	67	67	67

Prior experience with technology – binary logistic regression

Because the dependent variable "agree to study English with a cell phone" is dichotomous (a closed answer), it is preferable to use a logistic regression to determine the probability that respondents could be more willing to use their cell phones to study English (Pallant, 2007). Independent variables were identified as: prior cell phone training, phone training provider, carry a cell phone everywhere, listen to music on a cell phone, number of cell phone texts per day, and age of first access to a cell phone.

Table 25

Logistic Regression to Test Willingness to Study English with a Cell Phone

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	7.225	8	.513

The Hosmer and Lemeshow Test in Table 25 indicates that the goodness of fit of the logistic regression model is not significant (p = .513). This would indicate that there is no relationship between students' prior experiences with cell phone technology and their decision to indicate that they would be willing to study English with a cell phone.

Table 26

Logistic Regression to Test Willingness to Study English with a Cell Phone

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	Cell phone training	.770	.951	.656	1	.418	2.160	.335	13.936
	Carry a cell phone everywhere	-.291	1.306	.050	1	.824	.748	.058	9.673
	Listen to music on a cell phone	-.317	.663	.229	1	.632	.728	.198	2.673
	Phone training provider	.036	.191	.036	1	.851	1.037	.713	1.508
	Number of texts per day	.495	.364	1.845	1	.174	1.640	.803	3.351
	Age of 1st phone access	-.209	.310	.453	1	.501	.811	.442	1.491
	Constant	.460	1.636	.079	1	.778	1.585		

[a] Variable(s) entered on Step 1: cell phone training, carry a cell phone everywhere, listen to music on a cell phone, phone training provider, cell phone texting per day, age of first access to a cell phone

The individual significance values for each independent variable tested confirm the non-significant relationship between these variables and students' preferences to study English with a cell phone. In other words, students' interests in studying English were not influenced by their prior experiences with this device.

Favourite feature analysis

Students were asked to rate their favourite features from 1 (most liked) to 5 (least liked). The mean analysis provided below indicates that while 'texting' ($\bar{X}$[1] = 1.96, s = .87) and 'calling' ($\bar{X}$ = 2.07, s = .89) were rated as the most liked features, the video recording feature was rated as a neutral feature ($\bar{X}$ = 3.30, s = .131). That is, students did not have a clear opinion of this feature. The 'cash card' feature available on cell phones was the least liked feature ($\bar{X}$ = 4. 48, s = .11).

Table 27

Most Preferred Cell Phone Feature

One-Sample Statistics

[1] $\bar{X}$ denotes a sample mean and **s** denotes sample standard deviation

Favourite cell phone features N=67	Mean	Std. Deviation	Std. Error Mean
Note taking	2.85	1.019	.124
Shape	2.27	.931	.114
Calendar	2.81	.988	.121
Schedule	3.03	1.114	.136
Alarm	2.21	1.008	.123
Size	2.25	.927	.113
Compact	2.31	.988	.121
Light	2.51	.859	.105
Video	3.30	1.073	.131
Cost	3.09	1.069	.131
Texting	1.96	.878	.107
TV	2.97	1.325	.162
Company service	2.96	.878	.107
Music	3.30	1.279	.156
Cash card option	4.48	.911	.111
Internet	2.51	1.284	.157
Watch movies	3.70	1.128	.138
Calling	2.07	.893	.109
Photo	2.42	.972	.119

Weekly Diary Evidence

Production and strategies

During the project, students were encouraged to report on their production preparation process. The evidence reported below provides information concerning the following seven production categories: preparation time, recording attempts, strategies used to prepare, to remember, and to improve speeches, errors identified during the preparation process, and the rating of the overall production process.

Presentation of the data

Each category mentioned above is analysed following the same pattern of analysis. An overall descriptive presentation of responses is provided in two sets. The overall aggregate analysis overview is presented as a graph that provides a week-by-week overview of the differences that may emerge over time. A histogram then presents each group's production process pattern. Next, inferential statistics are used to report whether or not any significant differences exist between students of the same group and students from different groups. Finally, a plot is utilised to reveal group performance per week in relation to the themes. The plot is also used as a comparative analysis of responses reported at Week 2 (T1) and Week 13 (T2). The plot allows the researcher to observe if there are any significant differences that may indicate either progress or a lack thereof. The evidence is presented in the order that it was gathered via the weekly diaries and not on pre-assumed relation order.

Weekly diary rate of return

Students filled in all the required boxes on the weekly diaries; however, as explained previously, some students did not return all their weekly diaries. Nonetheless, the return rate was 85%, or 57 students out of 67 students returned all their weekly diaries. Therefore the total number of cases reported over 12 weeks is 684. Since the number of cases can at times be small and spread over a large number of variables, the analysis will mainly report the general trends and indicate the presence of extreme values. Extreme values are cases that behave outside the norm and are necessary to identify participants who can provide some insight to their performances during the interview and observation session.

The aggregate graphs below are not on the same scale. The simple reason is that, for some categories, the response is spread out evenly, as are the number of cases. The highest number of cases can be lower than in other categories where there are fewer options, and therefore more chances of increasing the number of cases.

Learning Strategies Used as Reported in Weekly Diaries

Preparation time

As Figure 6 indicates, 152 cases spent 30 minutes to prepare their speech (22%). 100 cases indicated that speeches were prepared in 20 minutes (14%). Eighty-seven cases prepared speeches in 25 minutes (12%) and 86 cases prepared speeches in 40 minutes (13%). A few cases indicated the need for either less or more time to complete this task. Ten cases (1.5) reported preparing a speech in 5 minutes. Some cases prepared speeches in more than 60 minutes (n = 18, 3%), 70 minutes (n = 3, 0.44%), 80 minutes (n = 2, 0.29%), 90 minutes (n = 1, 0.15%).

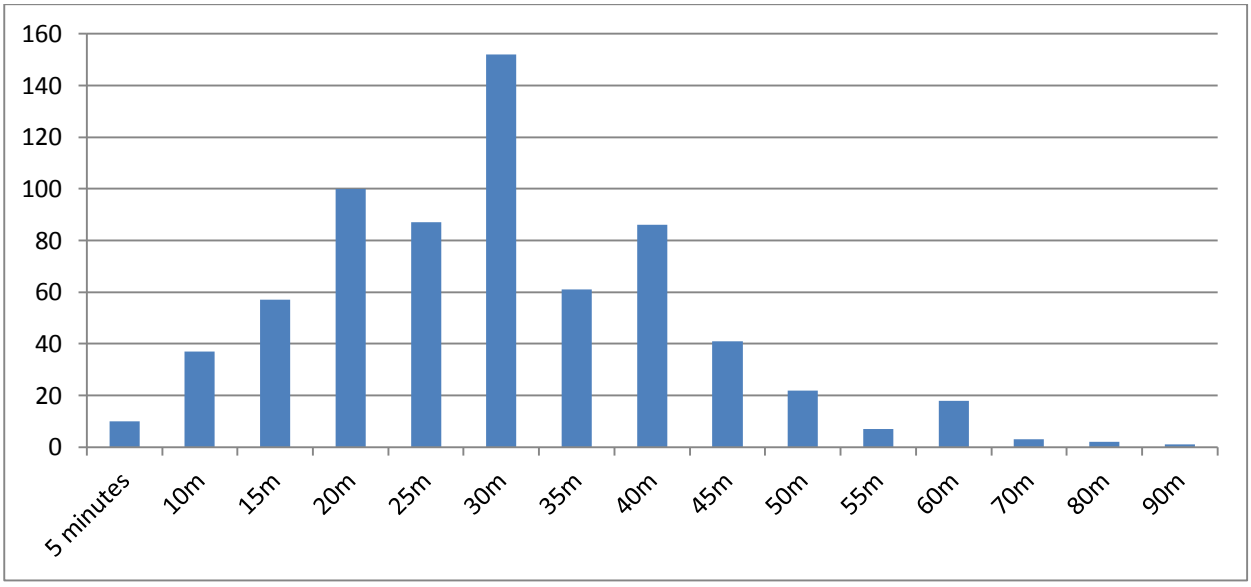


Figure 6. Participants' Overall Preparation Time in minutes

Figure 6 is the aggregate of all the students and of all their responses over the 12-week period. It only displays the distribution for preparation time across all students. It may be of interest to understand if groups perform differently. The histogram per group, below, provides such detailed information.

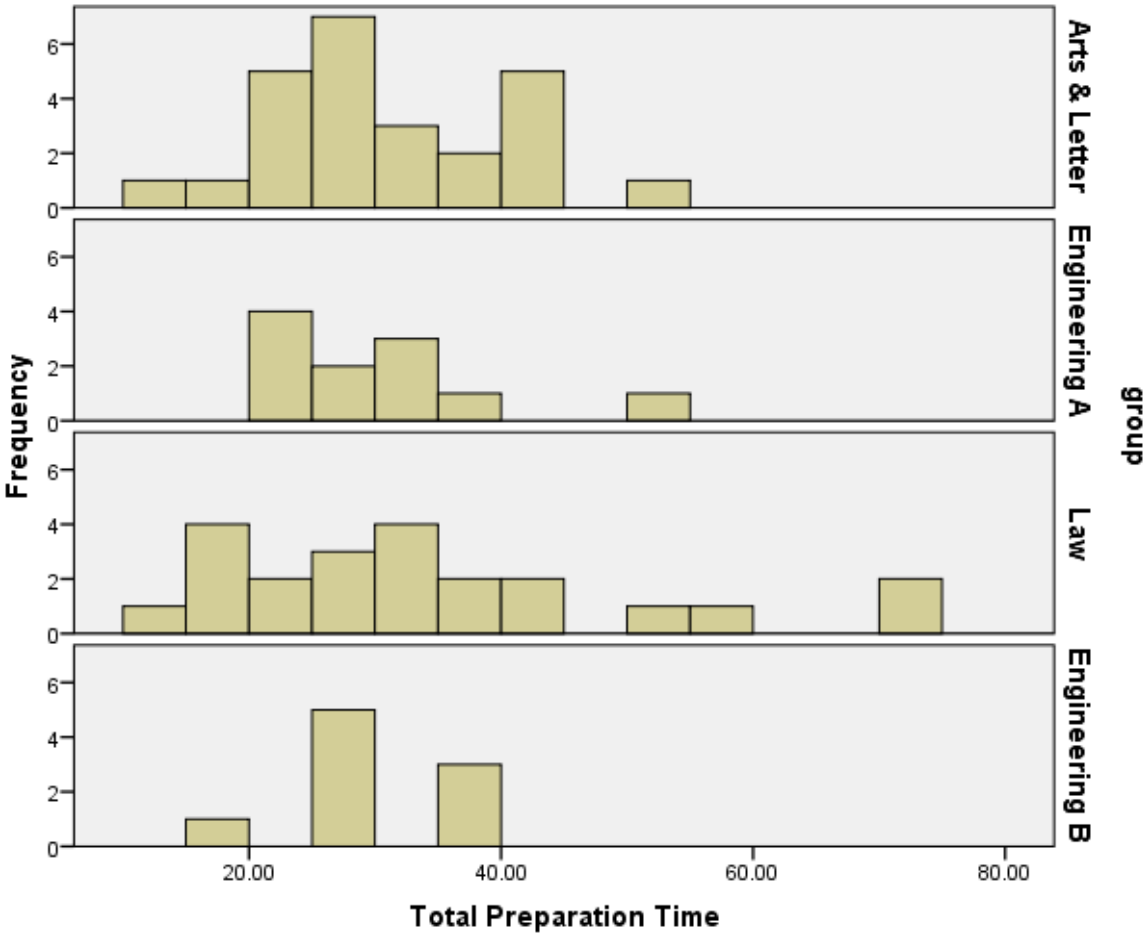


Figure 7. Preparation Time Per Group

The histogram above gives a graphical representation for each group for the total of their preparation time. The *x* axis represents the total amount of preparation minutes for a particular group. The *y* axis represents the frequency. Referring to the Law students group, the histogram indicates higher extreme values for preparation time. For example, a small range of cases prepared their videos in more than an average of 70 minutes per week. In addition, the Law students displayed a flatter distribution of preparation time. Conversely, Arts and Letters students demonstrated a slightly more normal distribution with the most number of students preparing their videos clustering around 20 to 30 minutes. This is most likely because the Arts and Letters students represent the largest group in the sample (n = 25, 37%). Both Engineering A and B have a smaller group of students, resulting in a less defined distribution.

MANOVA analysis of preparation time responses over 12 weeks.

Responses collected over twelve weeks were analysed using MANOVA. This statistical technique allows for the analysis of repeated measures. The MANOVA is reported in terms of tests within subjects to observe if any significant differences exist between participants and between groups. This evidence is followed by a plot which provides a graphical overview of each groups' average responses on the weekly diary over the 12-week period.

Table 28

MANOVA Analysis of Preparation Time Responses over 12 Weeks

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Preparation Time	Sphericity Assumed	4022.702	11	365.700	3.817	.000	.064
Preparation Time * group	Sphericity Assumed	4199.015	33	127.243	1.328	.106	.066

The MANOVA indicates that there is a significant difference with preparation time over the course of the 12 weeks, f (11, 33) = 3.82, p = .000. There are no significant differences between preparation time and within group preparation, f (11,33) = 1.33, p = .106.

The evidence presented above suggests that individual students are likely to consider their preparation time while, as a whole, there is no difference between individual students. That is to say, all students within a group spend a similar amount of time to prepare for their speech.

There is also no significant difference between the different groups, f (3) = .405, p = .75 (see Table 29).

Table 29

Between Groups Significant Analysis

Tests of Between-Subjects Effects

Measure:MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	540030.213	1	540030.213	357.176	.000	.864
group	1835.596	3	611.865	.405	.750	.021
Error	84668.954	56	1511.946			

Plot.

Evidence on the graphical representation below seems to indicate that in the beginning, students needed different amounts of time to prepare their speeches. However, over the length of the course, the evidence seems to converge indicating a more congruent preparation time before diverging towards the end of the project.

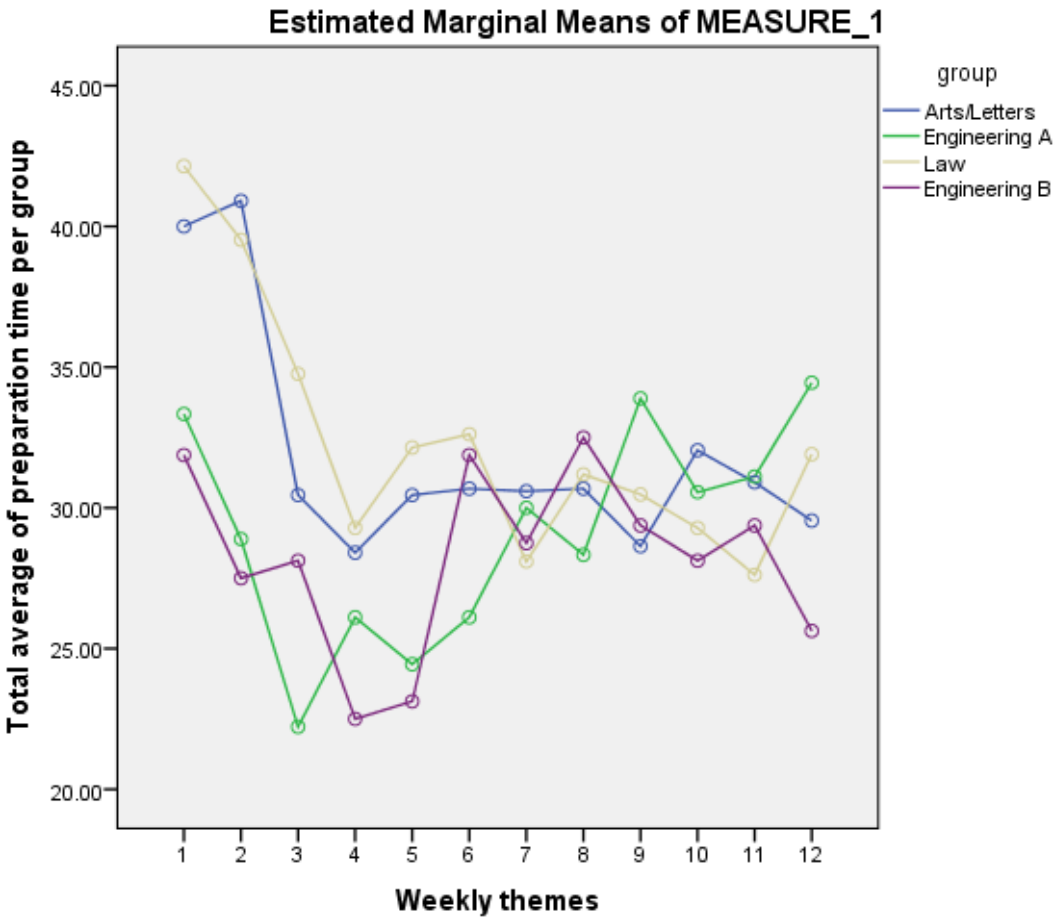


Figure 8. Plot of Preparation Time Presented over 12 Weeks

As Figure 8 indicates, at T1 the average preparation time for each group is different with a slight similarity recorded between the Arts and Letters and Law groups and a close score similarity between the Engineering B and Engineering A groups. All groups experience a decrease in preparation time from Week 2 to Week 5, to eventually arrive at a more consistent average in preparation time at week 8. From then on, while the average preparation time varies, all groups behave within the same time bracket. At T2, while Engineering A and the Law group increase their preparation time, the other two groups do not.

It would appear that the themes that encourage students to "Describe your favourite shop" (Week 7) and "Describe your favourite painting" (Week 8) are instigators that encourage all groups to spend the same amount of preparation time, on average.

Recording sessions

In addition to collecting evidence about preparation time, evidence concerning the number of times students needed to record a video that they would consider a suitable display of their speaking abilities was also collected.

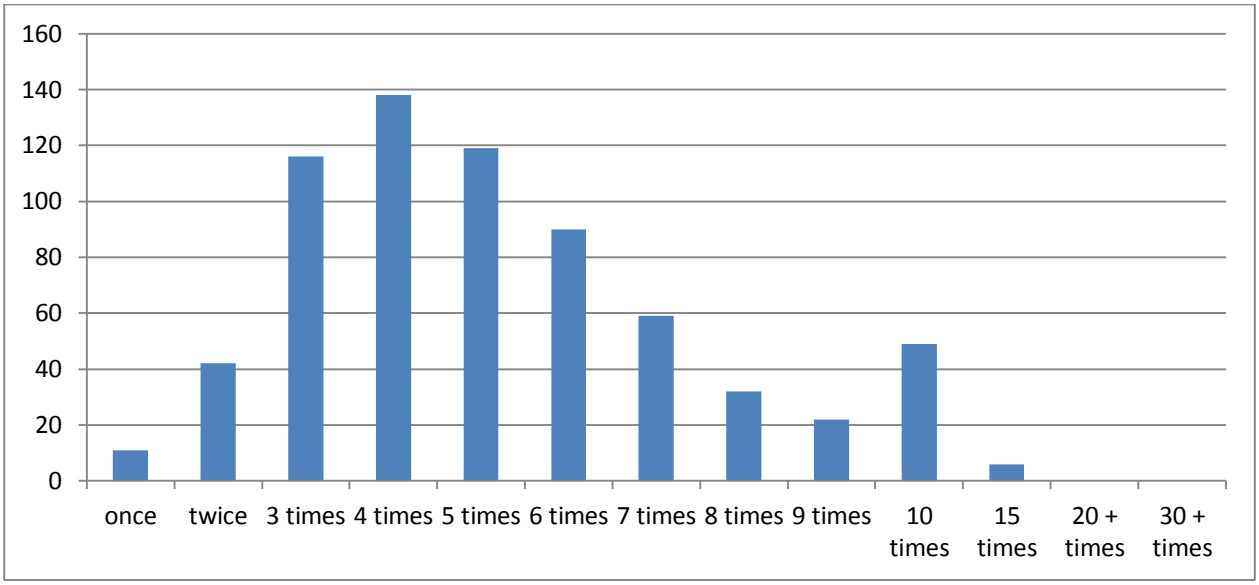


Figure 9. Number of Recordings before Sending Video

From Figure 9 it is visible that the majority of the cases recorded a suitable video after three to five attempts. 20% (n = 138) made four recordings before sending their videos to the teacher. Some needed five trials (n = 119, 17%) and some three (n = 116, 17%). Thirteen percent of the students recorded a suitable video in 6 trials (n = 90). The shortest number of attempts reported was noted in eleven cases (1.6%) with only one recording attempt. The highest number of recording attempts reported was 15 attempts to achieve a suitable result (n = 6, 0.9%).

As explained previously, the above graph presents an aggregate view of all students' data over 12 weeks. The histogram below provides more details concerning group differences in recording sessions.

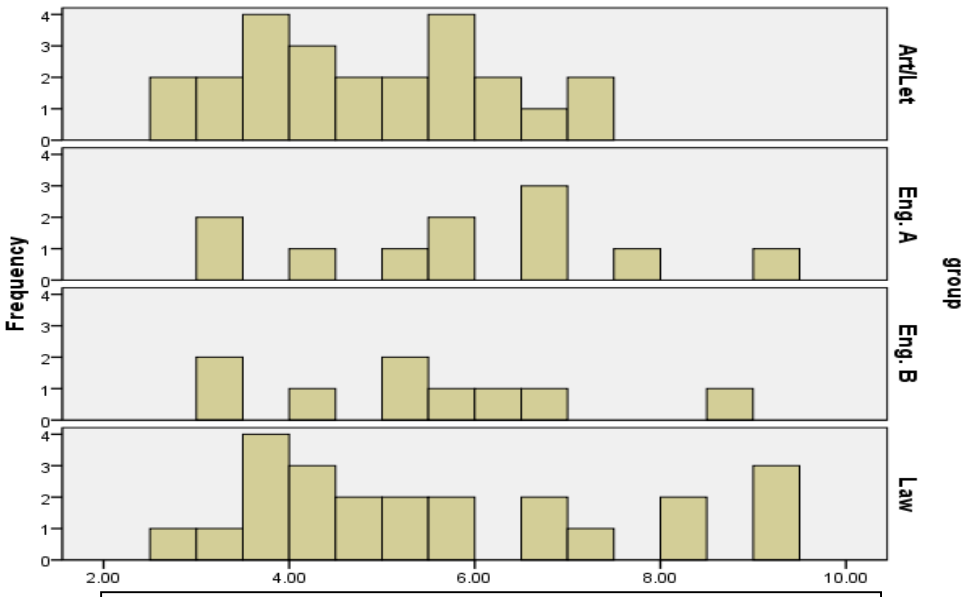


Figure 10. Frequency of Total Recorded Sessions per Group

The histogram above gives a graphical representation for each group for the total number of recording sessions before students decide to send their best video (Figure 10). It would appear that the Arts and Letters group has a more compact distribution, compared to the Law group which seems to have a flatter distribution, with some cases requiring more than eight recording attempts before achieving a satisfactory video. In contrast, both Engineering A (n = 11, 16%) and B (n = 9, 13%) groups due to their low number of students have lower frequencies of attempted video recording sessions, as well as have a few cases requiring more than eight attempts to produce a satisfactory video. Also, both groups have cases of recording sessions that do not demonstrate a normal distribution.

MANOVA analysis of recording session responses over 12 weeks.

A MANOVA analysis reports any significant difference in the number of recording attempts in general for all participants and in contrast between groups.

Table 30

MANOVA Analysis of Recording Sessions per Group

Tests of Within-Subjects Effects

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Recording Session	Sphericity Assumed	59.715	11	5.429	1.775	.055	.030
Recording Session * group	Sphericity Assumed	171.015	33	5.182	1.694	.010	.082

The data in Table 30 approach a near significant difference in students' recording attempts, f (11,33) = 1.77, p = .055 (Table 27). That is, students are likely to re-record their video depending on their spoken performance. There is a significant difference within groups, f (11,33) = 1.69, p = .01. Students within a group will respond differently in terms of number of times to re-record a performance.

Table 31

Recording Analysis amongst Participants

Tests of Between-Subjects Effects

Measure:MEASURE_1 Transformed Variable:Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared

Intercept	17184.453	1	17184.453	449.498	.000	.887
group	58.119	3	19.373	.507	.679	.026
Error	2179.127	57	38.230			

Data from the Between-Subjects Effects reveal that, over the 12 weeks, there is no significant difference in the perception of a need to re-record performances, f (3) = .507, p = .679 (see Table 31 above).

Plot.

As the graphical representation below indicates, students behave differently at different points in time depending on the theme, in relation to their need to increase their recording session attempts.

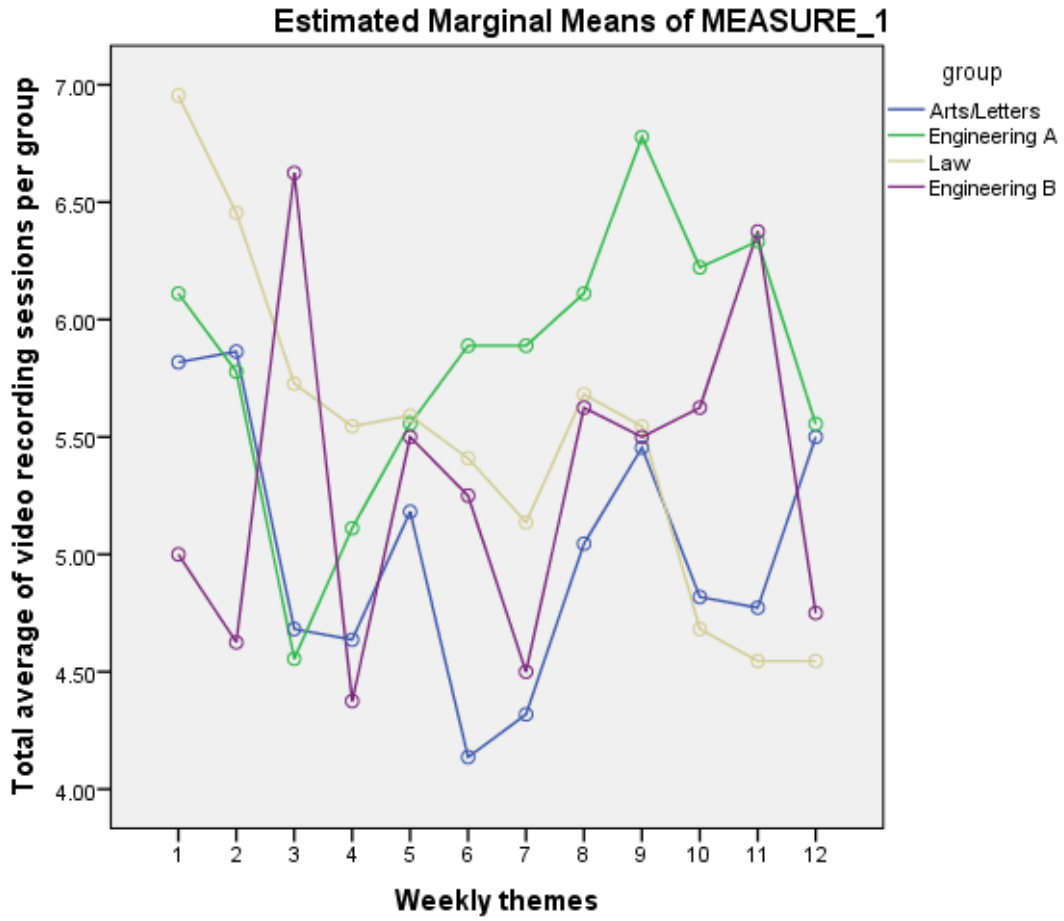


Figure 11. Recording Attempts per Week

On average from Week 2 to Week 4, the Engineering A, Arts and Letters, and Law groups reduce the number of attempts to produce a suitable video performances, compared to the Engineering B group which reports an abrupt increase in recording attempts between Week 4 and Week 5, for example.

While the participants' behaviour seems to perform in a similar manner, it would seem that the number of recording sessions are erratic, meaning that the themes may influence student ability to create a video in a few recording attempts.

Compared to T1, at T2 both the Law and the Engineering B groups were able to reduce the average number of recorded attempts. In comparison, the Arts and Letters and the Engineering A groups report requiring the same number of attempts at T1 and T2.

Speech preparation strategies

During the speech preparation and cell phone video recording session, students might have used certain strategies to prepare their speech. As Figure 12 indicates, there are 355 cases reporting a preference to write speeches in English without the aid of a dictionary (52%). One hundred and seventeen cases reported not using any particular strategy (17%). While 69 cases indicated writing speeches with the aid of a dictionary (10%), 79 cases wrote speeches with the aid of a dictionary and asked a friend to check their work (11.5%). Fifty-eight cases reported being able to video record their speech without any preparation or aid (8.5%). Six cases (0.9) wrote their speech in Japanese before translating it to English.

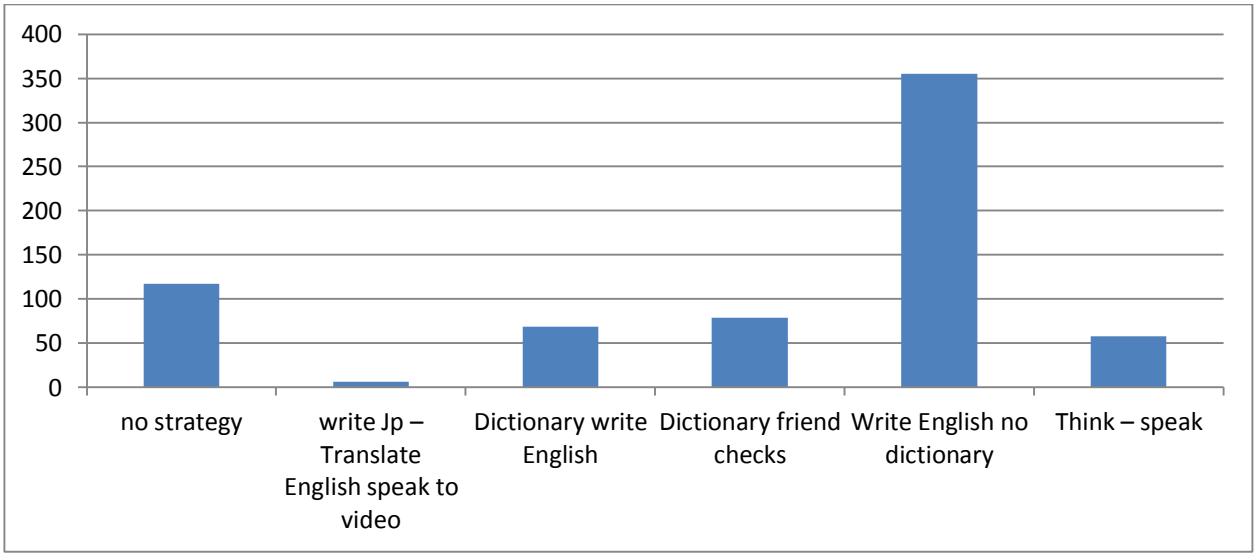


Figure 12. Strategies to Produce Speech

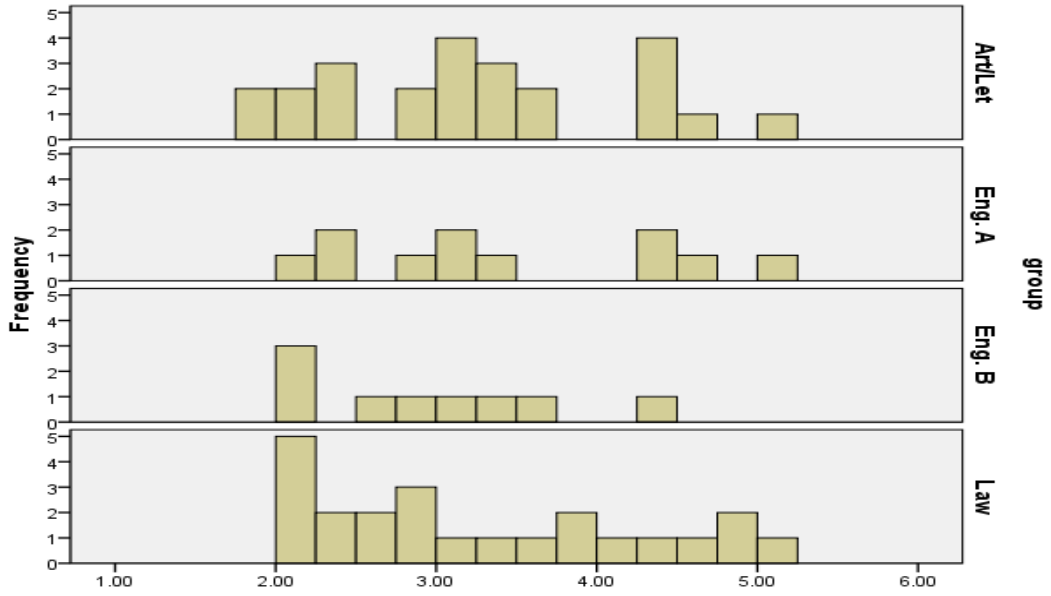


Figure 13. Preparation Strategies per Group

The histogram above reveals that the Law group has a flatter distribution. The data for this group also indicate a higher frequency for writing and then translating speeches from Japanese to English. This is also evident for the Engineering B group. In addition, all groups seem to have a few cases that indicate low frequencies for preparing speeches by writing directly in English.

MANOVA analysis of preparation strategies responses over 12 weeks.

As shown in Figure 12 and Figure 13, the preparation strategies question reports evidence concerning students' strategies to prepare their scripts. The evidence in Table 32 reveals no significant difference between preparation strategies, f (11,33) = 1.029, p = .419 and between groups and their use of particular strategies f (11, 33) = .828, p = .741, across the duration of the project. This means that students are more likely to apply similar strategies to prepare their speech prior to producing a video.

Table 32

Preparation Strategies MANOVA Analysis per Group

Tests of Within-Subjects Effects

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Preparation Strategies	Sphericity Assumed	16.467	11	1.497	1.029	.419	.018
Preparation Strategies * group	Sphericity Assumed	39.788	33	1.206	.828	.741	.042
Error (Preparation Strategies)	Sphericity Assumed	912.488	627	1.455			

Between group analysis of preparation strategies did not reveal any significant differences f (3) = .295, p = .829. This means that all groups applied similar strategies to produce their script (see Table 33 below).

Table 33

Preparation Strategies Analysis per Group

Tests of Between-Subjects Effects

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	5853.321	1	5853.321	516.615	.000	.901
Group	10.037	3	3.346	.295	.829	.015
Error	645.818	57	11.330			

Plot.

The plot below is a graphical representation of students' use of various preparation strategies across all weeks. While the plot presents an erratic preparation strategy, it could be argued that the themes or the task itself influences students' selection of particular preparation strategies.

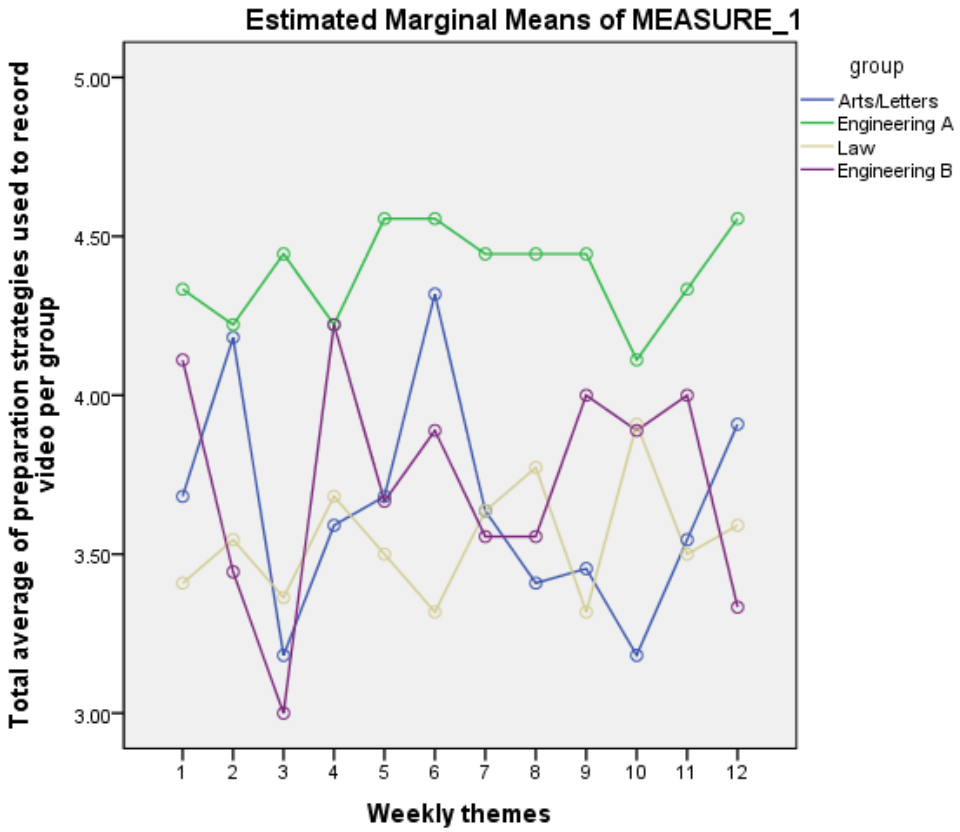


Figure 14. Preparation Strategies over 12 Weeks

It would seem that while the Law, Arts and Letters, and the Engineering B groups have a tendency towards a more basic or traditional approach to writing their scripts, the Engineering A group seems to utlise more advanced preparation strategies such as writing with a peer, which indicates that students have shifted from working alone to working with peers and thus enhancing their opportunity to discuss and negotiate the meaning of their speech, or writing their scripts directly in English.

There does not seem to be any consistency between the groups. While the preparation strategies are on average the same, the students' choice to write their scripts in Japanese and then translate them into English cannot be linked to the challenge of the theme. For example, the theme for Week 6 "How will you improve your next presentation?" would seem to be more demanding than the Week 7 theme "Describe your favourite coffee shop" because the first requires some reflection and understanding of the weaknesses of one's performance, while the second theme requires a reflection of choice. Yet while both the Engineering B and Arts and Letters groups indicated a small shift from direct translation with a textbook to translation with the help of a friend, the Law and Engineering A groups reported using different strategies, shifting from what seems a more advanced strategy for a harder task to a more basic strategy for an easier task.

At T1, students were more likely to translate their script directly from Japanese to English, but at T2 respondents indicated using a dictionary or working with a friend. This slight shift would indicate that students may feel more confident working with peers as opposed to working independently.

Strategies to remember speeches

Once students had prepared their speeches, they indicated whether or not they used strategies to help remember them (see Figure 15).

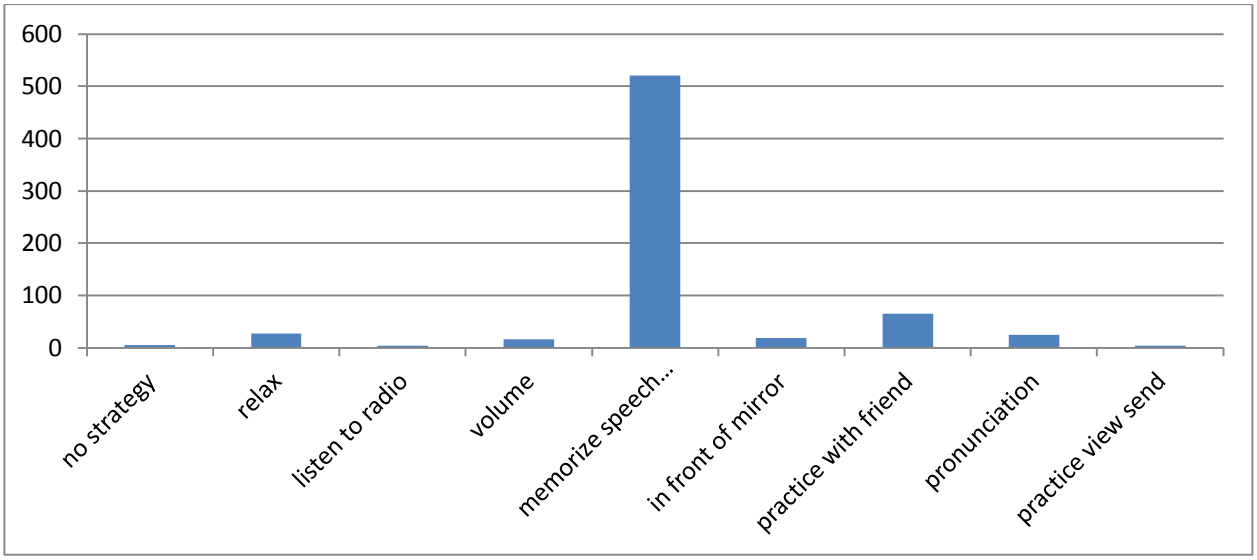


Figure 15. Strategies to Remember Speech

The majority of the cases (n = 521, 76%) reported a preference for memorising their speeches. Similar to the strategy used to prepare their speeches, some cases (n = 65, 9.5%) indicated practising their speeches with a friend. The rest of the strategies were not predominantly important to the students. A few cases tried to relax (n = 27, 4%), to improve pronunciation (n = 24, 3.5%), practise in front of the mirror (n = 18, 2%), or improve speaking volume (n = 16, 2%).

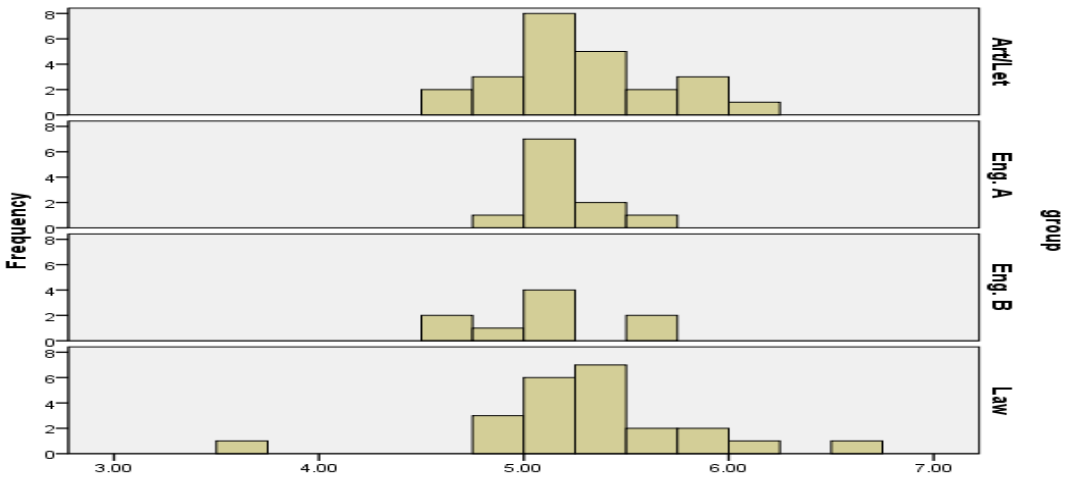


Figure 16. Strategies to Remember Speeches per Group

Figure 16 gives a graphical representation for each group for the total number of strategies used to remember their speeches. It would appear that all groups share a similar distribution in the range of strategies presented to them to remember their speech, with the Arts and Letters and the Engineering A group sharing a normal distribution. The Law group seems to have a flatter distribution with some cases either using low end strategies to remember a speech (volume) or strategies at the high end (focus on pronunciation).

MANOVA analysis of strategies used to memorise speech responses over 12 weeks.

Students were provided with a basic list of possible strategies for remembering their speeches (see the Data Collection Method chapter). In this section of the weekly diary, students had the opportunity to report strategies they used but that were not listed. These were collected and included in the final analysis.

Table 34

Analysis of Strategies to Memorise Speech over 12 Weeks

Tests of Within-Subjects Effects

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Memory Strategies	Sphericity Assumed	22.811	11	2.074	1.409	.164	.024
Memory Strategies * group	Sphericity Assumed	38.342	33	1.162	.790	.795	.040

The memory strategies analysis did not report any significant differences in the memorisation practices amongst students, f (11, 33) = 1.409, p = .164 (see Table 34).

The MANOVA also did not report any significant differences when correlating the memorisation strategies against groups f (11, 33) = .79, p = .795. The Between-Subjects Effects tests did not report any significant differences between groups f (11,33), p = .509. Technically, it means that the variance with memorisation strategy within groups was greater than the variance between groups.

Plot.

As the graph below reveals, students applied different strategies for each week. There did not seem to be a consistent preference for one strategy over another.

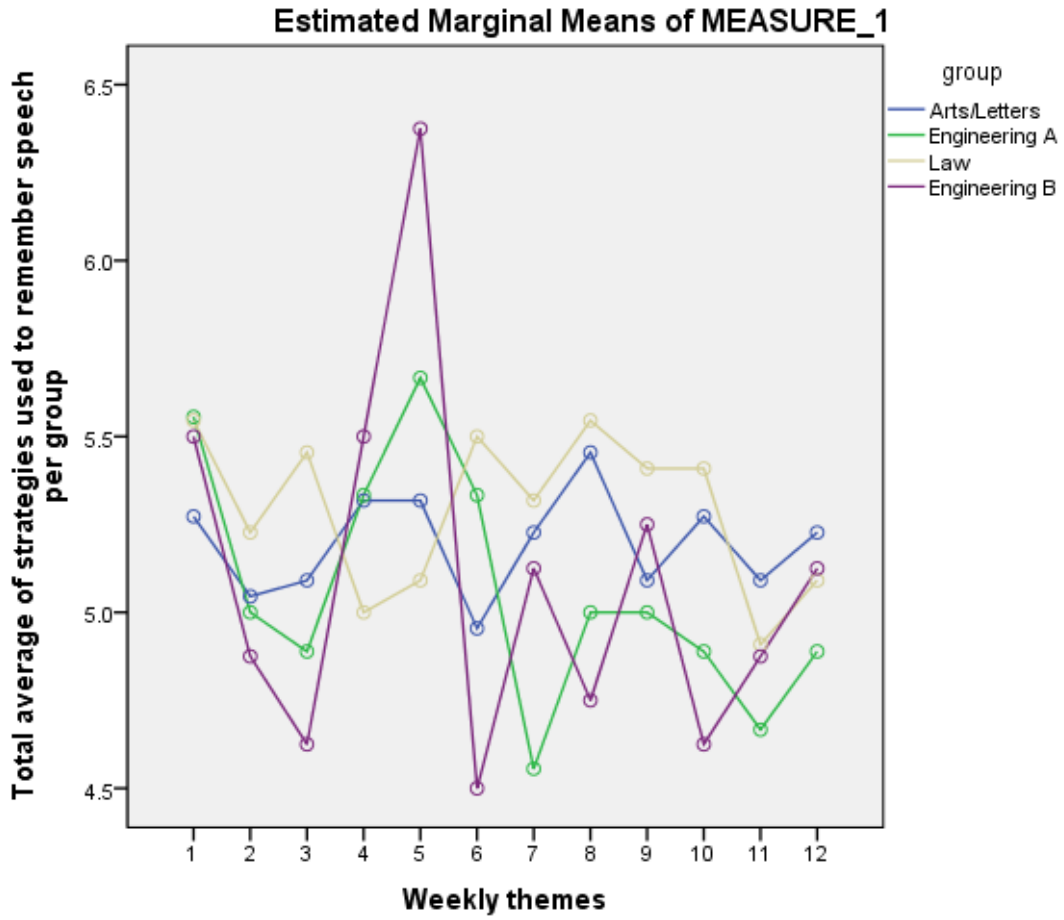


Figure 17. Strategies to Remember Speech Used Over 12 Weeks

The Engineering B group is the only group to behave differently in their selection of strategies to remember their speech, between Weeks 3 and 6. The cause for these cases to select different strategies cannot be identified. However, an estimated guess could be that for this particular group of students, the themes may have been of some influence.

It can be observed that on average students do not vary greatly in their use of strategies to remember their speeches. On average, the graph indicates that students prefer to use a more controlled approach to memorising their speeches and that is to practise by themselves.

Areas identified for improving speech production

In order to evaluate if students viewed their previous videos in order to improve themselves, participants were required to report aspects of their speech that they attempted to improve.

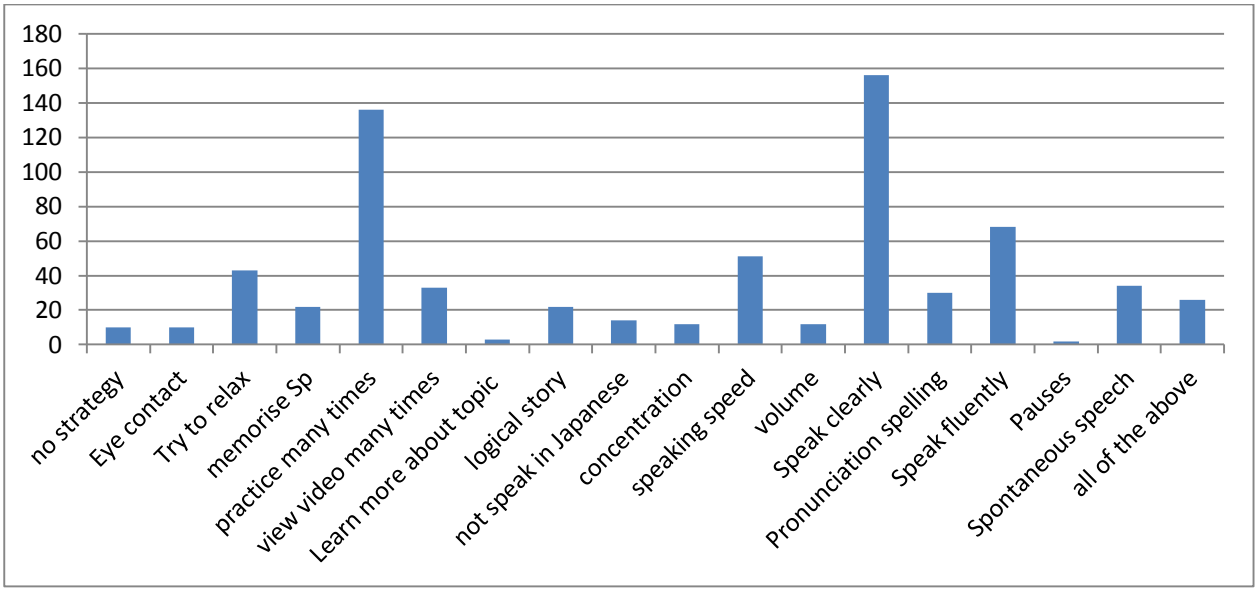
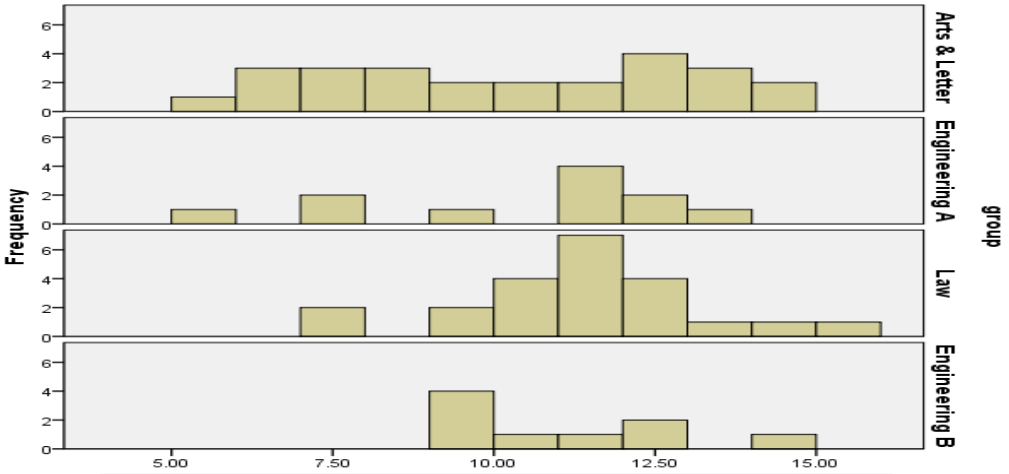


Figure 18. Areas Identified for Speech Improvement

One hundred and fifty-six cases reported attempting to speak clearly (23%) as a strategy for improving their speeches. Other cases reported practising many times to remember the content of their speeches (n = 136, 20%). There are 68 cases of trying to speak more fluently (9.9%) and 51 cases of trying to improve speaking speed (7.5%). The rest of the strategies used to improve speeches included: trying to relax (n = 43, 6.3%), speaking spontaneously (n = 34, 5%), viewing the video many times before sending it (n = 33, 5 %), improving pronunciation (n = 30, 4%), memorising the speech (n = 22, 3%), using a logical story (n = 22, 3%), and making an effort not to speak in Japanese (n = 14, 2.%). Amongst the least attempted improvements are: concentration (n = 12, 1.8%), increasing speaking volume (n = 12, 1.8%), maintaining eye contact (n = 10, 1.5%), learning more about the topic (n = 3, 0.4%), and using pauses more effectively (n = 2, 0.3%). While 10 cases report not using any strategies (1.5%), there are 26 cases of preferences for using all identified strategies to improve speeches (3.8%).



Total average of areas needed to be improved per group

Figure 19. Areas Identified for Improvement per Group

The histogram above gives a graphical representation for each group for the total strategies identified for improving the speeches over 12 weeks. It appears that the Arts and Letters group has a flatter distribution across all identified strategies. While the Engineering A group also has a flatter distribution, frequencies are present for only a few strategies (*Practise many times, learn more about the topic, and memorise speech*). The Law group has a more normal distribution, with some cases leaning more towards advanced type strategies (*pronunciation, speaking fluently, and pauses*). In contrast, the Engineering B group has a skewed distribution leaning more towards a high frequency for improving concentration.

MANOVA analysis of strategies to improve speech production responses over 12 weeks.

Strategies to improve speech production refers to the strategies students used to improve their speaking performances. Students could either select from a list of strategies for improving their speech, or they could add more strategies to the list. Once all the weekly diaries were analysed, there seemed to be a significant difference in the strategies students used to improve their speech production.

Table 35
MANOVA Analysis of Strategies to Improve Speech over 12 Weeks

Tests of Within-Subjects Effects

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Strategies to improve	Sphericity Assumed	522.713	11	47.519	2.294	.009	.039
Strategies to improve * group	Sphericity Assumed	915.356	33	27.738	1.339	.100	.066

The Within-Subjects Effects Test above reports significant differences between students in their use of strategies to improve their speaking abilities, f (11, 33) = 2.29, p = .009. However, there is no significant difference between students within groups, f (11, 33) = 1.34, p = .10 over the course of 12 weeks. Also, there does not seem to be any significant differences between groups f (3) = 1.15, p = .335. This would indicate that all groups of students seem to select similar strategies for attempting to improve their speeches.

Table 36

MANOVA Analysis of Strategies to Improve Speech Difference between Groups

Tests of Between-Subjects Effects

Measure:MEASURE_1 Transformed Variable:Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	66844.012	1	66844.012	1107.326	.000	.951
Group	209.227	3	69.742	1.155	.335	.057
Error	3440.819	57	60.365			

Plot.

At the beginning of the project, most students applied intermediate strategies ranging from *viewing the video many times* (Item 6), *learning more about the topic* (Item 7), *using a logical story* (Item 8), and *not using Japanese accidently* (Item 9). By the end of the project, at T2 some students had shifted from using intermediate strategies to more advanced strategies such as trying to improve *pronunciation* (Item 14), while others identified low end advanced strategies such as trying to improve the *speaking speed* (Item 11), and *speaking clarity* (Item 13). Thus, there are notable changes in the selection of speech improvement strategies, which could signify that students became more aware of their speaking skills and that they attempted to make progress.

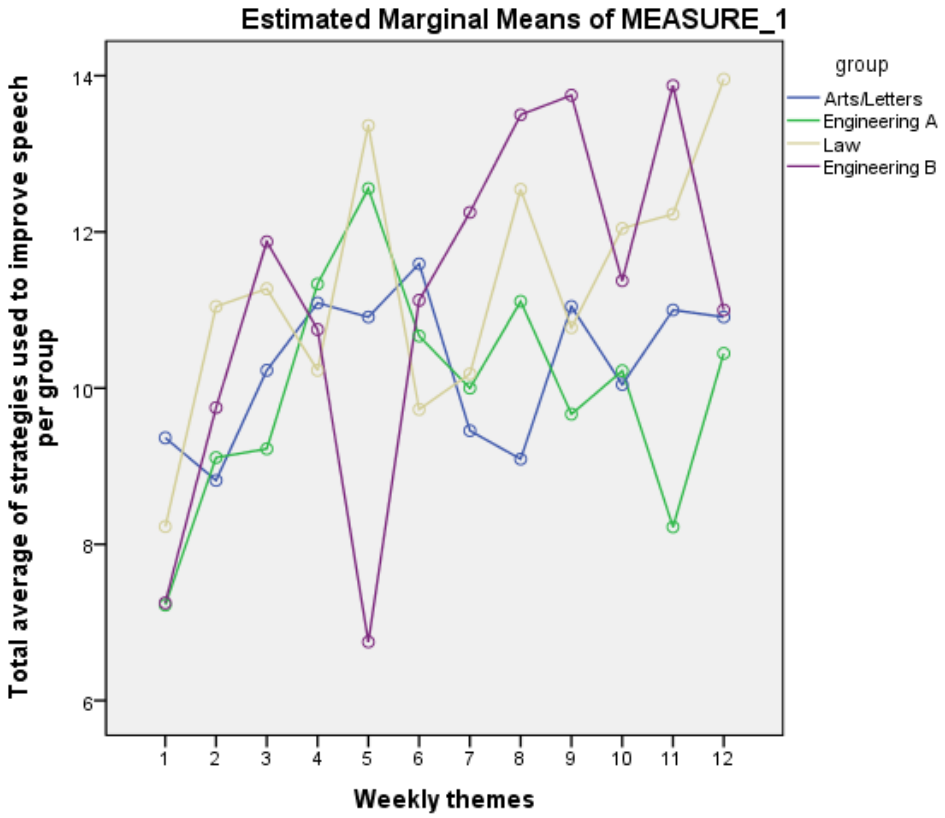


Figure 20. Strategies to Improve Speech over 12 Weeks

The graphical representation above reveals that the Engineering B group attempted to use more advanced strategies before selecting more intermediate strategies in the last week.

By contrast, the Law group seemed to be shifting from intermediate to more advanced strategies in the last week. As with the other strategies, there does not seem to be a consistent preference for one strategy over any others.

On average, students' strategies to improve their speaking performance were erratic from week to week, which does not allow for a clear understanding of the influence of the theme as a motivating factor. However, as the graph above reveals, students' selection of strategies seems to converge at Week 5 "What do you think of your peers' presentation?" and Week 7 "Describe your favourite shop in Sendai." At both weeks the preferred strategy to improve speaking performance was to *increase speaking speed*.

Error Identification

Finally, students were encouraged to report what errors they had made during the recording of their videos.

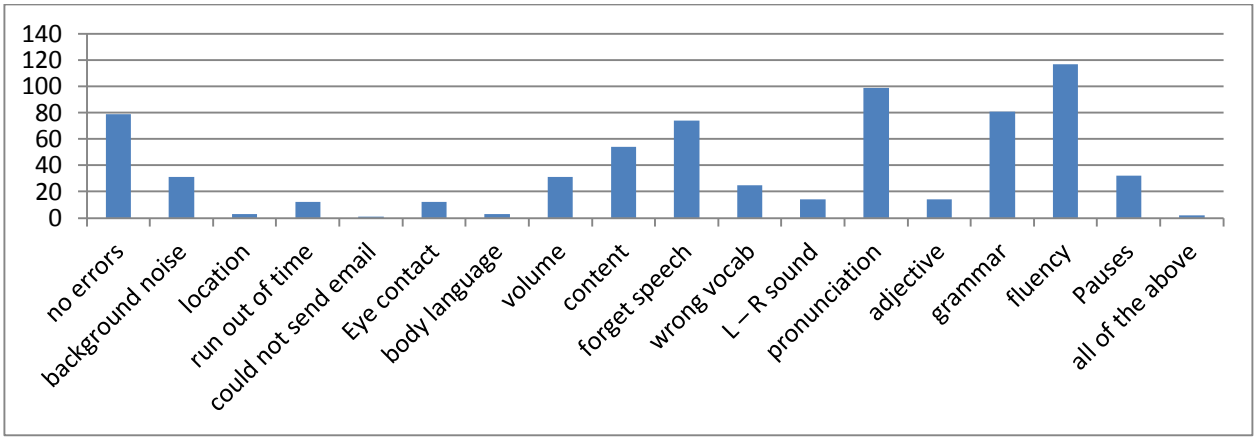


Figure 21. Errors Identified During Speech Production

There were 117 cases that reported making some errors with fluency (17%) and 99 errors with pronunciation (14%). While there are cases that reported making some errors with grammar (n = 81, 11.8%), other cases reported making errors specifically with adjectives (n = 14, 2%). Fifty-four cases reported problems with the content of the speech (8%), forgetting parts of the speech (n = 76, 11%), or forgetting some of the vocabulary (n = 25, 4%). There are cases of making errors with speech volume (n = 31, 4.5%) and noticing background noises (n = 31, 4.5%). Some cases reported making errors with pauses (n = 32, 5%). Amongst the more technically oriented errors, some cases reported running out of recording time (n = 12, 1.6%), selecting an inappropriate location (n = 3, 0.4%), or having difficulties sending the video (n = 1, 0.15%). There are a few cases whereby errors were more visual, such as maintaining eye contact (n = 12, 2%) or not using appropriate body language (n = 3, 0.4%). There are 79 cases of no errors being identified (12%).

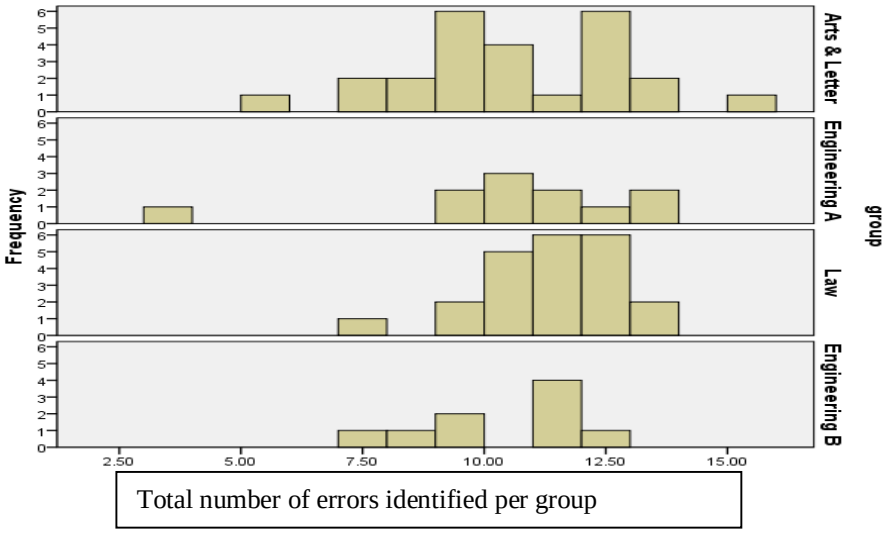


Figure 22. Errors Identified During Speech Production per Group

The histogram above gives a graphical representation for each group for the total number of identified errors over 12 weeks. It appears that the Arts and Letters group has a flatter distribution reporting a wider range of identified errors. It is the only group where cases have been able to identify more finite errors such as grammar and fluency. While the Engineering A group also has a flatter distribution, outliers had challenges with low level technical or visual errors. The Law group has a narrower distribution, with high frequencies for forgetting whole or parts of speech. The Engineering B group indicates a disjointed distribution in the graph with errors being made with volume or forgetting parts of speeches, and some errors being identified as pronunciation errors.

MANOVA analysis of error identification responses over 12 weeks.

On the weekly diary form, students were offered a range of potential basic and intermediate errors to select from which they may have made during their speech productions. For example, the most recognised error amongst the literature is the Japanese speaker's challenge when differentiating between L and R sounds, so students are likely to experience difficulties producing these sounds. The list included other similar basic or intermediate errors. Students could also add to the list by writing down some errors they may have noticed during the production of their performance. All the errors were collected and analysed.

Table 37
MANOVA Analysis of Errors Identified during Speech Production

Tests of Within-Subjects Effects

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Error Identification	Sphericity Assumed	928.860	11	84.442	4.136	.000	.068
Error Identification * group	Sphericity Assumed	1238.699	33	37.536	1.839	.003	.088

The MANOVA reports significant differences with error identification, f (11, 33) = 4.14, p .000, and between error identification and groups, f (11, 33) = 1.84, p = .003. These significant differences would seem to indicate that students were able to identify different types of errors in their speeches over the 12 weeks. Students' abilities to identify errors also seem to differ within groups, so students within groups could identify different errors than their peers.

Table 38

Analysis of Errors Identified during Speech Production per Group

Tests of Between-Subjects Effects

Measure:MEASURE_1 Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	66364.351	1	66364.351	1192.756	.000	.954
group	146.125	3	48.708	.875	.459	.044
Error	3171.452	57	55.640			

By contrast, there are no significant differences between groups in identifying errors, f (3) = .875, p = .459, meaning that all groups identified similar errors.

Plot.

The graphical representation below reveals that groups of students started selecting errors from different categories. The graph also reveals that at Week 3 students started to identify similar error productions.

At T1, while the Engineering A group experienced more technical errors, such as *selecting the wrong location*, the other teams started at either the basic level of error identification or the intermediate level. The Engineering B group identified more basic errors such as *volume* and the Arts and Letters and the Law group identified more intermediate errors such as *forgetting parts of speech* or *using the wrong words*.

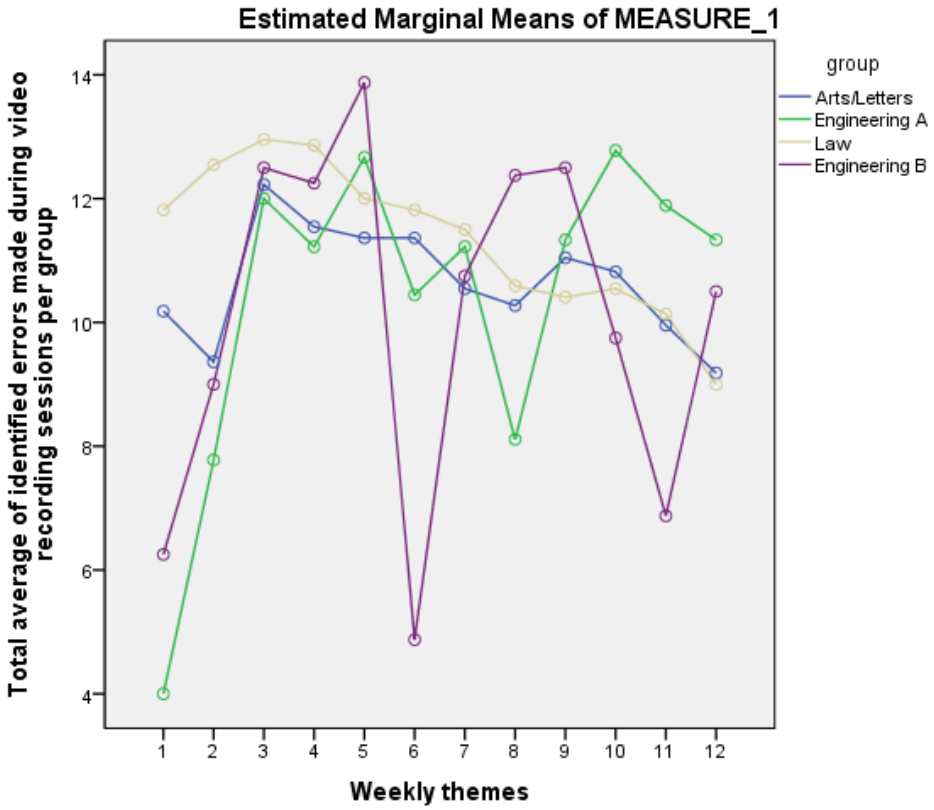


Figure 23. Errors Identified during Speech Production over 12 Weeks

By T2, the Law group had made a slow shift in the types of errors they could identify, shifting from the recognition of *L/R sound* to *forgetting parts of speech*. The Arts and Letters group followed a similar trend from *forgetting parts of speech* at T1, to *forgetting the whole speech* at T2.

Both engineering groups, which started either with technical error identification or basic error recognition such as *volume* at T1, were able to improve their error identification at T2. The Engineering A group was able to recognise more intermediate type errors such as producing *L/R sounds*, and the Engineering B group was able to recognise that they sometimes *forgot parts of speech*.

The evidence indicates that the larger groups on average followed similar trends, compared to the smaller engineering groups. Both engineering groups also seemed to have a more noticeable reporting of errors, which might be correlated by between themes and error production types. In addition, it appears that all groups identify errors within the same band at Weeks 4 and 5, before beginning to identify different errors.

Rating enjoyment of video productions

The last question on the progress report inquires whether or not students enjoyed making the particular video for each week. As Figure 24 indicates, amongst 684 weekly diaries collected, enjoyment of the task scored 603 positive experiences (88%) as opposed to 81 cases of negative experiences reported (12%).

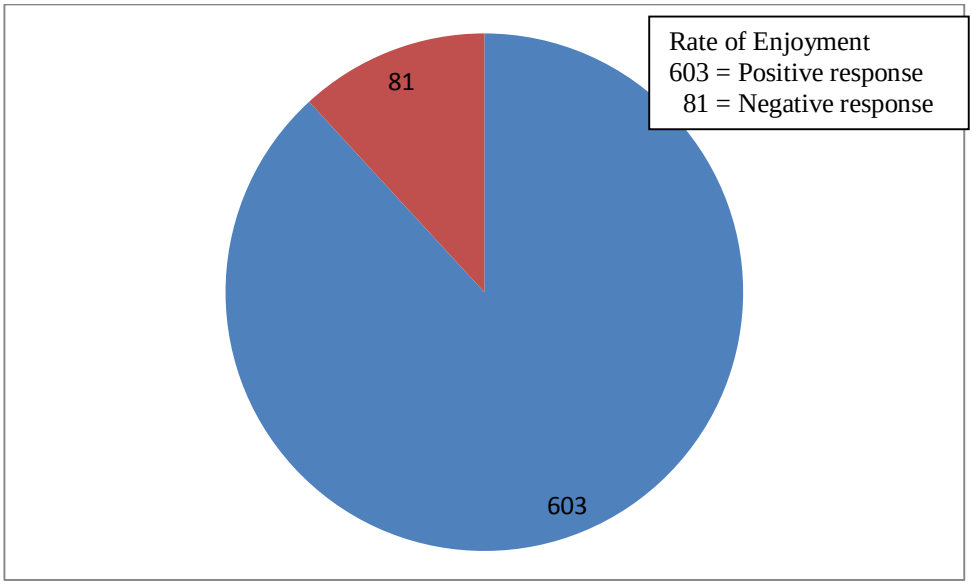


Figure 24. Rate of Enjoyment of Video Production over 12 Weeks

Overall, as the histogram below reveals, most participants enjoyed producing videos over the 12 weeks. "1" indicates that they enjoyed video production and "2" indicates that they did not enjoy the activity.

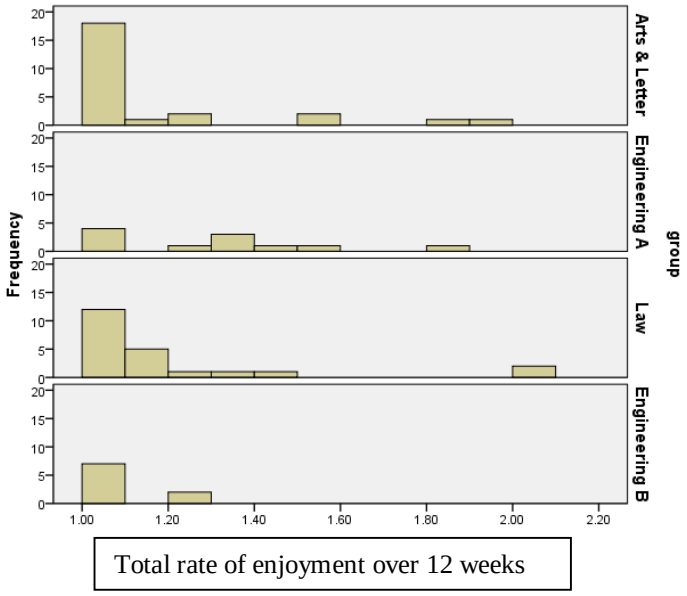


Figure 25. Total rate of enjoyment over 12 weeks

Nonetheless, it is noticeable that, at times, some students did not enjoy the production process. While the Arts and Letters, Engineering A, and the Law group have wider spread distributions, the Engineering B group displays high frequencies of enjoyment with the video production process.

Compared to the other three groups, the Law group reports a higher frequency of not enjoying the task at some point during the 12 weeks.

MANOVA analysis of rate of production enjoyment responses over 12 weeks.

Once students had completed their video for a particular week and once they had reported their production process, the last question on the weekly diary required that they state whether or not they had enjoyed this task for that particular week.

Based on the evidence reported in Table 39, there is a significant difference between individual students' enjoyment of the task over the 12 weeks, f (11,33) = 4.56, p = .000. However, there is no significant difference between individuals in the same group, f (11,33) = 1.24, p = .169.

Table 39
Enjoyment of Video Production

Tests of Within-Subjects Effects

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Rate Enjoyment	Sphericity Assumed	3.728	11	.339	4.558	.000	.074
Rate Enjoyment * group	Sphericity Assumed	3.045	33	.092	1.241	.169	.061

There is no significant difference between groups, f (3) = .298, p = .826 (see Table 8987).

Table 40
Enjoyment of Video Production per Group

Tests of Between-Subjects Effects

Measure:MEASURE_1 Transformed Variable: Average

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	789.471	1	789.471	963.958	.000	.944
group	.733	3	.244	.298	.826	.015
Error	46.682	57	.819			

This would seem to suggest that students at times enjoyed the task to the same extent.

Plot.

The plot below (Figure 26) seems to identify the themes that students agreed about not enjoying. While it appears that the first video project students had to produce was rated as not very enjoyable, the last video production received a higher rating of enjoyment. Both Engineering groups rated the last task as fully enjoyable, while some participants in the other two groups (Law and Arts and Letters) still rated this task as not very enjoyable.

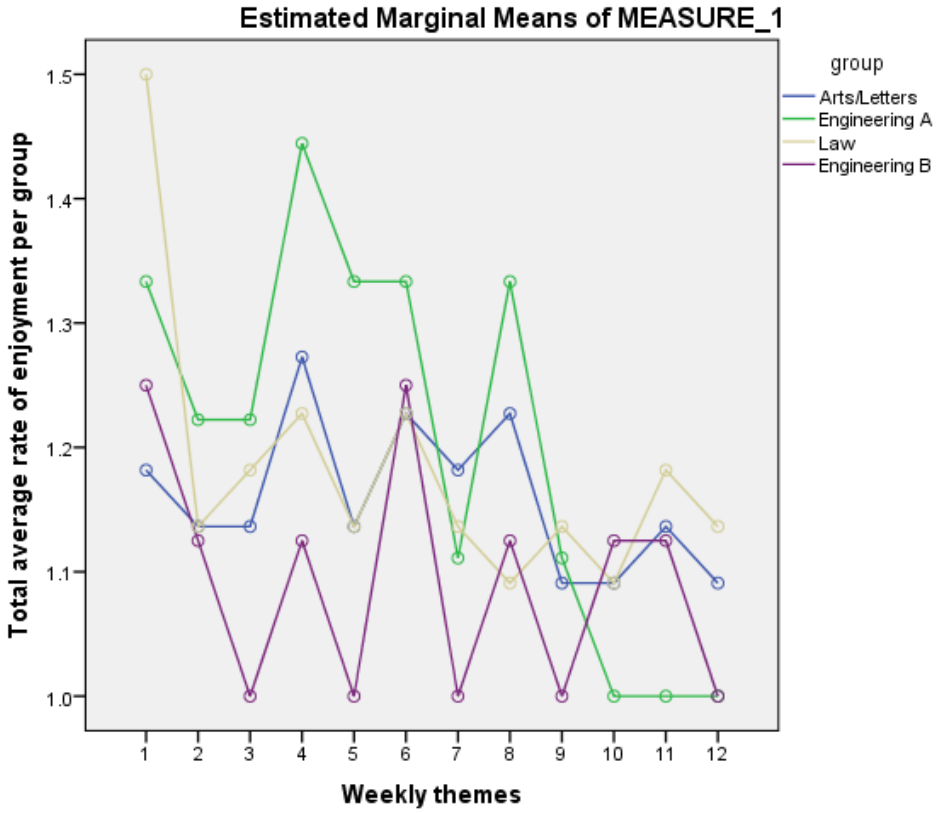


Figure 26. Rate of Enjoyment over 12 Weeks

The rate of enjoyment refers to students' enjoyment with the whole video production process, including the writing, practising, and producing phases.

Based on the evidence gathered, it would seem that the themes rated as the most enjoyable in terms of production process were Week 3 "What did you do during Golden Week," Week 5 "What did you think of your peers' opinions during their presentations," Week 7 "Describe your favourite shop," Week 9 "How would you save the environment," and Week 12 "What will you do during the summer holiday."

Week 4 "What did you think of your peers' speaking style?" and Week 8 "Describe your favourite painting" seem to have recorded more negative ratings from all groups compared to the other themes. Some of the other themes also received negative ratings, but these were dependent on individual group perceptions. For example, while Engineering B group rates the Week 11 "Explain why you

agree or disagree with your peers' opinions in their presentations" theme positively, the other three groups report slightly more negative perceptions towards this theme.

Linguistic Improvement Analysis

Correlation Analysis

Correlation analysis is a statistical technique that enables researchers to identify linear relationships between variables, without making any inferences. As an analytical technique it does not aim to identify causality between variables. Correlation analysis is used to understand if any relationship exists between the variables selected in the weekly diary (preparation time, recording sessions, speech preparation, speech memorisation and improvement strategies, and error identification) without inferring that one causes the other to occur. Since Week 2 (T1) and Week 13 (T2) share the same theme "What do you think of this course," two correlation analyses were conducted for these weeks. The aim was to notice if any correlation between the identified variables exists as students gain more experience with cell phone video production.

There are two suitable correlation analysis tools available on SPSS; the Pearson-product-moment correlation coefficient and the Spearman rank order coefficient rho (Pallant, 2007). While the former is most suitable with scores, the latter is best when used with "ordinal or ranked data" (Pallant, 2007; p. 126). The weekly production progress diary included items that ranked the data provided by students. For example, data concerning "Strategies to prepare a speech" ranked possible options in order from least advanced (write in Japanese) to the more advanced strategies (speak in English without notes). Hence, students selected the strategy they utilised to produce one video**.** Once the data were entered in SPSS, they were ranked according to the specific variable. Once all the data were coded, the Spearman rank order correlation was used to evaluate all the feedback forms provided. At first only pre- and post-production progress diaries were analysed.

Table 41
Spearman's rho Correlation at T1

Correlations

			preparation time	Recording Sessions	preparation strategies	Remembering speech strategies	Strategies to improve speech production	Errors made during recording sessions	Rate enjoyment of task
Spearman's rho	preparation time	Correlation Coefficient	1.000	.018	-.230	.272*	-.133	.160	.007
		Sig. (2-tailed)	.	.883	.061	.026	.283	.196	.957
		N	67	67	67	67	67	67	67
	Recording Sessions	Correlation Coefficient	.018	1.000	.054	.065	.128	.051	.167
		Sig. (2-tailed)	.883	.	.666	.601	.302	.682	.176
		N	67	67	67	67	67	67	67
	preparation strategies	Correlation Coefficient	-.230	.054	1.000	-.018	.315**	.076	.206
		Sig. (2-tailed)	.061	.666	.	.882	.009	.542	.094
		N	67	67	67	67	67	67	67
	Remembering speech strategies	Correlation Coefficient	.272*	.065	-.018	1.000	.138	-.080	.101
		Sig. (2-tailed)	.026	.601	.882	.	.266	.520	.417
		N	67	67	67	67	67	67	67
	Strategies to improve speech production	Correlation Coefficient	-.133	.128	.315**	.138	1.000	.067	.208
		Sig. (2-tailed)	.283	.302	.009	.266	.	.590	.091
		N	67	67	67	67	67	67	67
	Errors made during recording sessions	Correlation Coefficient	.160	.051	.076	-.080	.067	1.000	-.089
		Sig. (2-tailed)	.196	.682	.542	.520	.590	.	.475
		N	67	67	67	67	67	67	67
	Rate enjoyment of task	Correlation Coefficient	.007	.167	.206	.101	.208	-.089	1.000
		Sig. (2-tailed)	.957	.176	.094	.417	.091	.475	.
		N	67	67	67	67	67	67	67

As can been seen in Table 41, there is little correlation between production process items in at time, which is the second week. The only visible correlations seem to be between "preparation time" and "remembering speech strategies" (r = .272) which is significant since p < .05, as well as between "preparation strategies" and "strategies to improve speech production" (r =.315) which is also significant since p < .01.

Table 42 reports the Spearman's rho correlation analysis for Week 13 (T2).

Table 42

Spearman's rho Correlation at T2

Correlations

			preparation time	Recording Sessions	preparation strategies	Remembering speech strategies	Strategies to improve speech production	Errors made during recording sessions	Rate enjoyment of task
Spearman's rho	preparation time	Correlation Coefficient	1.000	.293*	-.132	.005	.277*	.217	.087
		Sig. (2-tailed)	.	.016	.288	.966	.023	.077	.485
		N	67	67	67	67	67	67	67
	Recording Sessions	Correlation Coefficient	.293*	1.000	.160	.202	.248*	.069	.326**
		Sig. (2-tailed)	.016	.	.196	.101	.043	.579	.007
		N	67	67	67	67	67	67	67
	preparation strategies	Correlation Coefficient	-.132	.160	1.000	.045	.056	-.008	.270*
		Sig. (2-tailed)	.288	.196	.	.717	.652	.952	.027
		N	67	67	67	67	67	67	67
	Remembering speech strategies	Correlation Coefficient	.005	.202	.045	1.000	-.004	.028	.126
		Sig. (2-tailed)	.966	.101	.717	.	.973	.819	.308
		N	67	67	67	67	67	67	67
	Strategies to improve speech production	Correlation Coefficient	.277*	.248*	.056	-.004	1.000	.180	.214
		Sig. (2-tailed)	.023	.043	.652	.973	.	.144	.082
		N	67	67	67	67	67	67	67
	Errors made during recording sessions	Correlation Coefficient	.217	.069	-.008	.028	.180	1.000	.215
		Sig. (2-tailed)	.077	.579	.952	.819	.144	.	.080
		N	67	67	67	67	67	67	67
	Rate enjoyment of task	Correlation Coefficient	.087	.326**	.270*	.126	.214	.215	1.000
		Sig. (2-tailed)	.485	.007	.027	.308	.082	.080	.
		N	67	67	67	67	67	67	67

As it can be seen in Table 42, there seem to be more correlations between production process items for the last video production task. Spearman correlation analysis reveals a correlation between "Preparation time" and "Recording sessions" (r = .293, p < .05), and with "Strategies to improve speech production" (r = .277, p < .05). There is also a correlation between "Recording sessions" and "Strategies to improve speech production" (r = .248, p <.05), and with "Rate of enjoyment" (r = .326, p < .01). Finally, there is a correlation between "Preparation strategies" and "Rate of enjoyment" (r = .270, p < .05).

In summary, evidence collected from the students' diaries seems to suggest that some students perceived improvements not only during each week, but also between T1 and T2. The analysis also seems to suggest that there were some improvements or significant behavioural differences between participants and between groups. However, this is only one part of the data collected. To confirm whether or not there were noticeable improvements, analysis of students' spoken performances is necessary.

Spoken Utterances Analysis

While students kept track of their cell phone video production processes, the teacher tabulated all students' cell phone speeches. Thirteen weeks of speech performances were coded in terms of words spoken per second. In addition, lexical items utilised in students' speeches were also catalogued and analysed. The sections below provide evidence concerning the calculations for determining the most effective dependent variable, words spoken per second, and students' lexical selection range.

Words spoken per second

To build speaking confidence, Boonkit (2010) explains that "pronunciation, vocabulary and collocations are singled out as important factors to be emphasised in building fluency" (p. 1306). Boonkit asserts that focusing on these three speaking aspects reduces students' fear of making errors. However, Boonkit offers little advice for analysing speaking output. Kormos and Denes (2004) suggest either using the speech rate, the mean length of runs or the phonation-time ratio. Hincks (2010) adds that "speaking rates can be counted in both words and syllables and by both minutes and seconds" (p. 7).

Both the speech rate and the mean length of run use the number of syllables uttered as a source of analysis (Kormos & Denes, 2004). The phonation-time ratio compares the time spent speaking against the time spent to produce that particular speech (Kormos & Denes, 2004). While the latter is not suitable because in this research the participants have a production practice, the former two options are also not suitable because they take into consideration pause time. In this particular research, the speakers will have pre-final video practice and, once they are ready to perform their final videos, they will have had greater awareness and control over their pauses. Therefore, for the purpose of this research, students' utterances were calculated by dividing the number of words by the time spoken. Table 43 provides an example of a group's words per second count for one week of cell phone videos. Since this research investigates the educational benefit of integrating cell phone technology as a speaking production tool, this author decided that an extensive analysis of speech would distract from the intended research objective.

Table 43

Word per Second Analysis

Week 2: What do you think of this course?				
	Students	Word count	Time (seconds)	Words/ Second
	St1	68	31	2.193548
	St2	52	28	1.857143
	St3	78	28	2.785714
	St4	58	31	1.870968
	St5	66	28	2.357143
	St6	40	28	1.428571
	St7	0	0	0
	St8	63	29	2.172414
	St9	31	21	1.47619
	St10	56	28	2
	St11	53	24	2.208333
	St12	53	28	1.892857
	St13	48	29	1.655172
	St14	64	29	2.206897
	St15	60	30	2
	St16	60	33	1.818182
	St17	51	29	1.758621
	St18	45	29	1.551724
	St19	70	26	2.692308
	St20	54	30	1.8
	St21	73	30	2.433333
	St22	74	30	2.466667
	St23	53	29	1.827586
	St24	54	28	1.928571
	St25	0	0	0
	Average	52.96	26.24	1.855278
	Std Dev	19.2234	8.227393	0.658122

As the sample above demonstrates, the number of words spoken and the speaking time were recorded. These numbers are then divided to give an overview of the number of words spoken per second. Obviously, the faster a student speaks the more words they will be able to utter. The objective is not to force students to speak fast, but to observe how students manage to express their opinions within a time limit. The dilemma concerns the fact that some students will express their opinion in 28 seconds (St10) and achieve the same number of words spoken per second as a student who speaks for 30 seconds (St15).

Discussions with professional analysts from James Cook University explained that it would be possible to apply a particular calculation to position the evidence on the same time scale; that is, all utterances could be scaled on 30 seconds, thus providing a standardized time. However, these professionals also mentioned that this would be an exercise in futility, and that it would remove an accurate view of students' true performances.

Table 44

Full Words per Second Analysis

	Week 2 What do you think of this course				
Students	Words/ Second	Deviation from mean	Deviation from group mean	Words/Scd against class	Words/Second T Against Whole
St1	2.19	0.3388	0.191515	2.577755	3.075996653
St2	1.85	-0.0012	-0.14849	-0.00913	-2.3848894
St3	2.78	0.9288	0.781515	7.066761	12.5522401
St4	1.87	0.0188	-0.12849	0.14304	-2.063660808
St5	2.35	0.4988	0.351515	3.795113	5.645825383
St8	2.17	0.3188	0.171515	2.425585	2.754768061
St9	1.47	-0.3812	-0.52849	-2.90035	-8.488232635
St10	2	0.1488	0.001515	1.132143	0.024325035
St11	2.2	0.3488	0.201515	2.65384	3.236610948
St12	1.89	0.0388	-0.10849	0.295209	-1.742432217
St15	2	0.1488	0.001515	1.132143	0.024325035
St16	1.81	-0.0412	-0.18849	-0.31347	-3.027346582
St17	1.75	-0.1012	-0.24849	-0.76998	-3.991032356
St19	2.69	0.8388	0.691515	6.381998	11.10671144
St21	2.43	0.5788	0.431515	4.403791	6.930739748
St22	2.46	0.6088	0.461515	4.632046	7.412582635
St23	1.82	-0.0312	-0.17849	-0.23738	-2.866732287
St24	1.93	0.0788	-0.06849	0.599549	-1.099975035
St7	0	-1.8512	-1.99849	-14.0848	-32.0985341
St6	1.42	-0.4312	-0.57849	-3.28078	-9.291304113
St20	1.8	-0.0512	-0.19849	-0.38955	-3.187960878
St13	1.65	-0.2012	-0.34849	-1.53083	-5.597175313
St18	1.55	-0.3012	-0.44849	-2.29168	-7.203318269
St25	0	-1.8512	-1.99849	-14.0848	-32.0985341
St14	2.2	0.3488	0.201515	2.65384	3.236610948
Average	1.8512				
Std Dev	0.657161				

Table 44 demonstrates the various methods used to calculate students' performances in relation to their group and the whole group of participants. As can be seen, the calculations provide an overview of the class average and the standard deviation between each performance. Such data allow this author to observe the performance differences between a student and his or her classmates, which is identified by the "deviation from mean" score. T-analysis for each score was performed and provided some information. However, while the information was considered necessary to explore students' performances against that of their peers, the information was not suitable to determine the benefits of using the cell phone video recording feature as a learning tool. Therefore, for the purpose of data analysis, only the words per second data are utilised as the most significant dependent variable.

The words spoken per second data are presented in two parts. A general overview of the groups' performances is presented first, followed by a comparative analysis of words spoken per second at T1 and T2. Both of these periods of time required students to answer the same question "What do you think of the course?" The process for evaluating the data included MANOVA, an analysis of the descriptive statistics, a *t*-test analysis, and a one-way analysis of variance (one-way ANOVA). Charts and histograms are also used to provide an overview of participants' performances over the 12 weeks. The findings are reported below.

MANOVA analysis of words spoken per second responses over 12 weeks.

Students' performances over the 12 weeks were recorded. A repeated measure analysis MANOVA was conducted to provide the evidence below.

Table 45

MANOVA Analysis of Words Spoken per Second

Tests of Within-Subjects Effects

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Word Seconds	Sphericity Assumed	9.064	11	.824	9.983	.000	.161
Word Seconds * group	Sphericity Assumed	4.003	33	.121	1.470	.046	.078

The evidence reported in the MANOVA in the table above indicates a significant difference in the number of words spoken per second between students during the 12-week period, f (11,33) = 9.98, p = .000. It also reports a significant difference between words spoken per second between students from the same groups, f (11,33) = 1.47, p = .046. It can be inferred that students were likely to speak at different speeds.

Table 46

MANOVA Analysis of Words Spoken per Second Difference between Groups

Tests of Between-Subjects Effects

Measure:MEASURE_1 Transformed Variable:Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	2574.080	1	2574.080	2411.686	.000	.979
Group	11.647	3	3.882	3.638	.019	.173
Error	55.501	52	1.067			

The MANOVA results above also indicate that students from different groups performed differently during the course of the 12-week project, f (3) = 3.64, p = .019. To identify the groups in which the significant differences occur, it is necessary to conduct a multiple comparison using the Bonferroni method of analysis.

Table 47

Bonferroni Analysis between Groups

Multiple Comparisons

	(I) group	(J) group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Bonferroni	1 Arts/Letters	2 Engineering A	.12	.126	1.000	-.23	.46
		3 Law	-.24	.094	.085	-.50	.02
		4 Engineering B	-.09	.126	1.000	-.44	.25
	2 Engineering A	1 Arts/Letters	-.12	.126	1.000	-.46	.23
		3 Law	-.36*	.124	.034	-.70	-.02
		4 Engineering B	-.21	.149	.989	-.62	.20
	3 Law	1 Arts/Letters	.24	.094	.085	-.02	.50
		2 Engineering A	.36*	.124	.034	.02	.70
		4 Engineering B	.15	.124	1.000	-.19	.49
	4 Engineering B	1 Arts/Letters	.09	.126	1.000	-.25	.44
		2 Engineering A	.21	.149	.989	-.20	.62
		3 Law	-.15	.124	1.000	-.49	.19

* The mean difference is significant at the .05 level.

As the evidence from Table 47 would suggest, there is a significant difference in words uttered per second between the Engineering A and Law groups, p = .034. No other significant difference exists between other groups.

Plot.

While students seem to perform differently in the amount of words spoken per second, Figure 27 below highlights that this data set increases over the 12-week project.

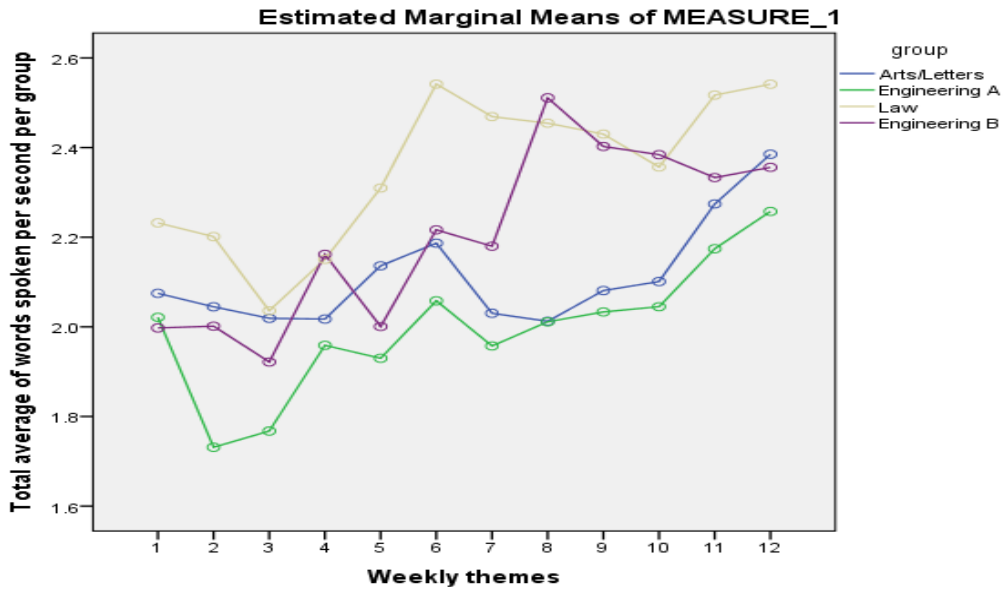


Figure 27. Words Spoken per Second Performance over 12 Weeks

Overall, the graphical representation reveals that participants in the Law group were on average able to rapidly increase the number of words spoken per second. While the Arts and Letters and the Engineering A groups followed similar trends, at Week 8 (Describe your favourite painting) the Engineering B group noticeably increased the number of words spoken.

Also noticeable is that for harder topics, such as "How will you improve your next presentation?" students produced on average more words per second than for easier topics, such as "Describe your favourite shop in Sendai." It could be argued that with easier topics, students were more confident that they could perform the task and therefore did not spend as much time trying to express their opinions fully. With harder topics, students may have written more to ensure that their opinion was clear.

Such a pattern is noticeable throughout the graphical representation provided in the data analysis, whereby easier topics usually produce a lower word output per second than harder topics. To provide another example, students produced less words per second when discussing "What did you do during Golden Week" (Week 3), a national holiday, than the words per second performed for a harder topic, such as "What did you think of your peers' speaking style" (Week 4).

The graphical representation provides a strong view of students' significant improvements with their speaking speed by increasing the number of words they spoke between T1 and T2.

Descriptive data word count per second.

Table 48 provides an aggregate view of all students, regardless of their groups, and words spoken per second at T1 and T2.

Table 48

Comparative Data between T1 and T2 Words Spoken per Second

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
T1 - Word per second output (raw score)	64	1.42	2.82	2.0622	.35858
T2 - Word per second output (raw score)	66	1.26	5.07	2.3600	.53883
Valid N (listwise)	63				

As the evidence reveals, after their first attempt with the technology, at T1 students spoke on average 2.06 words per second (min. = 1.42, max. = 2.82). The standard deviation was .35, which indicates that students performed in a similar fashion. At T2 students spoke on average 2.36 words per second (min. = 1.26, max. = 5.07) with a standard deviation of .54, which also indicates similarity in performance.

Table 49 provides a general view of the mean comparisons between T1 and T2 for each group. It is visible that all groups were able to increase their words spoken per second by the end of the project.

Table 49

Group Analysis of Words Spoken per Second between T1 and T2

Report

Group		T1 - Words / second output (raw score)	T2 - Words / second output (raw score)
Arts/Letters	Mean	1.8512	2.2178
	N	25	25
	Std. Deviation	.65716	.84395
Engineering A	Mean	1.9118	2.2287
	N	11	11
	Std. Deviation	.44330	.36649
Law	Mean	2.2215	2.5178
	N	22	22
	Std. Deviation	.29348	.34861
Engineering B	Mean	1.9508	2.2677
	N	9	9
	Std. Deviation	.31163	.51636
Total	Mean	1.9961	2.3248
	N	67	67
	Std. Deviation	.50234	.60751

The histogram below (Figure 28) provides a graphical representation of each groups' performance at T1. At first glance it can be noticed that all groups have a wide distribution for words spoken per second. It is also noticeable that while the Arts and Letters, and Engineering A and B groups behaved similarly, the Law group behaved a little above the other groups with words spoken per second, ranging between 1.69 and 2.82.

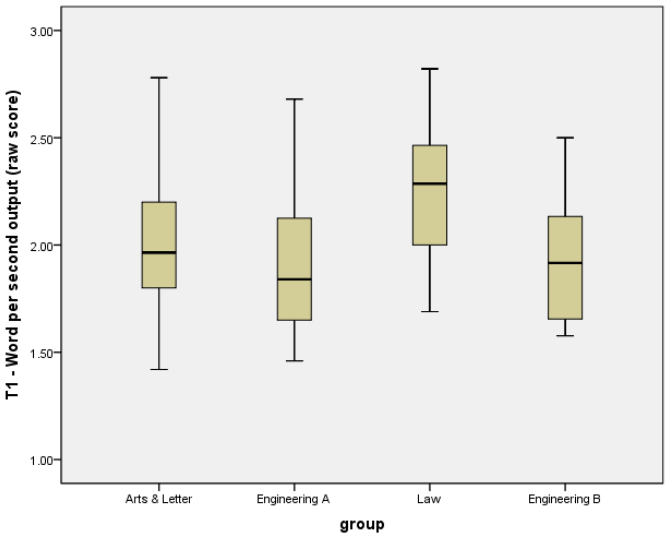


Figure 28. Group Output of Words Spoken per Second at T1

By contrast, the histogram for words spoken per second at T2 (see Figure 29) reveals that the distribution for the Arts and Letters, Engineering A, and Law groups seem to be narrower, and the distribution for Engineering B group seems to be more evenly spread across its mean (min. = 1.56, max. = 3.27). The histogram also indicates two outliers, cases 12 and 63. The issue of outliers will be discussed in the section Extreme Values later on in this chapter.

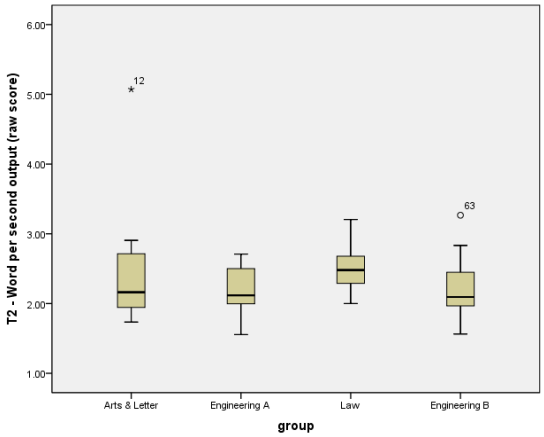


Figure 29. Group Output of Words Spoken per Second at T2.

Based on the results presented above, it becomes noticeable that students were able to increase their words per second output.

A comparison of means was performed using a paired samples *t*-test analysis for words spoken per second at T1 and T2 (see Table 50).

Table 50
Paired Sample t-test Analysis of Words Spoken per Second

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	T1 - Words per second output (raw score) T2 - Words per second output (raw score)	-.30684	.45104	.05683	-.42043	-.19325	-5.400	62	.000

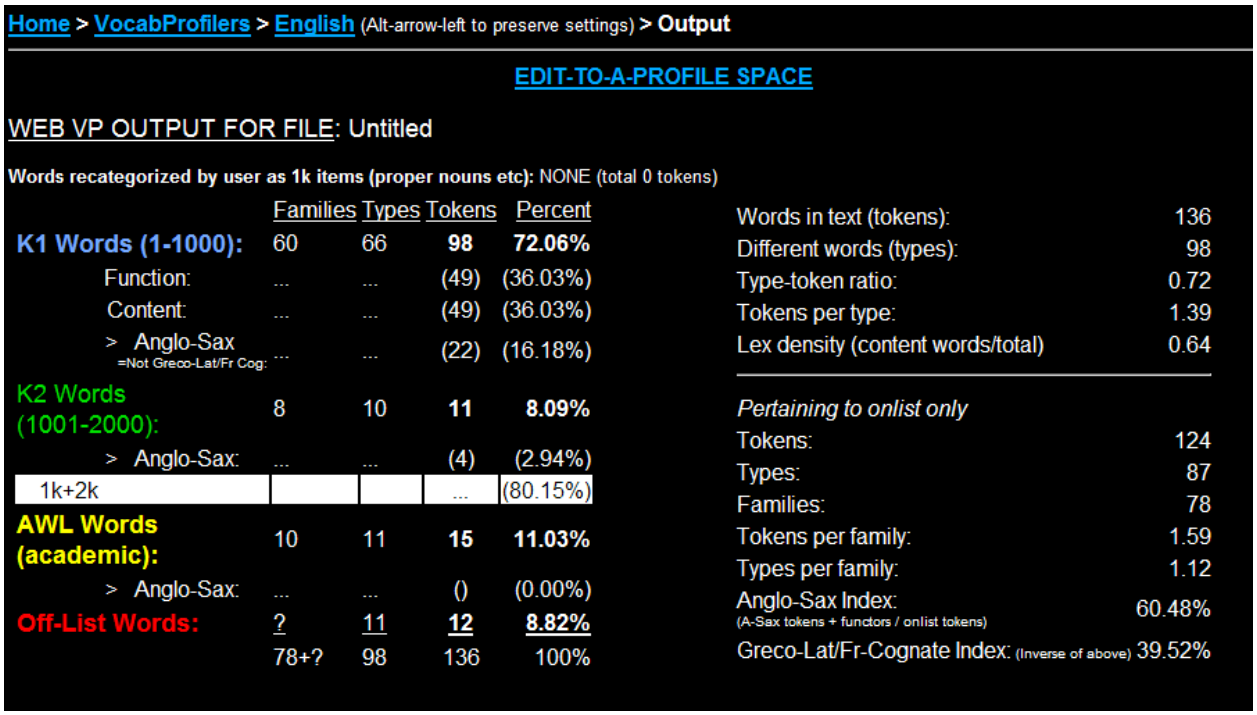
Comparing the mean between words spoken per second at T1 and T2 reveals a significant difference (M = -.306, SD = .45, p = .000).

The evidence presented above seems to indicate that, for these particular groups of students, regularly producing cell phone based videos enabled them to improve their ability to speak more consistently and efficiently. Both male and female students, regardless of their academic fields were able to perform similarly. While students were able to improve their word count over time, this does not necessarily mean that they uttered coherent sentences, or that their sentence structures reflected an improvement in their selection of lexical range. Therefore what follows is an analysis of students' vocabulary items.

Lexical Item Analysis

Once the words per second ratio was calculated, the next step was to document students' selection of lexical items. The assumption was that, based on students' in-class learning experiences and the regularity of producing cell phone videos, participants might be motivated to extend their linguistic cognisance. The content of each speech was also analysed in terms of lexical difficulties. That is, lexical types and tokens were recorded in order to determine any relationship between cell phone based learning, speech production, and mobile learning as influencing factors. The VocabProfile

English v.3 by Lexical Tutor (2011) was utilised. This online vocabulary profiler allows researchers to analyse their students' word frequency (Cobb, 2011). The frequency list analysing website was based on the work by Cobb (2011), Meara (1995), and Nation and Waring (1997). Analysing word frequency is a simple process of placing a student's speech in the window of the VocabProfiler and the online software will classify the speech in terms of "families," "types," and "tokens" spoken. The output provides a view of a student's "first 1,000 words" (which are determined as easy everyday words), the second set "1001 – 2000 words" (which are determined as more advanced words), and finally the AWL. Wetzel (2002) explains that types are unique words and are considered more accurate descriptors for data analysis.



Home > VocabProfilers > English (Alt-arrow-left to preserve settings) > Output

EDIT-TO-A-PROFILE SPACE

WEB VP OUTPUT FOR FILE: Untitled

Words recategorized by user as 1k items (proper nouns etc): NONE (total 0 tokens)

	Families	Types	Tokens	Percent
K1 Words (1-1000):	60	66	98	72.06%
Function:	...	...	(49)	(36.03%)
Content:	...	...	(49)	(36.03%)
> Anglo-Sax =Not Greco-Lat/Fr Cog:	...	...	(22)	(16.18%)
K2 Words (1001-2000):	8	10	11	8.09%
> Anglo-Sax:	...	...	(4)	(2.94%)
1k+2k			...	(80.15%)
AWL Words (academic):	10	11	15	11.03%
> Anglo-Sax:	...	...	()	(0.00%)
Off-List Words:	?	11	12	8.82%
	78+?	98	136	100%

Words in text (tokens):	136
Different words (types):	98
Type-token ratio:	0.72
Tokens per type:	1.39
Lex density (content words/total)	0.64
Pertaining to onlist only	
Tokens:	124
Types:	87
Families:	78
Tokens per family:	1.59
Types per family:	1.12
Anglo-Sax Index: (A-Sax tokens + functors / onlist tokens)	60.48%
Greco-Lat/Fr-Cognate Index: (Inverse of above)	39.52%

Figure 30.Visual Example of LexicalTutor Analyser

Figure 30 shows an example of the output analysis performed by LexicalTutor. The information provided is extensive, however, as explained above, only the data concerning "types" are recorded.

While the evidence reported above is descriptive and indicative of only separate parts of the production process, the next stage is to analyse the correlation between each factor. For example, does words spoken per second influence lexical item selection? The next part of this data analysis attempts to answer this and other similar questions. It is anticipated that correlating the evidence will lead to a better understanding of the educational benefits of integrating cell phone based activities in the language classroom.

The approach for the lexical item analysis is similar to the word utterances per second data analysis strategy. First, a MANOVA analysis is conducted to present the evidence over 12 weeks. Then the descriptive evidence at T1 and T2 is reported, followed by a *t*-test and a one-way ANOVA analysis.

First 1000 words analysis

MANOVA analysis of K1000 word list over 12 weeks.

The list of the first 1,000 words would empower a reader or listener to comprehend 70% of a text or spoken performance. This is a highly necessary word list for English language learners. The MANOVA reports a significant difference in the number of K1000 lexical items used by individual students during the 12-week project, f (11, 33) = 6.52, p = .000 (see Table 51).

Table 51

Analysis of K1000 Words Used per Group

Tests of Within-Subjects Effects

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
k1000	Sphericity Assumed	3720.645	11	338.240	6.518	.000	.097
k1000 * group	Sphericity Assumed	1873.974	33	56.787	1.094	.331	.051

There are no significant differences in the number of K1000 words used between students from the same group. There is however a significant difference in the number of K1000 words used between groups, f (3) = 4.08, p = .011.

Table 52

Analysis of K1000 Words Used per Group

Tests of Between-Subjects Effects

Measure:MEASURE_1 Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	797407.293	1	797407.293	1700.670	.000	.965
Group	5734.577	3	1911.526	4.077	.011	.167
Error	28601.585	61	468.878			

A Bonferroni method of analysis was conducted to identify the between group difference.

Table 53

Bonferroni K1000 Analysis between Groups

Multiple Comparisons

Measure:MEASURE_1

	(I) group	(J) group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Bonferroni	1 Arts/Letters	2 Engineering A	.8917	2.35274	1.000	-5.5243	7.3076
		3 Law	-5.5606*	1.84502	.023	-10.5920	-.5292
		4 Engineering B	-3.6065	2.44326	.870	-10.2693	3.0564
	2 Engineering A	1 Arts/Letters	-.8917	2.35274	1.000	-7.3076	5.5243
		3 Law	-6.4523	2.38398	.053	-12.9535	.0489
		4 Engineering B	-4.4981	2.87207	.735	-12.3304	3.3341
	3 Law	1 Arts/Letters	5.5606*	1.84502	.023	.5292	10.5920
		2 Engineering A	6.4523	2.38398	.053	-.0489	12.9535
		4 Engineering B	1.9541	2.47336	1.000	-4.7908	8.6990
	4 Engineering B	1 Arts/Letters	3.6065	2.44326	.870	-3.0564	10.2693
		2 Engineering A	4.4981	2.87207	.735	-3.3341	12.3304
		3 Law	-1.9541	2.47336	1.000	-8.6990	4.7908

* The mean difference is significant at the .05 level.

There is a significant difference between the Arts and Letters and the Law group, p = .023. Evidence between the Engineering A and the Law group is approaching significance, p = .053. Some researchers would argue that the p = .053 means that there is a significant difference in these two groups using an alpha = .10/90% level of confidence.

Plot.

When observing the number of K1000 words being used over a 12-week period, it becomes apparent that students increase their use of these words (see Figure 31).

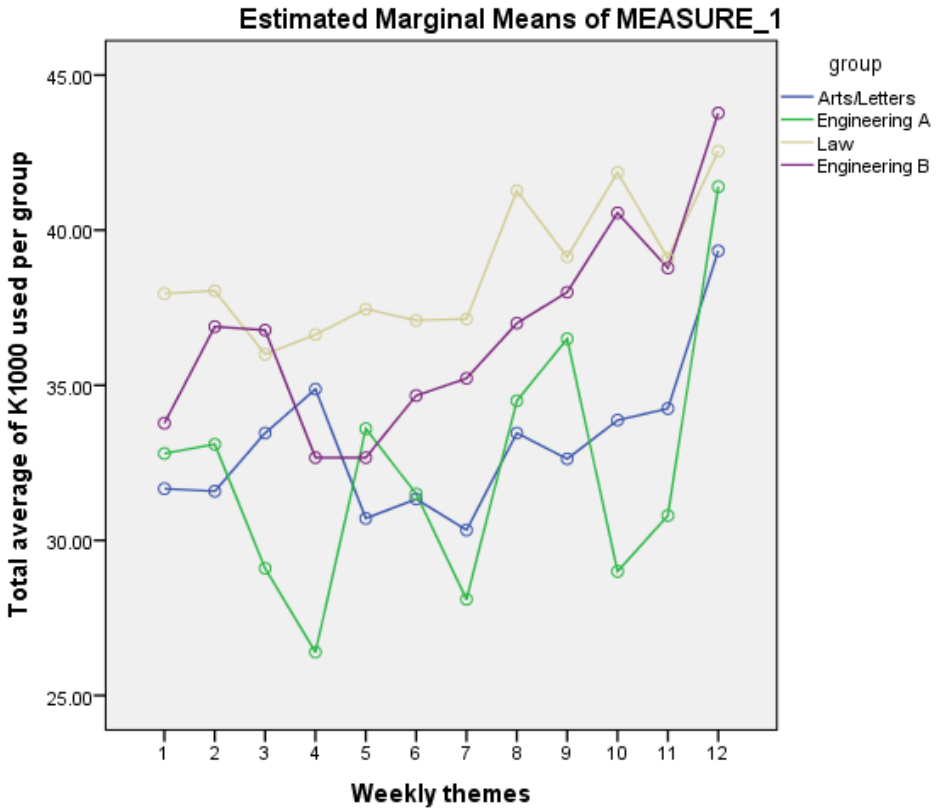


Figure 31. K1000 Word Types Used over 12 Weeks

As Table 54 below will indicate, the numbers on Figure 31 represent the average number of K1000 type words used per student per group. Hence the mean at T1 is 34.82 K1000 type words compared to 41.27 K1000 type words used at T2. Apart from the Engineering A group which performed erratically, the other three groups were able, from Week 8 onwards, to increase their use of K1000 words exponentially. Overall, the Law group used the highest range of K1000 lexical items from the word list designed by Cobb (2011).

Until Week 8, students' use of K1000 words was erratic and may not have been related to the themes. The Week 6 topic "How would you improve your next presentation?" and Week 7 topic "Describe your favourite shop in Sendai," showed that students from the Law group produced similar amounts of K1000 word use, the Engineering B group evidence indicated a slight increase in K1000 word use, and the Arts and Letters and Engineering A groups decreased their K1000 word use.

Between Weeks 9 and 10, the Engineering A group performed similarly. The evidence reports a decrease in the use of K1000 words compared to the other three groups. Week 9 required students to explain how they would save the environment. Such a topic could be classified as a harder issue to address compared with the Week 10 theme "Describe your favourite invention." Explaining an idea for saving the environment might be a harder topic to address and thus students may focus more on the matter they wish to discuss rather than the words they need to express their opinion. In contrast, describing an invention is a process explanation narrative.

Figure 31 also seems to highlight that the number of K1000 words used might be related to the theme. However, when producing a speech, students may use a wider range of words and these may include either K2000 or AWL words.

Descriptive statistics of K1000 words between T1 and T2.

According to Cobb (2011), word frequency analysis allows researchers to understand students' familiarity with the basic lexical items of a target language. The more familiar a learner is with vocabulary items, the more likely they are to understand text or spoken output. For a learner to be able to comprehend a speaker in the target language, they need to be familiar with the first 1,000 words. This allows a learner to understand 70 percent of what they hear or read.

Table 54
Descriptive Statistics between T1 and T2 for K1000 Words

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
T1 - first 1,000 word group (raw score)	65	18	48	34.82	6.955
T2 - first 1,000 word group (raw score)	66	27	70	41.27	8.153
Valid N (listwise)	64				

As Table 54 indicates, at T1 learners used between 18 and 48 words from the K1000 word list (M = 34.82, SD = 6.95) and at T2 between 27 and 70 words (M = 41.27, SD = 8.15) from the same list. From the data set above, a wide standard deviation dispersion is noticeable. This seems to indicate that students selected a wide range and quantity of words to express their opinions.

A Paired Samples test revealed that there was a significant difference between T1 and T2 performances in the use of K1000 words (sig. = .000) (see Table 55). A significant difference confirms that students increased the number of K1000 words they used in their speeches.

Table 55

Paired Sample t-test for K1000 Words Used at T1 and T2

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	T1 - first 1,000 word group (raw score) T2 - first 1,000 word group (raw score)	-6.156	8.663	1.083	-8.320	-3.992	-5.685	63	.000

A one-way ANOVA analysis was conducted to determine if there were any significant differences in K1000 performance between each group across the 12-week period.

Table 56

Mean Difference Within and Between Groups at T1

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	30.433	24	1.268	1.085	.401
Within Groups	45.567	39	1.168		
Total	76.000	63			

Table 57

Mean Difference Within and Between Groups at T2

ANOVA

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	40.276	26	1.549	1.596	.091
Within Groups	37.845	39	.970		
Total	78.121	65			

As Tables 56 and 57 reveal, there were no significant differences within and between groups at T1 ($p = .401$) and at T2 ($p = .091$), insinuating that students across all groups used the same number of K1000 words to produce their speeches at these particular points in the study.

First 2000 words analysis

K2000 word list over 12 weeks - MANOVA analysis.

The MANOVA reveals significant differences between the number of K2000 words used by individuals, f (11,33) = 17.24, p = .000, and the number of K2000 words used by students within the same group, f (11,33) = 1.47, p = .044.

Table 58

K2000 MANOVA analysis

Tests of Within-Subjects Effects

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
k2000	Sphericity Assumed	501.312	11	45.574	17.241	.000	.215
k2000 * group	Sphericity Assumed	128.441	33	3.892	1.472	.044	.066

The MANOVA does not report any significant differences between groups, p = .068 (see Table 59 below).

Table 59

K2000 Word Types Used between Groups

Tests of Between-Subjects Effects

Measure:MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	10670.241	1	10670.241	996.594	.000	.941
Group	80.261	3	26.754	2.499	.068	.106
Error	674.522	63	10.707			

This set of evidence would suggest that while the selection of lexical items from the K2000 word list varies between individuals, the number of words does not vary between groups.

Plot.

The plot below highlights that while students do not seem to use a large number of K2000 words, by the end of the 12-week project they have increased their use of words from this word list. The plot also indicates that on average, students accessed the same number of K2000 words for each theme.

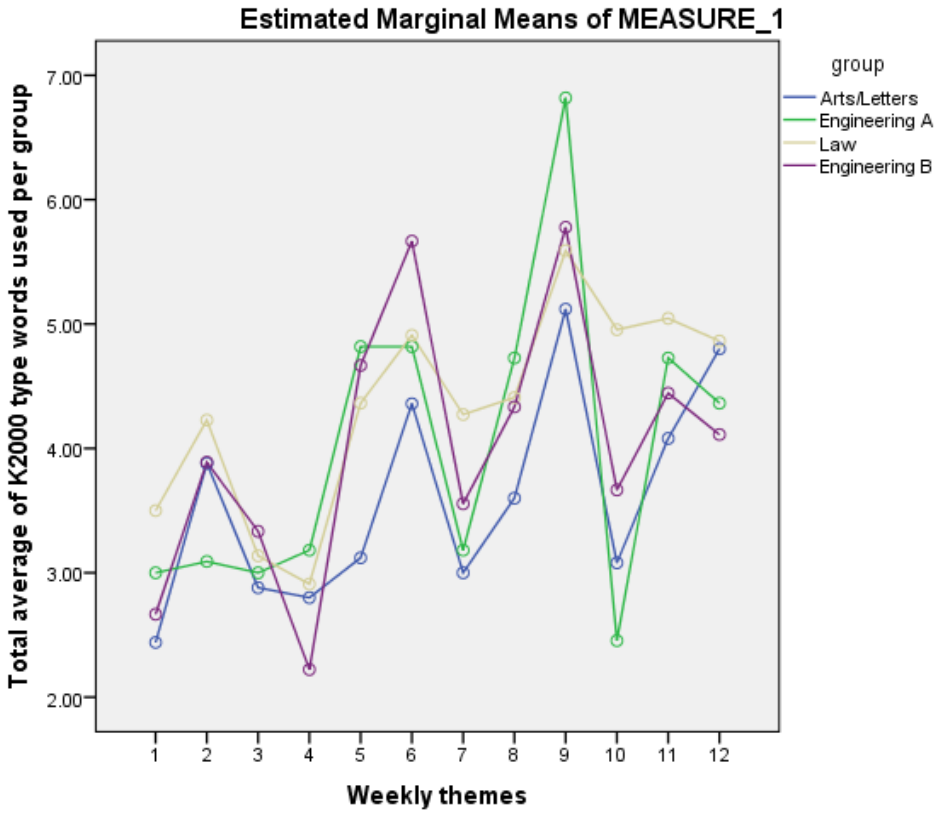


Figure 32. K2000 Word Type Used over 12 Weeks

The graph also seems to suggest that the use of K2000 words could be related to the themes students have to discuss. Comparing the evidence for Week 6 and Week 7, it is noticeable that an easier theme, such as "Describe your favourite shop in Sendai" (Week 7), motivates students to use fewer K2000 words than a harder topic such as "How will you improve your next presentation" (Week 6). This pattern is confirmed by comparing similar evidence between Week 8 and Week 9. Week 8 "Describe your favourite painting," which could be described as an easy topic, does not motivate the students to use more K2000 words than a harder topic such as "How would you save the environment?" There is a significant increase in the amount of K2000 words used between T1 and T2.

Descriptive statistics of K2000 words between T1 and T2.

Learners familiar with the K2000 word list would be able to understand 85% of text or spoken output.

Table 60
Descriptive Statistics of K2000 Word Types Used at T1 and T2

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
T1 - 2,000 word group (raw score)	65	0	5	2.97	1.287
T2 - 2,000 word group (raw score)	66	1	10	4.82	1.831
Valid N (listwise)	64				

As Table 60 indicates, at T1 students were able to speak between 0 and 5 words from the second 1,000 word list (M = 2.97, SD = 1.29). At T2, the data indicate that students were able to increase their use of words from the K2000 list (min. = 1, max. = 10) (M = 4.82, SD = 1.83).

T-test.

Table 61
Paired Sample Test for K2000 Word Types Used

Paired Samples Test

		Paired Differences					T	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	T1 - 2,000 word group (raw score) T2 - 2,000 word group (raw score)	-1.906	2.014	.252	-2.409	-1.403	-7.574	63	.000

As Table 61 reveals, there was a significant difference in the number of K2000 words used between T1 and T2 (sig. = .000). This confirms that students increased their use of K2000 words in their speeches.

One-way ANOVA calculations for T1 and T2 did not reveal any significant differences between groups in the number of K2000 words used in speeches.

Academic word list (AWL) analysis

AWL over 12 weeks – MANOVA analysis.

According to the data reported in Table 62, it would seem that there is a significant difference between individual use of AWL words, f (11,33) = 14.30, p = .000, as well as a significant difference between individuals in the same group, f (11,33) = 1.73, p = .008.

Table 62

AWL types Used between Groups

Tests of Within-Subjects Effects

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
AWL	Sphericity Assumed	182.151	11	16.559	14.305	.000	.185
AWL * group	Sphericity Assumed	65.976	33	1.999	1.727	.008	.076

However, there are no significant differences between groups and their use of AWL over the 12-week project, f (3) = 2.59, p = .06 (see Table 63).

Table 63

AWL Words Used between Groups

Tests of Between-Subjects Effects

Measure:MEASURE_1 Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	750.924	1	750.924	312.610	.000	.832
group	18.677	3	6.226	2.592	.060	.110
Error	151.333	63	2.402			

Similar to the observation reported in the K2000 word list section, evidence from the AWL analysis suggests that while the selection of lexical items from the AWL word list varies between individuals, the number of words from this category does not vary between groups.

Plot.

The evidence on Figure 33 reveals that on average, participants and groups accessed the same number of AWL words for each theme. Also, it would seem that while students varied in their use of number of AWL words at T1, at T2 students seem to average the same amount of AWL use.

It is also apparent from the graph that certain themes stimulate use of a greater number of academic words.

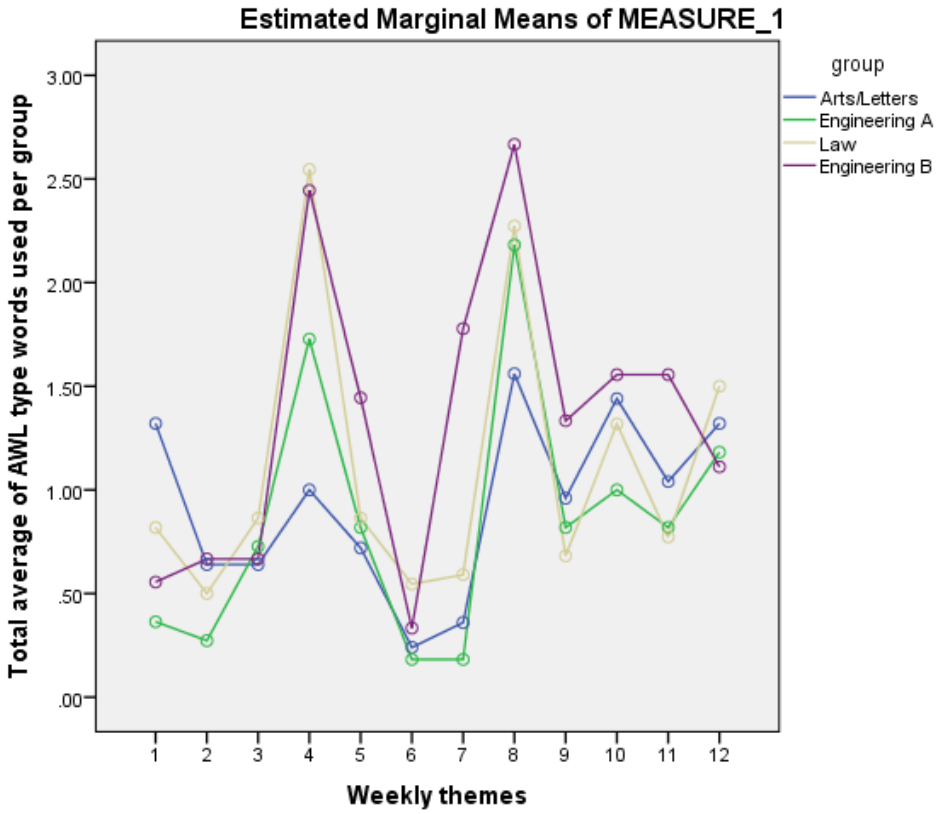


Figure 33. AWL Type Words Used over 12 Weeks

All groups behaved similarly between weeks 3, 4, and 5, when the number peaked at Week 4 before reducing at Week 5. The Week 3 topic "What did you do during Golden Week?" was assumed to be an easier theme than the Week 4 topic "What did you think of your peers' speaking style?" and Week 5 "What did you think of your peers' opinions during their presentation?" It could be deduced that the use of AWL is not necessary to explain holiday events. Still, the difference between weeks 4 and 5 is not clear. The data would seem to advance that describing a speaking style requires the use of more, if not the same amount of AWL words than explaining someone else's opinion.

This pattern is repeated between weeks 7, 8, and 9, with AWL word use peaking at Week 8 and reducing at Week 9. Week 7 "Describe your favourite shop" is similar to Week 8 "Describe your favourite painting" and yet different from Week 9 "How would you save the environment." It could be argued that since students had prior experience with describing something favourable in Week 7, that they would be able to increase their use of AWL words to describe another favourable matter in Week 8. It could also be argued that describing a painting requires more AWL words then describing a shop, but when contrasted against the performance at Week 9, the explanation is not so linear. It

could be assumed that more AWL words would be required to explain the process for saving the environment. All the participants decided to use fewer AWL words for this last topic. One motivating factor could be that the topic was too challenging and students decided to focus on easy examples to explain their approach for saving the environment.

Descriptive statistics of AWL words between T1 and T2.

According to Cobb (2011), the AWL includes a minimum collection of 570 lexical items. Students familiar with the K2000 and the AWL would be able to comprehend 90% of a text or verbal output. Analysing the use of lexical items from this list is important since it can reveal whether or not students are accessing vocabulary items from this list to express their opinion.

Table 64

Descriptive Statistics for AWL Words Used at T1 and T2

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
T1 - AWL group (raw score)	65	0	4	.85	1.093
T2 - AWL group (raw score)	66	0	9	1.36	1.688
Valid N (listwise)	64				

Similar to evidence collected from the K1000 and K2000 analyses, Table 64 also reports an increase in the use of AWL words between T1 (min. = 0, max. = 4) (M = .85, SD = 1.09) and T2 (min. = 0, max. = 9) (M = 1.36, SD = 1.69).

T-test.

Table 65

AWL Paired Sample t-test at T1 and T2

Paired Samples Test

		Paired Differences					T	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	T1 - AWL group (raw score) T2 - AWL group (raw score)	-.500	1.944	.243	-.986	-.014	-2.058	63	.044

A paired samples test revealed a significant difference in the number of AWL words used between T1 and T2 ($p = .044$). This indicates that students did manage to use more AWL words at T2 compared to T1.

Two issues emerge from the vocabulary analysis above. The first issue is that the degree of vocabulary recycling from sources beyond classroom content or from previous cell phone video productions cannot be readily determined. The second issue is that the frequency analysis is general and is not indicative of actual individual performance; meaning that the data do not report which individual used more AWL words, for example, compared to their peers. Conducting such analysis, while honourable, may distract from the objective of this research, which is to understand the benefits of using the cell phone video recording feature as a learning tool for EFL learners.

Nonetheless, a compromise could be to compare students' means in order to see if either gender or academic fields are influencing factors in the selection and use of lexical items. Data from *t*-test and one-way analysis of variance are reported below.

Independent sample t-test for difference in gender

Researchers such as Wang and Higgins (2006) have argued that female students behave differently than their male counterparts in relation to using technology (see Okabe & Ito, 2006, for a similar description). The total mean for words spoken per second, K1000, K2000, and AWL words across all weeks were calculated and used to conduct an independent sample *t*-test.

Table 66

Independent Sample t-test between K1000, K2000, and AWL Words

Independent Samples Test

		Levene's Test for Equality of Variances		*t*-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Total_WdScd	Equal variances assumed	.870	.354	-.516	65	.608	-.06404	.12421	-.31211	.18403
	Equal variances not assumed			-.652	10.872	.528	-.06404	.09829	-.28069	.15261
Total_k1000	Equal variances assumed	.030	.864	-1.048	65	.299	-2.66267	2.54186	-7.73911	2.41377
	Equal variances not assumed			-.982	8.685	.353	-2.66267	2.71114	-8.82977	3.50443
Total_k2000	Equal variances assumed	.119	.731	-.123	65	.902	-.04573	.37058	-.78582	.69437
	Equal variances not assumed			-.146	10.216	.887	-.04573	.31268	-.74043	.64898
Total_AWL	Equal variances assumed	.846	.361	-.254	65	.800	-.04467	.17581	-.39578	.30645
	Equal variances not assumed			-.227	8.483	.826	-.04467	.19657	-.49351	.40417

As Table 66 reveals, there were no significant differences between males and females in their performances during the 12-week project (all p values are greater than .05).

It would be difficult to assess why students were able to increase their use of lexical items from these three groups of word categories, assuming that the regularity of producing cell phone videos is premature at this stage. Nonetheless, the evidence presented above is encouraging.

Learner Perspectives

Post-Intervention

The post-intervention included both closed and open items which targeted four aspects of learning with technology. First, some of the post-intervention items targeted students' perceptions of their improved confidence with using the cell phone video recording feature. Other items targeted students' processes for producing videos with a cell phone. Two other items related to students' opinions about using cell phone technology as a learning tool, as well as their perceived enjoyment of making a cell phone video. Students' responses to the test items for each of these aspects are reported below.

Cronbach's alpha coefficient

As explained in the previous chapter, the pre- and post-intervention surveys were tested in prior research. During the design process of these surveys, consideration for the reliability of the survey items was imperative. Therefore efforts were made to ensure that these survey items were suitable for the overall purpose of data collection. The pre-intervention survey had been trialed and tested in previous research. Test item ambiguity was addressed to increase reading comprehension by EFL learners. Colleague and student feedback increased the reliability of the pre-intervention survey.

The post-intervention survey data had received little modification and had only been trialed once. Therefore the first step of data analysis was to assess the "scale's internal consistency" or reliability of the survey (Pallant, 2007, p. 95). The most recommended statistical analysis of reliability is "Cronbach's alpha coefficient" (Pallant, 2007, p. 95). An alpha coefficient of 0.7 or above indicates the existence of strong covariance between survey items (Hinkin, 2005; Pallant, 2007). All the answers from the post-intervention survey were entered into the SPSS software for analysis. The Cronbach's alpha for post-intervention items was .712.

Another reliability test was conducted for the weekly task of producing a video (reported in terms of words spoken per second – see below for further explanation and analysis), the weekly diary feedback on the process of producing a cell phone video, and the weekly word token/type ratio. The Cronbach's alpha coefficient for 136 items was .756. This does not indicate a correlation between these test items; it simply indicates a positive scale of internal consistency.

Process of producing a video with a cell phone

Amongst the 67 students that answered the post-intervention survey, 38 (56.7%) students indicated experiencing some difficulties speaking within the time limit of 30 seconds. The remaining 29 students did not experience difficulties. This time limit was set by the technology itself. First, not all

cell phones could record longer videos; and second, cell phones that could record longer videos could not send such large files via the phone's email service.

While 26 students (38.8%) reported experiencing some technical problems with the cell phone video production process or with the Yahoo! email account, 41 students (61%) did not.

For 53 students (79%), creating regular cell phone videos may have motivated them to be more creative with the content and the selection of an appropriate location for filming their video. Fourteen students (20%) did not think that the task motivated them to be more creative.

Once the students produced their videos, they had to send them to their teacher. Fifty-nine students (88%) reported that they viewed their videos before sending them to the Yahoo! email account. Eight students did not view their videos before submitting them. This method of previewing their performance before sending it may have had some influence on the students' ability to improve their speaking performances.

Part of the task required students to view and transcribe their peers' video speeches. While 38 students (56.7%) indicated that they did not like it when their peers viewed their videos, 63 students (94%) indicated that they enjoyed viewing their peers' videos. In contrast, 29 students did not mind that their peers viewed their videos, and four students reported not enjoying viewing their peers' videos. Such evidence seems to lead to the observation that students for the most part enjoyed viewing their peers' video performances, whilst at the same time not liking their videos to be viewed by other classmates. These particular students enjoyed learning from others. The conflict or contradiction that emerges may be culturally influenced by the "loss of face" theory described earlier.

Once the students had emailed their videos, they had to select one video from their peers to transcribe its content. Fifty-four students (80.6%) indicated that this part of the task was helpful. The remaining 13 students (19%) did not.

In addition, the teacher would view all the students' videos and send some email feedback to the students, regarding their video performance. Sixty-four students (95.5%) reported that the written feedback was effective in helping them understand how to correct their speech production and appreciated that some of their errors were mentioned. Three students did not find this feedback helpful.

Students' perceived improvements

Sixty students (89.5%) believed that the task enabled them to improve their speaking speed by the end of the term. Seven students (10.5%) thought otherwise. All students (n = 67) believed that the cell phone video project did help them to improve their speaking abilities.

Table 67

Post-Intervention Survey #11 C: Skills Improved Due to Task

11 C – Mark the speaking skills that you were able to improve with the cell phone video project.					
	A lot	**A little**	**Some**	**Not much**	**Not at all**
Pronunciation	25 (37.31%)	33 (49.25%)	6 (8.96%)	2 (2.99%)	1 (1.49%)
Volume control	17 (25.37%)	29 (43.28%)	17 (25.37%)	4 (5.97%)	0 (0.00%)
Speed	35 (52.24%)	27 (40.30%)	4 (5.97%)	1 (1.49%)	0 (0.00%)
Fluency	32 (47.76%)	28 (41.79%)	3 (4.48%)	3 (4.48%)	1 (1.49%)
Pausing	10 (14.93%)	25 (37.31%)	20 (29.85%)	11 (16.42%)	1 (1.49%)
Speaking without notes	39 (58.2%)	21 (31.3%)	5 (7.46%)	2 (2.99%)	0 (0.00%)

As Table 67 reveals, students noticed some improvements with pronunciation, volume control, speed, fluency, and speaking without notes. Pausing, for students, seemed to have been a speaking element that was more challenging to control and/or manipulate. The time limit may have had some influence over this speaking element. Control over pauses while speaking fast in order to utter a coherent speech in 30 seconds may not be an easy task for EFL learners.

Four questions relating to the enjoyment of producing a cell phone video in English were randomly placed in the post-intervention survey. The purpose was to ensure that their feedback was genuine and not a random answer.

Hence, 65 students (97%) reported that they thought their English speaking abilities improved because of making regular cell phone videos, compared to two students who did not think their abilities improved. While 55 students (82%) reported enjoying making a cell phone video to study English, 12 said they did not enjoy it. Another question asked the students to rate their enjoyment of completing this project. While 23 students (34%) indicated that they enjoyed it a lot, 29 students indicated that they enjoyed it a little (43%). Fourteen students (20.9%) thought that it was OK. One student (1.5%) did not think that it was enjoyable. None of the students thought that the task was not at all enjoyable. Finally, while in the pre-intervention survey 40 students (60%) responded they would like to study English with a cell phone, the feedback in the post-intervention survey reports an increase, with 53 students (79%) agreeing to the idea of studying English with a cell phone. Fourteen students (20.9%) still remained unconvinced.

Confidence with technology

After completing 13 cell phone-based videos, 45 students (67%) reported that it was easier for them to produce a cell phone video performance, compared to 22 students (32%) who did not think it became easier. Nonetheless, when asked in another question if they felt more confident using their cell phone video camera, 61 students (91%) responded positively but six students did not think they were more confident using this feature.

When rating the audio and video quality of their cell phones, only six students rated the audio highly and 42 thought it was good. Nineteen students thought the audio quality was poor. In relation to video quality, five students rated it high quality and 39 students thought it was good. Twenty-three students rated the video quality as poor. In regard to the cell phone video quality in terms of viewing and listening to their peers' performances, 54 students (80.6%) thought that it was good enough and 13 (19.4%) thought that it wasn't. Finally, students were asked to consider which cell phone feature would be a challenge for using the cell phone as a learning tool.

Table 68

Opinion of Quality of Cell Phone Features to Complete Task

Cell Phone Quality Issues	Yes	No
Small keypad	27	40
	40.30%	59.70%
Small screen	29	38
	43.28%	56.72%
Poor audio quality	44	23
	65.67%	34.33%
Expensive to use	25	42
	37.31%	62.69%

As Table 68 indicates, students thought that poor audio would be a constraint for using cell phones as a language learning tool. Small keypads, small screens, and expenses were not perceived to cause concerns to the majority of students. Overall, 51 students thought that a cell phone was a suitable language learning tool (76%), compared to 16 who did not think so (24%). This response was corroborated by another question from another section of the post-intervention survey in which 56 students thought that the cell phone video feature was a good learning tool (84%), compared to 11 students who rated the video feature negatively (16%).

Comparing cell phone-based learning to other options

The last part of the post-intervention asked students to compare whether studying with a cell phone was better than other methods.

Table 69

Cell Phone-Based Learning Compared to Other Learning Methods

Studying with a cell phone is better than…	**I strongly agree**	**I agree**	**It is the same**	**I disagree**	**I strongly Disagree**
studying with a book	9	21	23	14	0
	13.43%	31.34%	34.33 %	20.90%	0.00%
studying with a DVD or CD-ROM	11	21	26	8	1
	16.42%	31.34%	38.81 %	11.94%	1.49%
studying in pairs or groups	4	13	33	15	2
	5.97%	19.40%	49.25 %	22.39%	2.99%
talking with a native speaker	5	11	18	21	12
	7.46%	16.42%	26.87 %	31.34%	17.91%
talking on a tape recorder	17	21	22	6	1
	25.37%	31.34%	32.84 %	8.96%	1.49%
completing paper homework	17	23	20	7	0
	25.37%	34.33%	29.85 %	10.45%	0.00%
studying English in non-communicative classes	8	20	28	10	1
	11.94%	29.85%	41.79 %	14.93%	1.49%

Based on the feedback documented in Table 69, it appears that a large majority of students thought that studying with a cell phone was better than studying with a tape recorder (positive response = 38, neutral = 22, negative = 7) and completing paper homework (positive = 40, neutral = 20, negative = 7). Studying with a cell phone was also perceived as better than studying with a book (positive = 30, neutral = 23, negative = 14) or a DVD or CD-ROM (positive = 32, neutral = 26, negative = 9). Data

from students seemed to indicate that they could not make a congruent decision about the benefits of studying with a cell phone compared to studying in pairs or groups (positive = 17, neutral = 33, negative = 17). Students were more in agreement when comparing cell phone based learning with talking directly with a native speaker (positive = 16, neutral = 18, negative = 33). There seemed to be a greater preference for face-to-face communication. Lastly, students seemed to believe that studying with cell phones is preferable to studying in non-communicative classes in which grammar analysis and translation work are the objectives of the course (positive = 28, neutral = 28, negative = 11).

Rating the weekly themes

Students were provided with 13 themes to address in their cell phone video performances. In the post-intervention survey, students were required to rate these themes in terms of "I liked it a lot," "It was OK," and "I did not like it" (see Table 70).

Table 70

Rating of Video Themes

Video Themes	I liked it a lot	It was OK	I did not like it
Week 1 – Self-introduction	25	26	16
	37.31%	38.81%	23.88%
Week 2 – What do you think of this course?	15	36	16
	22.39%	53.73%	23.88%
Week 3 – What did you do for Golden Week?	35	22	10
	52.24%	32.84%	14.93%
Week 4 – What did you think of the speaking style of your peers?	14	41	12
	20.90%	61.19%	17.91%
Week 5 – What did you think of your peers' opinions during their presentations?	14	39	14
	20.90%	58.21%	20.90%
Week 6 – How will you improve your next presentation?	30	29	8
	44.78%	43.28%	11.94%
Week 7 – Describe your favourite shop in Sendai.	40	17	10
	59.70%	25.37%	14.93%
Week 8 – Describe your favourite painting.	38	15	14
	56.72%	22.39%	20.90%

Week 9 – How would you save the environment?	19	35	13
	28.36%	52.24%	19.40%
Week 10 – Describe your favourite invention.	37	22	8
	55.22%	32.84%	11.94%
Week 11 – Explain why you agree or disagree with your peer's opinions in their presentations.	19	43	5
	28.36%	64.18%	7.46%
Week 12 – What will you do during the summer holidays?	42	20	5
	62.69%	29.85%	7.46%
Week 13 – What do you think of this course?	35	30	2
	52.24%	44.78%	2.99%

The themes that received the highest scores were "What will you do during the summer holidays" (63%), "Describe your favourite shop in Sendai" (59.7%), "Describe your favourite painting" (56.7%), "Describe your favourite invention" (55%) and "What do you think of this course" (52%). It would seem from the evidence displayed in Table 70 that the themes that encouraged students to explain their personal experiences were well received, compared to themes that required students to either demonstrate their ability to comprehend content covered in class ("What did you think of your peers' speaking style" = 61% OK) or to solve a problem ("How will you improve your next presentation" = 43% OK). As a post-intervention result, the above data provide a view of the types of themes that students found to be more memorable. That is to say, there might be a correlation between what the students did in their video (interesting location, what they spoke about) and the positive memories of that theme.

Attempting to report all the participants' responses is beyond the scope of this research because, as individuals, participants selected the most memorable theme based on personal experiences. Therefore, only the most revealing responses, gathered from the post-intervention survey open-ended responses, are reported below.

One student from the Engineering A group explained,

> "My favourite cell phone video is Week 8 about my favourite painting. Because I could use the technique I learned in class. For example, I used 'there is,' 'it seems to be,' and other similar terms."

Another respondent, from the Engineering B group, reported,

> "May 7 'What did you do for Golden Week?' It was the first time for me to make a video in nature. So I was nervous and I had a difficult time finding the best place."

A participant in the Law group explained,

> "Week 13 was the most memorable video, because I could show everything I had learned in this course, especially to tell my opinion easily with simple words and pictures."

Finally a student from the Arts and Letters group also found selecting the appropriate location as memorable,

> "'What is your favourite shop?' was a memorable theme because I filmed it at the front of the Sendai station. Many people were watching me and I felt the strain."

As the evidence from Table 70 above suggests, some students identified some of the themes as not enjoyable. An open-ended question enabled all students to write why they may have disliked any of the themes.

A participant from the Engineering A group reported,

> "I disliked the theme 'How would you save the environment?' because many of my peers spoke about something similar, so it was not interesting."

A student from the Engineering B group explained,

> "The first video about introducing myself was hard. I didn't know how to give a good speech, or which words I should use, and I felt nervous because my peers would view my video."

A respondent from the Law group wrote,

> "I dislike the video about 'How to improve my next presentation?' because in my video I gave lots of examples about how to improve. But I did not carry out what I had explained. In my next presentation, I read from my notes and I was nervous so I looked at my peers a few times only. So I did not keep my promise."

Finally a respondent from the Arts and Letters group mentioned the challenge of filming on location,

> "I didn't like the theme 'Describe your favourite shop in Sendai' because I did not record my movie outside. I didn't show a shop, I was at my apartment and I used my computer to show the shop."

Post-intervention survey open-ended responses

The post-intervention survey included 15 open-ended questions relating to various topics. There were two general aims to these questions. The first was to extend on particular closed questions, from which the findings are reported above. The second was to gather data concerning students' perceptions of the benefits of using the cell phone video recording feature and their opinions of the educational gains generated by the activity.

As explained above, providing all the participants' open-ended responses would be beyond the scope of this analysis. Instead, students' feedback was collated and grouped according to the questions they addressed. Then the answers were categorised into positive and negative feedback. Thereafter, general keywords were identified amongst the answers and were grouped based on their similarities. Finally, tighter grouping was generated by combining similar keywords, that is, ideas that expressed a similar opinion using different keywords. Each open-ended question is reported below as its own category. It must be pointed out that four students did not respond to this question, so the responses of 63 participants are reported.

Reasons for enjoying the cell phone activity.

The first question required students to explain why they did (or did not) enjoy making cell phone videos. There were 11 positive answer categories and 6 negative answer categories identified. Amongst the positive answers, the keyword that was identified the most was that students enjoyed making the cell phone videos because it enabled them to improve themselves (n = 12, 19%) and it improved their skills in general (n = 10, 16%). Eleven percent of the students reported that they enjoyed the task itself (n = 7) and ten percent indicated that the task was different from any other they had ever completed in their academic lifespan (n = 6). Six percent of the participants enjoyed the fact that the cell phone video allowed them to self-evaluate their performances (n = 4), and another six percent enjoyed the teamwork that the activity facilitated (n = 4). Among the remaining positive answers, two respondents indicated that they enjoyed the activity because it enabled them to learn more about information technology, one appreciated the easy to use feature, another enjoyed receiving teacher feedback, and one enjoyed the opportunity to develop new ideas and opinions.

Amongst the 13 negative answers, the majority (56%) reported that they did not enjoy the activity because they were either too shy or embarrassed to perform (n = 7). Amongst the remaining negative answers, two students reported that they did not enjoy making errors (22%), and another two mentioned that the activity was time consuming (22%). A few individual students reported interesting negative responses. While one student commented that he was not good at using technology in general, another commented that he did not like to be teased by his peers. While students being teased by their peers is not a positive behaviour that teachers should encourage in their classroom, the fact that this student reported it is invaluable because it indicates that students might have discussed each other's performances outside class time. It offers a glimpse about the peer dynamics that emerged outside the classroom.

Types of difficulties experienced during the project.

Thirty-two out of 63 students (51%) did not experience any challenges or difficulties. Amongst the remaining 49% that did experience difficulties, 14 reported it was due to the lack of familiarity with using the email account set up for the class (22%). Nine students had difficulties sending large video files via their cell phone internet service (14%) and five students had difficulties viewing the videos on their computer at home (8%). Two students experienced cell phone malfunctions such as running out of batteries or having a poor video camera feature (3%). One student commented that it was difficult to film himself (1.6%).

Peer viewing of videos.

Once the students produced their cell phone videos, they uploaded these on the class email account. Only peers in the same class could view the videos. Students would select one video from the list, view the video, and write a transcript. The transcript was then uploaded to the email account. Therefore a student was both a viewer and a peer whose video was viewed by others.

Feedback on peers watching videos.

While there were a few positive explanations from students who enjoyed having their class peers view their videos, 39% of students responded negatively by stating that they were shy or embarrassed (n = 25). While the term "shy" does not provide a clear cause of this perception, seven students commented that they did not think that their pronunciation was clear enough for their peers to understand (11%). Four students did not like to have their peers view their videos, because the video itself was evidence of their bad performance (6%).

Amongst the 43% of positive answers, 11 participants commented that they enjoyed receiving feedback from peers (17%). Seven respondents thought that it assisted in self-evaluation (11%) and five respondents stated that this particular task was a good way to share opinions (8%). While two students were indifferent, one student commented that viewing peers' videos was a good approach to get to know them. Another student commented that it was a good method to improve peers' listening skills.

Feedback on viewing peers' videos.

Unlike the previous question, viewing peers' videos generated more positive responses. Twenty students explained that they enjoyed learning from their peers (32%). Eleven respondents commented that it was a good way to share opinions (17%), and 10 commented that it was a good method to get to know their peers and develop friendships (16%). Nine students reported that viewing their peers' videos was a good way to improve upon their skills (improving either their filming or speaking skills) (14%). Four respondents thought that viewing their peers' videos allowed them to compare performances. While two students thought that the peers' videos helped them learn new vocabulary, one student thought that her peers' videos provided good examples of best performances.

While three students thought that the content and filming were interesting, one student commented that her peers' opinions expressed in their videos were too common and not interesting. Two students pointed out that poor audio quality was a negative reason for not enjoying viewing their peers' videos.

Opinions of writing video transcripts.

This particular open-ended question generated both positive and negative responses. Amongst the positive responses, 24 students agreed that writing a transcript enabled them to improve their listening skills (38%). Fifteen respondents enjoyed writing the transcripts because this activity allowed them to learn more about their peers (24%). They could learn about pronunciation, word selection, and filming strategies. While two respondents explained that they could learn about new topics, another two explained that writing the transcript helped them improve their typing skills. One student commented that it was a good way to compare videos and another stated that they could develop friendships. One student reported that it helped him improve his speaking skills.

Amongst the negative responses, eight indicated that they had difficulty understanding their peers' pronunciation and this did not make writing the transcript enjoyable (13%). While three students commented that they were not good at typing, another three explained that the process of writing a transcript was cumbersome, and three respondents highlighted the fact that listening to native speakers, rather than their peers, was perceived as more beneficial.

Some of the open-ended questions attempted to gain an understanding of whether or not the homework of producing videos improved students' English speaking abilities.

Explanation about the weekly homework and improvement of English ability.

Ninety-eight percent of the students believed that the weekly homework improved their English abilities. Nineteen respondents enjoyed the homework because it gave them a chance to speak on a regular basis outside of class time (30%). Sixteen students believed that the homework improved their speaking skills because it enabled them to think about using vocabulary and grammar in order to express their opinion, but the time constraint forced them to think about using all their skills to speak within the time limit (25%). Eight students explained that they enjoyed the homework because it motivated them to improve their speaking ability; that is, they could improve their memory, pronunciation, or pausing for effect (13%). Six respondents thought that the homework provided them with a good method for self-evaluating their performance and progress (9.5%). Five students enjoyed the opportunity to practise speaking on a regular basis (8%). Three students enjoyed receiving teacher feedback, another three enjoyed learning new vocabulary and syntax structures, and the remaining two students enjoyed the homework because it helped them gain more confidence speaking to an audience.

One student provided a negative response by indicating that he did not believe the homework improved his English ability because he used easy grammar and relied on his prior knowledge of lexical items to produce his speeches. Nunan (2004, in communication) commented that his Chinese students had similar opinions. Some students do not seem to appreciate the benefits of the communicative approach and the fact that they have to rely on their prior knowledge to perform, preferring instead a more traditional approach to learning.

Process for using cell phones to improve speaking ability.

All students reported that using the cell phone improved their speaking abilities. Forty-five respondents used the cell phone for self-evaluation purposes, indicating that they could view their videos to identify errors or bad habits or recognise good speaking skills such as good pronunciation, speed, or logical story structure (71%). Eight students explained that the cell phone video recording feature enabled them to practise speaking, something they seldom did in other English classes (13%). Four students explained that the time constraint was a motivating factor to improve their speaking ability; they had to develop strategies or "rules" to improve their speaking speed. While two students commented that writing a script improved their speaking abilities, two other students commented that using a particular speaking pattern enabled them to remember their speeches more effectively. While one student stated that the video enabled him to receive teacher feedback, which then motivated him to think more critically about his performance, one student explained that the regular practice enabled him to learn to speak without notes. The cell phone for this student was an effective tool because he could view and reflect on his performance, think about what he did, and then try to improve upon the performance.

Strategies used to speak within the time limit.

In previous feedback, the time limit was a motivating factor. Therefore, it was necessary to understand the strategies students used to improve speaking within 30 seconds, or the time set by the cell phone video recording feature.

Students applied a multitude of strategies for speaking within the time limit. Fourteen students explained that practice was vital in their ability to speak within the time limit (22%). Practice, they explained, enabled them to speak more fluently, to develop a speaking rhythm, and to assist in their recollection of the content of the speeches. Thirteen respondents explained that focusing on maintaining a suitable speed was of importance to them. They identified a speaking rhythm which concentrated on breathing and pausing, as well as learning the text by heart; both assisted in their ability to speak faster (21%). Memorising the speech, working on the pronunciation of common words, or even developing structure was a strategy used by 11 students (17%). Another 11 students applied a more structured approach, concentrating on understanding the number of words that would express their opinion effectively within the time limit (17%). Based on prior experience, these students could remember their average number of words per 30 seconds and then adjust their sentences to fit in the right number of words to express their opinion effectively. For other students, selecting the right focus or point of their speech was a helpful strategy to help them understand the content they had to cover within the time limit (n = 6, 10%). Developing a speech pattern was also a helpful strategy for three students. For another three students, selecting the right vocabulary items was important. For these students, using simple words and grammar assisted them in remembering their speeches more efficiently. The remaining two students used either self or peer evaluation of their videos before submitting them to the email account.

Challenges to speaking faster.

While all students were able to identify some positive strategies for improving their speaking speed, it was still necessary to understand if they experienced challenges in their attempts to speak faster.

Twenty-seven students concurred that practice was an effective approach to enable them to speak faster (43%). These students explained that producing videos on a weekly basis kept them thinking about their English task and performance. Twelve students identified memorisation as a method used to speak faster (19%). Similar to the response above, the regular activity meant that these students seemed to make some effort to retain and recycle vocabulary from previous videos. They could also remember the process of structuring an effective speech, which enabled them to remember the necessary sentence structures to introduce or conclude their speech. This ability to use speaking patterns more effectively was also identified by another six students as an effective method to speak faster (10%). For five students, the regularity of producing a cell phone video was a motivating factor to assist them in speaking faster (8%).These students agreed that sometimes it took them a week to produce their videos, with one student explaining that wanting to express his opinion fully was a motivating factor to speak faster. While four respondents explained that the task itself motivated them to speak faster and that they had more to say about certain themes, three students agreed that learning to use the video recording tool more effectively was a motivating factor to speak faster. One student commented that to speak faster he learned to understand sound structures. He explained that he was able to understand how to pronounce words and how to pronounce whole sentences. Another student reported selecting more appropriate lexical items. Two students did not explain why they were able to speak faster, so they were unable to identify a particular strategy. One student responded negatively, stating that aiming to speak faster was actually distracting to the purpose of the task, which was to speak.

Teacher feedback.

Once students submitted their videos on the class email account, the teacher would view all videos and provide students with feedback about the content, the speaking, or the visual aspects of the video. Fifty-one students stated that the teacher feedback was effective because it helped them identify errors (81%). Some students commented that even when they thought they had done a good job, they wanted to read whether or not the teacher was able to identify some area for improvement. While five respondents appreciated the guidance provided by the teacher, another five enjoyed the positive feedback they received. Two students explained that the teacher feedback was effective because it made them feel valued.

Motivation to be creative with content or location.

Students identified 10 positive and three negative factors of motivation to be creative with their cell phone video productions. Eleven students identified the theme as a motivating factor to write creatively about their opinion or to select appropriate filming locations (18%). While seven students wanted to be different from their peers and attempted to create entertaining videos (11%), seven students explained that being able to compare videos was a motivating factor to try to be creative with their filming. For the other seven students, being able to see stimulating videos from their peers was motivating. It enabled them to think more about filming locations or methods. Six students explained that the task itself was enjoyable and this was motivating (10%). Another six students reported that the feedback from peers and the teacher was motivating, and for six other students, location and weather conditions were a motivating factor to be creative. If it rained, one student explained that they would find a suitable place indoors. While four students commented that being able to self-evaluate their videos before sending them was a motivating factor, one student commented that the user-friendliness of the cell phone itself was a motivating factor to be more creative with the filming process.

Amongst the three negative factors, four students commented that they did not find filming outdoors to be a motivating factor (6%); they preferred to film inside their home or room. Two students reported being shy and one student explained that since the activity was time consuming, it was not motivating to be creative.

Now that most of the open-ended responses have been reported above, what remains to be understood is whether or not the cell phone video recording feature was perceived as a good language learning tool, whether or not students agreed to study with their cell phones at the end of the project, and what their opinions are on the future of cell phone video-based telecommunication.

The cell phone video recording feature is a good language learning tool.

Based on their experiences with cell phone video production, 26 students believed that this tool was suitable for language learning, because it enabled them to self-evaluate their performances before and after production (41%). Nine students reported that portability rendered the cell phone a good language learning tool since they were able to learn anywhere and at any time (14%). Eight students identified ease of use and cost effectiveness as positive aspects of the cell phone-based learning (13%). While five students thought that it was similar to some extent to having a face-to-face conversation, two thought that the cell phone-based learning made it possible for them to practise all of their skills. One student indicated that the cell phone enabled her to focus more on learning. Another indicated that the opportunity to email the video to the teacher made the cell phone a good learning tool.

Amongst the four negative answers, three students indicated that they preferred to learn face-to-face with a real person (5%). Another three students commented that it was not a suitable learning tool because some students may not have a video recording feature on their phones. Two students commented that the time constraint set by the recording feature was not effective and another two students did not find that the audiovisual quality of the videos was good enough to learn with.

Studying with a cell phone is suitable.

There were 10 response categories in agreement with studying with a cell phone and five categories in disagreement with this learning approach. Fifteen students agreed that studying with a cell phone assisted them in improving their speaking skills (24%). Nine respondents explained that the task assisted them in improving multiple skills (reading, speaking, listening, writing, filming, and editing) (14%). Eight students enjoyed the ability to self-evaluate their performances and keep track of their progress (13%). While for six students, the cell phone was easy to use, five students agreed that the cell phone was a suitable learning tool because they could learn anytime and anywhere. Another five students agreed because it gave them a chance to speak at greater length on a topic of their choice, something they had not previously experienced. Four respondents explained that everyone is familiar with cell phones, so it is worthwhile to study with them. While two students enjoyed developing friendships, another two students commented that the video recording feature itself was an effective tool since it let them share opinions with their peers.

On the negative side, three students were of the opinion that the small screen and poor audio quality kept them from agreeing with studying with cell phone (5%). Among the rest of the students, one expressed that he preferred to study with a native speaker and another commented that the cell phone should be used only as a private device for entertainment and communication. One student commented that sending the videos directly from the cell phone incurred a cost which did not motivate him to continue learning with this tool. One student commented that the task was time consuming and for this reason she did not agree with studying with her cell phone.

Students' perceptions of the future of the cell phone video recording feature.

After completing the project, it seemed appropriate to collect students' perceptions of the future of the cell phone video recording feature. Twenty-two respondents agreed that the video recording feature will become an important feature for video calls (35%). Seven students concurred that this tool will allow them to access classes and exams and possibly participate in homeschooling (11%). Six students thought that in the future, more students will learn languages with this feature (10%) and another six thought that all courses will use this feature as a learning tool. Six students also thought that eventually cell phone technology will be so advanced that it will replace PC technology. While three students thought that the business industry would make better use of this feature (to conduct business meetings, interviews, and auditions), another three students thought that the video recording feature could be an important tool in the event of emergencies, and the last three students thought that it will be a tool preferred in the medical field.

While two students commented that the video camera will become an obsolete feature, one student explained that the video recording feature is not a compulsory tool on all phones and that the time restriction will not motivate people to want to use this feature.

Interview Responses

Collecting evidence from outside class activities is useful, but it provides only one view of students' use of the technology and much can remain unknown or unobserved about how students interact with the technology. Therefore, interviews were conducted in the researcher's office and were videotaped for further analysis. The office was located in the Center for the Advancement of Higher Education building on the main campus and thus was readily accessible to students. The office was large, reducing the chances that students might feel claustrophobic or uncomfortable. The door was left slightly open during students' interviews. Students were provided with a table and chair facing away from the researcher so that they did not feel like they were under pressure. The video camera was placed two metres away so that students would be able to disregard its presence and the zoom feature facilitated close-ups of students completing their task.

At the beginning of the interview, students were informed about the purpose of videotaping the interview and their consent was sought. In addition to videotaping the interview, the researcher used a questionnaire to ensure that all interviewees responded to the same questions.

An interview schedule was organised and all students were invited to participate in a one-off interview. Since this researcher is male, due to university policy and international standards on teacher-student relationships, it was decided that it would be best to invite female to be interviewed in pairs. It was left up to the students to schedule an interview at a time convenient to them. While the aim was to interview all students, it became apparent that this was not feasible. Students' academic requirements and commitments infringed on the interview schedule therefore, out of 67 participants, 45 (67%) were able to commit the time to participate in the interview.

The interview was divided into two parts and lasted no more than one hour. In the first part of the interview, students were requested to produce a video with their cell phones as if they were at home. They were allowed to use all the tools necessary to produce their videos. The second part of the interview was divided into two parts. In the first part, the interviewer would question students on any aspects of their video production that were deemed different from any other prior experience with creating a video. Not all students were questioned on their video production process, and so this part was not always included. Thereafter, the second part focused on the interview (see Table 71 for the interview questions).

Table 71

Interview Questions

Q1 – When you are writing your script do you think in Japanese and then translate into English?
Q2 – Cell phone age
Q3 – Memory size
Q4 – Explain how you make your videos at home.
Q5 – Tell me how you practise your speech at home. Do you use a mirror? Do you watch your videos?

Q6 – Why do you / don't you record your videos outside your apartment?
Q7 – When you finish making your video, do you check the quality of the video before you email it to me?
Q8 – Have you ever used your cell phone video camera to film friends or relatives in Japan?
Q9 – Have you ever received a cell phone video from a friend?
Q10 – Since making the cell phone videos for your homework, have you sent any videos to your parents or friends?
Q11 – Is the task of making a cell phone video easy?
Q12 – Is the activity interesting?
Q13 – Is it easy to email the video?
Q14 – Do you ever review your old videos?
Q15 – Does viewing your peers' previous videos help you understand how to improve your speaking skills?
Q16 – Friendship
Q17 – Future

The interview questions were structured to be free from any listening comprehension ambiguities and aimed to offer a lead into a particular area of discussion upon which students could clarify their opinions. All students had sufficient language skills to provide comprehensible answers suitable as evidence for analysis.

All responses were typed and checked against the video evidence to either confirm the content collected or to extrapolate any data deemed necessary. All the responses were organised so as to quantify the findings.

Hardware

Based on the interviews, it became apparent that not all students were familiar with their cell phones. Out of 45 interviewees, 20 did not know where to find the memory capability of their cell phone and they did not know this information. Ten phones had a memory size of up to 100 megabytes (MB), two had a memory size between 101 and 150 MB and two had a memory size between 151 and 200 MB. While one cell phone had a memory size of 256 MB, four had a 400 MB memory size and another four had a memory size of 800 MB. Two cell phones had a memory size of 1 gigabyte (GB). Amongst these, 18 cell phones had an extra 1 GB memory in the form of an SD card.

Access

The majority of the cell phones were two years old (n = 14). Eleven cell phones were one year old. Five students owned their phones for three years, and three had their phones for more than four years. However, some students had newer phones. Two students recently purchased new phones that were less than two months old. Five students purchased their phones within the previous three months and three students purchased their phones within four months. Two cell phones were nine months old.

The reasons why some students had new phones were either due to accidents (lost or dropped and broken) or they were gifts. Interestingly, students with new phones requested that the data from their old phones be transferred to their newer ones. Some of the students, whose phones had not suffered an accident, decided to keep their older phones due to emotional attachment (for example, one still contained senior high school photos).

Video production process

While the observations revealed that students wrote their scripts with the aid of a dictionary and at times requested the researcher's assistance, students also indicated during the interviews that at their domiciles, they generally thought about their scripts in Japanese first and then proceeded to write in English (n = 34). Eleven students were capable of thinking in English while writing their scripts. During the observations, only two students were capable of doing so. That is, two male students sat down, read the prompt for the week, and proceeded to make a video without any script or aid.

Twenty-eight students explained that most of the time they wrote their scripts, they memorised the content, and finally they proceeded to film their performances. Five students indicated a similar pattern; however, they made it explicitly clear that they also checked their scripts prior to memorising it. Some checked for spelling whereas others checked for grammar and sentence structure. While one student wrote the script in English, another memorised the script at home before going outside to film the video at a selected location.

Practice amongst students varied. Twelve participants indicated a preference to practise loudly with their phones, while three students preferred to practise quietly. Thirteen students indicated practising many times without their phones, and another four preferred to practise loudly with no phone. Two students indicated practising quietly at first and then loudly with their phones. One student practised in front of a mirror before using his phone.

Amongst the 12 students that practised with their phones, five commented that the phone was like a mirror. They could see evidence of their performance and they could then determine the areas that needed more practice.

Thirty-five students checked both the video and the audio before sending the final performance to the teacher. Twelve students reported that they looked at the background, their facial expressions, and their general appearance. Another 12 students looked only at their facial expressions and more specifically, their eye contact. Five students checked mainly their ability to maintain eye contact, while another four students looked at their mouths to determine proper enunciation. Two students were not sure what it was that they did when they reviewed their performance. Even during the discussion of the observation they simply commented "I look at everything," but could not identify what "everything" was. Nonetheless, all students commented that they listened to the audio to ensure that their voices were audible and clear and that there were no distracting background noises.

Ten students checked the audio only. Some indicated checking the audio against the script to ensure they had not omitted any words (n = 4). Others commented that they checked for voice and pronunciation clarity (n = 3) and some indicated that listening to the audio helped them to think more carefully about the sentence structures used (n = 2). One student commented checking all of the above as well as background noise.

Location

Amongst the 45 students interviewed, 13 students produced their videos at their domiciles. While four students indicated that they were too shy to film their videos outside, four mentioned that their apartments were quieter than outside. Amongst these four, two commented that they did not have neighbours, so they could speak loudly without feeling foolish. While two interviewees indicated that they were happy to complete the homework at home, another two explained that their apartments were comfortable. One student explained that it all depended on the weather.

The remaining 32 students made an effort to film their videos outside. These students commented that at first they did not have the courage to do so, but once they had seen a peer film their video outside, they were motivated to try. Others commented that once they had gained the confidence to produce effective videos inside their domiciles, they felt more confident performing in a public place.

Preserving videos for future viewing

There were two methods for accessing and viewing the videos, via the cell phones or via the email account. Twenty-one students reported accessing and viewing their videos on their cell phones, while 24 students preferred to view their videos from the class email account.

In terms of preserving the videos on their cell phones, 10 students kept all their final video performances only, but never reviewed them. While seven students indicated keeping all the attempted videos and not viewing them at all, 16 did not keep any of their videos.

Viewing peers' and own videos

It would seem that students preferred to view their peers' videos (n = 43) more than viewing their own videos (n = 11) to learn from. Two students indicated that there was no need to review either their peers' or their own videos since the homework was finished.

Developing friendships through the project

Twenty-four students reported that the project assisted them in developing friendships with their classmates. Twenty-one students reported that the project did not help them develop friendships; however, it did help them to become more comfortable with their peers. One student explained, "We are not friends, we are acquaintances."

Analysis of Extreme Cases

Case study suggests that extreme cases should be identified in order to explore elements that prompted these cases to be extreme. Fraenkel and Wallen (1996) explain the need to be careful when selecting a representative sample of extreme values (see also APA, 2010). While the objective of their explanation is to keep a random sample reflective of the sample size, Flyvbjerg (2006) explains that extreme values represent participants behaving outside the norm. In his book *Outliers*, Gladwell (2008) explains that outliers are the results of "accumulative advantages" (p. 33). That is to say, it is the sum of their experiences that renders them outliers. In fact at the beginning, Gladwell points out, these outliers only have a slight advantage which does not make them outliers per se, but just enough to be noticeable. It is after their training and expertise that these outliers become outliers. Nonetheless, for the benefit of reliability and validity, attempts are made to represent extreme cases that are reflective of the sample size in this research. In other words, the male to female ratio of undergraduate students at Tohoku University is 76% to 24%, respectively. Both the Arts and Letters and the Law group have similar male to female ratios. Therefore, among the extreme cases extracted, attempts were made to have a similar male to female ratio.

Before engaging in outlier analysis, Barnett and Lewis (1984) warn that a definition needs to be outlined. These authors explain that "an outlier [is] an observation which appears to be inconsistent with the remainder of that set of data" (p. 4). In addition, Barnett and Lewis (1984) warn that outliers can also emerge due to errors during the process of entering data (see also Azzalini, 1996, for similar comments). Case study research encourages the researcher to collect a variety of data from various sources. This method reduces the chance that the existence of outliers is due to improper data entry management. In addition, in statistical analysis the aim is to make the data fit within the norm, and outliers are regarded as contaminants. In case study research, outliers are invaluable since they provide the researcher with the opportunity to highlight cases that lie outside the norm.

In this case study, the author attempted to understand the motivating factor(s) that caused some participants to perform below or above their peers. The aim was not to disqualify or chastise participants for their performance, but more pointedly to find out the phenomena that may have influenced them.

Using SPSS, an analysis of extreme values was conducted and the findings are reported below. This list of cases will be used to explore the interviews and observations conducted with these cases in order to report any data that may have influenced these cases to behave as they did.

To determine the extreme values, students' averages generated from the 12 weekly diaries were calculated. The variables in the weekly diaries were preparation time, recording sessions, preparation strategies, strategies to memorise the speech, strategies to improve speech production, error identification strategies, and rating of enjoyment of the video production process. These variables also included the words per second performance, first 1,000, second 1,000, and AWL words. SPSS identifies five of the highest and five of the lowest extremes. From this list, only two or three of the cases identified for each extreme are reported. This was decided based on the fact that sometimes a large number of students perform at the same level and therefore these are not extremes.

Statistical analysis revealed 38 extreme cases, 34 males (89%) and four females (11%). As it is not possible to report feedback collected from all participants, extreme values that have a high level of representation are reported first. Extreme values with low levels of representation are used to either concur or provide more information.

Table 72

Results from Analysis of Extreme Value Identification

Variable	**Extreme**	**Case (gender) (mean)**	**Case (gender) (mean)**	**Case (gender) (mean)**
Preparation time	Highest	57 (M) (72.5)	58 (M) (70.5)	44 (F) (57.08)
	Lowest	37 (M) (14.58)	17 (M) (14.58)	65 (M) (15)
Recording session	Highest	37 (M) (9.45)	25 (M) (9.36)	54 (M) (9.36)
	Lowest	58 (M) (2.73)	23 (M) (2.89)	13 (M) (2.91)
Preparation strategies	Highest	50 (M) (5.17)	24 (M) (5)	35 (M) (5)
	Lowest	14 (M) (1.83)	23 (M) (1.89)	**
Strategies to memorise speech	Highest	45 (F) (6.5)	5 (M) (6.08)	52 (F) (6)
	Lowest	51 (M) (3.58)	19 (M) (4.5)	11 (M) (4.5)
Strategies to improve speech production	Highest	40 (M) (15.5)	23 (M) (14.78)	37 (M) (14.08)
	lowest	35 (M) (5.83)	22 (M) (6)	14 (M) (6)
Error identification	Highest	1 (M) (15.08)	44 (F) (13.42)	45 (F) (13.42)
	Lowest	31 (M) (3.17)	20 (M) (5.75)	**
Rating of video production enjoyment	Highest	37 (M) (2)	50 (M) (2)	20 (M) (1.92)
	Lowest*			
Words per second	Highest	54 (M) (3.04)	9 (M) (2.74)	42 (M) (2.7)
	Lowest	23 (M) (1.31)	22 (M) (1.43)	21 (M) (1.62)
K1000 words	Highest	46 (F) (50.5)	55 (M) (49.75)	42 (M) (49.42)
	Lowest	8 (M) (15.08)	33 (M) (20.4)	7 (M) (23)
K2000 words	Highest	55 (M) (7.5)	26 (M) (6.25)	23 (M) (5.92)
	Lowest	8 (M) (1.17)	22 (M) (1.42)	37 (M) (2.33)
Academic Words	Highest	64 (M) (2.83)	38 (M) (2)	52 (F) (1.83)
	Lowest	53 (M) (.25)	56 (M) (.42)	22 (M) (.42)

* Since the majority of students reported enjoying the task, there is no need to report cases since none would be extreme.
** indicates that there were no other significant case past that point

Case numbers 37 and 23 appeared five times as extreme values, and case number 22 appeared four times as an extreme value. Whilst nine cases appeared twice as extreme values, the remaining 26 cases only appeared once as extreme values.

Case 37

This student's cell phone was one year old. He mentioned not previously receiving or sending photos or videos to peers or friends. Up to the time of the interview, all the cell phone videos were recorded in the comfort of his apartment. He explained:

> "I prefer to film in my apartment because it is quiet and comfortable. It is easy to film without people listening to me. I can also check words on my dictionary."

In terms of video production quality, this student indicated that he always checked both the audio and the video. He made an effort to use the video evidence to check his pronunciation as well as his facial expressions. He also mentioned that he sent his videos to friends so that they could comment on his speaking speed or pronunciation.

In relation to the task, this student commented that:

> "It was not easy because it needs to use many kinds of English skills".

Further on in the interview process, this student mentioned that:

> "The activity is somewhat interesting because I have never done this kind of activity. So it is good experience because it is more practical. For example, I have to express my opinion on painting"

Although this student's cell phone had 100 MB of memory as well as a 1 GB SD card, this student did not keep all of the videos. He kept only the last two videos and he did not watch them. He did not want to view and learn from them.

The weekly video report indicated that this student needed 90 minutes to produce some of his videos. When queried about this preparation time, he provided more information by stating:

> "Writing a script takes more than 30 minutes and memorising the speech takes another 30 minutes. Filming takes 20 minutes."

This student also made between 10 and 15 attempts to record a video before achieving the best result. He explained that he did not feel comfortable speaking in English and this affected his ability to remember his speech.

As a consequence this student did not rate the task of producing a video with a cell phone as enjoyable. His response confirmed the above opinion:

> "It takes me a very long time to do this homework and I don't like to film myself."

This student was then guided to give a percentage of the stress levels of producing a video inside his apartment versus filming in public. He indicated that his stress level was low when filming his video inside (100% no stress) compared to filming his video in public (95% high stress).

The data for case 37 indicate that not only did it take him a long time to prepare, but it also took a long time to film the best video. This student did not rate the video production process as enjoyable at all over 12 weeks. Yet this student persisted with the task and submitted all videos on time. Towards

the end of the project, this student filmed some of his videos in public places, something he rated as highly stressful.

In the last video, the student confirms that while the project was difficult,

> "Mr. Gromik gave me some advice on improving my speaking skills and I was able to improve to some extent."

Case 23

This student is different from the previous case in the fact that she did not submit all the weekly videos on time (5 out of 13) and she was predominantly absent from class. There is no course or departmental policy for addressing students' absences, so this student could not be removed from the course.

When asked why she did not submit all the videos and reports on time, the answer was, "I forgot."

This may have been acceptable if this student had limited English speaking abilities, but this was not the case. This student had performed well in the self-introduction video during the first lesson. So after a few more prompts it became apparent that the homework was not a priority for this student. She explained:

> "Homework is a problem. Saturday and Sunday I work at part-time job. So I don't have enough time."

Students were allocated enough time. The class was on Monday and the homework was due four days later on Friday. So the student provided more information:

> "Sometimes the topic is interesting, for example, the introduction of myself. But I didn't want to talk about my favourite shop in Sendai because I am very shy. So I think I cannot do this theme. Also some of the themes are too challenging."

This last feedback was interesting because efforts were made to ensure that the themes were within students' reach and interests. In addition, the majority of the students were able to submit their videos on time. This student's cell phone had a large memory of 100 MB and a 2 GB SD card, so the technology was not considered to be an obstacle. After further discussion the student stated, "I have rock band club activity and we meet twice a week, so I don't have time."

The feedback provided by this student would seem to indicate that she had other priorities, and the purpose of the project did not meet her needs. While she made attempts to find valid explanations for her inability to submit her work on time, the fact that other students with a similar workload were able to complete the work would refute her argument.

After all, this student explained that she had enough time to write her script. Also she admitted that it was easy to record a video and email it. This student also indicated that the task was not "boring." In

terms of learning strategy, this student kept the few old videos she had produced to view them in order to "improve my speaking abilities, intonation, and vocabulary."

In terms of stress, this student indicated that she did not feel any stress to produce the videos inside her apartment (100% no stress). But when faced with the idea of producing the videos in a public place, she felt more stressed (90% high stress).

Case 22

Out of 13 videos, this student indicated enjoying only two video productions, but all videos were submitted on time. His cell phone was two years old, with a memory of 20 MB and a 4 GB SD card. Therefore this particular cell phone was suitable for the project.

Similar to some of his peers, this student mainly wrote the script in Japanese and then translated it to English. Like his peers, he also corrected his errors, practised a few times, and made a few video recording attempts before producing his best video.

Evidence from the video diaries revealed that this student produced his videos in line with his peers. That is, his preparation time and video recording sessions were within his group average. In addition, this student made an effort to check his videos before sending them, reporting that he listened to the audio once, but rarely looked at the video itself.

For this student making the script was easy, but he found it challenging learning to speak fluently. He also indicated that the task of making a cell phone video was easy and that he did not experience any major problems with emailing his video to the class email account.

However this student did not find the task interesting mainly because he was shy. He explained:

> "I don't like to speak in front of my peers, that is why I said that I did not enjoy producing the video."

This student also indicated that another reason for not wanting to view his prior video performances was because these reminded him of the mistakes he made.

The above feedback seems to be an influencing factor that made this student an outlier. The extreme value evidence reveals that this student had the second lowest score of words spoken per second; case 23 above being the lowest.

This student also did not use an extensive K2000 or AWL word range. It would seem that, for this student, the inability to speak in the target language was one possible factor that prevented him from enjoying the task.

Towards the end of the course, Case 22 was interviewed briefly a second time. With regards to his overall enjoyment of the project he replied with great difficulty, "I am not used to speaking in English, so this course was helpful."

While this feedback provides positive support for using the cell phone video recording feature as a learning tool, the difficulty this student displayed when trying to utter one sentence indicates that he

was not yet able to speak without notes. This seems to confirm the diary response from this student, that he mainly relied on low level strategies to improve his speech production.

Other cases

As pointed out, the extreme values above were selected because they displayed the greatest deviation from the average performance compared to their peers.

The next group of cases is a collection of participants that were identified as outliers on two variables (see Table 72 above). Amongst these nine outliers, six were male and three were female. Another way of categorising these outliers is to point out that six of the participants (M=3, F=3) were from the Law group, two male respondents were from the Arts and Letters group and only one male outlier was from the Engineering A group.

The feedback from the interviews conducted with these outliers is compiled in two reports – one for the female group and one for the male group.

Female cases.

At the beginning of the course, the three female cases used the same method for constructing their video speeches. They wrote their speeches in Japanese and then translated them into English. In a conversation late in the term, Case 45 reported:

> "I have become able to think about my speech in English and I try to speak it out spontaneously. When I cannot remember the whole speech then I begin to write it out in English"

This is an improvement that the other two cases were not able to achieve.

Also at the beginning of the course, these female students worked individually on the video project. By the middle of the term, Case 45 worked collaboratively with Case 52, whereas Case 44 did not indicate that she worked with other peers. This student indicated that she was shy and preferred to prepare the project at home.

Case 44 also indicated that she used the technology to check both her audio and video performances.

> "When I finish a video, I check my voice, the volume, and the grammar. I also check my movement, the video quality, and the framing of my face. If there are any errors I film it again."

On her video performances, Case 44 seemed to be a confident speaker. However, she mentioned that the task was not easy because, "I am not good at speaking in English and I am not familiar with some grammar points."

In terms of errors, she mentioned:

> "When I record my videos I am a little nervous, so I make mistakes. I have to film my performance many times but the task itself is not difficult. It is easy to practise and record the video."

During the interview the student was asked if she kept all her videos. She replied:

> "I keep all my videos, but I don't look at them. I don't think about looking at them. I keep them as souvenirs of my performance. Maybe in the future I will look at them…I don't use the videos to check my performance."

Case 44 explained that the video project was good to develop friendships with her classmates.

> "I always look at Case 49's videos. She always speaks rhythmically, so I am trying to speak like her."

She added:

> "Case 49 and I were good friends before, so the video project helped to maintain our friendship and we get to know more about each other."

When asked if she thought that using the video recording feature would be a good idea to learn in other classes, Case 44 responded:

> "It is a good idea to make videos in English. For Japanese classes it may be good because I can practise to speak to an audience and in the future we may have to speak to an audience such as for job interviews or in class presentations."

Based on Case 44's responses it appears that she thought the video project had merits and it did establish or improve her friendship with classmates. But she was still shy and preferred to prepare her videos at home.

Case 45 and Case 52 were friends before they started the course. Both mentioned that the project had made them become better friends. However, in the beginning both were shy and both prepared their speeches independently.

Case 45 explained:

> "At first I didn't know what was expected of me, and I didn't know how to express my opinion, so I was shy and nervous. I wanted to study alone. After viewing my peers' videos and comparing myself to them, I became more confident that what I did was right."

This was not true for Case 52. She reports:

> "I am shy, so I didn't like to make the videos. I preferred to make them at home."

Based on their stories, it would seem that Case 52 viewed some of Case 45's videos and she then approached her friend to see if they could collaborate together. Case 52 explained:

> "The homework is not easy. I like speaking in English, but I am not good at speaking in English, so I practise a lot. Then I asked [Case 45] if I could practise with her."

For both of these students the actual task was easy to do, "You just push the record button, that is it."

Both of these students also checked their videos, but they looked at different aspects of their performances.

For Case 45:

> "I always check the audio to listen to my pronunciation. I check the video to see the frame size and that my face is in the centre".

For Case 52:

> "I always check that I smile, I look at the background, and I listen to the background noise".

Both students kept their old video performances, but again for different reasons.

Case 45 explained:

> "I keep my previous best videos only, but I don't look at them. I look at them from the Yahoo! email account."

This is a similar response to Case 52 who states:

> "The phone memory is low, so I keep only the best performance. I check my videos on the Yahoo! account. But I don't look at my past performances."

The evidence from Case 45 indicates that she was able to improve by speaking 45 words in Week 2 (T1) to speaking 120 words in Week 13 (T2). She explained:

> "I watched Case 54's videos and I noticed that he could speak fast and clearly. So I decided to try, and I could do it. It was motivating and challenging. Also it is helpful to practise with Case 52."

Case 52 was able to speak 70 words in Week 2 and improved to speak 120 words in Week 13.

> "Practising with Case 45 was really helpful, and watching the videos on the Yahoo! account was also helpful. I could understand how to improve."

Based on the feedback from these three students, it appears that for two of them, collaboration proved useful. While Case 44 was able to develop friendships, she did not capitalise on the potential that collaboration could offer. Her spoken word range was constant with 70 words in Week 2 and Week 13.

Male cases.

Amongst the six male cases identified, one reported that the project enabled him to develop friendships with his classmates:

> "Our class is small size, so it is easy to communicate with them during class activities. So it is easy to get to know them through the video project and the transcript activity helps us to know our strength and weakness. So we can become friends" (Case 35).

Case 35 indicated checking his audio files for pronunciation accuracy and pausing effectiveness. He also checked the video files for face to frame ratio. In terms of keeping his videos for future reference, he explained:

> "The cell phone memory is not large so I keep my videos for one week then I delete them. I don't save them on my computer because the videos are stored on Yahoo! account."

However, before deleting them, Case 35 explained that sometimes he compared the previous video with the latest performance:

> "Sometimes, if the previous video was good, then I would compare my previous performance with the new performance to see if I can improve. Most of the time I don't do that."

The other five participants were of the same opinion that the project did not assist them in developing friendships with their peers, but that it did give them a chance to get to know their peers. Case 54 had the best explanation:

> "It doesn't help with becoming friends, because to become friends I need to meet them face-to-face in the real world."

All five students concurred that the videos helped them to get to know their peers better (cases 54 and 58), to understand their opinions more clearly (Case 14), and to learn more about the challenges they faced in their daily lives as well as to know more about their speaking strategies and styles (cases 20, 42, and 58).

Case 58 provided interesting feedback concerning video file sharing. He explains the situation with his girlfriend:

> "I told my girlfriend about the class video project and she liked the idea so she has been sending me videos. But I am shy, so I don't send her videos".

He adds that in the future he will continue to produce cell phone videos because his girlfriend lives in Tokyo, so that is a good way to exchange communication.

For this student, the video production process is easy if the theme is easy. He enjoyed viewing his peers' videos because it exposed him to more ideas and opinions as well as different vocabulary.

Case 58 was identified as having the lowest number of recording sessions. He explained that:

> "In the beginning I filmed the videos by myself. But then I saw [Case 51's] videos and he filmed outside. He is also confident, so I decided to film my videos with him, and now I am more confident."

For Case 20 the project was easy. He explains that he followed a consistent strategy to prepare the script and then to practise. However, while pushing the video recording button is easy, it takes him a long time to film a video:

> "Each topic is different so I have to write a new script every time, and I have to remember a whole new script with new vocabulary, that is challenging."

However, Case 20 did explain that he was not sure about the benefits of the task:

> "Up to now I have learned to read and write, but at university I have to speak, so I haven't had a chance to study to speak. I have never made a film so I am not sure of benefits and I don't know how to speak."

Case 20 later on during the interview adds:

> "I have made improvements because it is easier to speak in English. But I don't know if I have really improved because this is not a conversation, just a speech."

Case 20 does acknowledge that he received teacher feedback but for him, it was important to gain a sense of his conversation skills and abilities. This could explain the reason that Case 20 was identified as one of the lowest records of error identification. He was not able to use his previous performances as a guide for improving future videos.

Case 20 also had the highest record of not enjoying the task. When questioned about his weekly report of not enjoying the task he explained:

> "I am relaxed at home. When I am in my room, I am more relaxed. When I go outside I am surrounded by people and I can't concentrate. It makes me nervous. Also when I go out to make the video, my friends laugh at me. So I don't feel happy. I don't always make videos with friends."

Case 20 did not clearly explain why his friends were laughing at him. Based on his explanation it would seem that his friends laughed at his content and sentence structures. "They laugh at what I say, or some of the words I use." It did not seem that his peers mocked him, but rather they were surprised by his selection of words or sentence structures.

Case 42 was also embarrassed to make his videos outside at first. He also tried to make videos with his peers, but they also laughed, so he decided to make his first videos at home. Then:

> "[Case 59's] movies are good, for example, his speaking speed and pronunciation, so I listen to him and I try to improve similar points."

After viewing Case 59's videos, Case 42 started to make his videos outside again:

> "At first I was ashamed, but then I became accustomed to speak outside, and now I am more relaxed."

He explained further on:

> "During Golden Week (a holiday) I went to my hometown and I showed my movies to my buddies, they said 'your study is hard, this is great'".
>
> "I looked at my peers' videos, I talked to my friends about the videos, and I felt that my speaking skills improved."

The story provided by Case 42 indicates that discussing his video project with peers encouraged him to persevere and this led him to gain more confidence speaking in public places.

In the future however, he won't be using his cell phone to make videos:

> "I want to improve my speaking skills so maybe I won't use my cell phone video but I will continue to practise."

Case 42's perseverance seemed to have been of some benefit because the data indicated that he was able to increase his word count as well as increasing his use of K1000 words.

Case 14 also preferred to produce his videos in his home. He explained that he was shy and did not like to speak loudly. However, he did find a solution afforded by the cell phone. He explains:

> "I can record my video in nature, because there are no people there."

From the third video onward, Case 14 filmed all his videos outside in forests or near rivers where the general population does not venture. This shows that this particular student was capable of thinking of a solution to meet with the challenge of the task.

Consequently, Case 14 checked the quality of his audio in terms of clarity and background noises. He also checked his video performances to observe his pronunciation. In addition, this student sent his videos to peers to have them check his final video:

> "If my friend say 'It's good,' then I send it to the teacher. If not then I try again."

This student kept all his videos on his cell phone so that he could review and check his pronunciation, intonation, and volume.

In terms of future use of the cell phone video recording feature as a learning tool, Case 14 explains:

> "No I won't use it for English studies because this was a homework. In the future my videos will be in Japanese, because I can share my opinion of the content more easily."

Data from Case 14 indicated that at first he decreased his speech preparation time to later increase it, before decreasing the preparation time again. When asked about this particular shift, he explained:

> "The first time I made a speech quickly. But later I wanted to make my videos more interesting so my preparation time changed. Now I am able to write my speech more efficiently so my preparation time is quick."

The evidence and feedback provided seemed to indicate that, for Case 14, the task was challenging; however, through practice and reflection, he was able to find solutions that made sense to him. The solutions allowed this student to find methods for improving himself in terms of public speaking and preparation time.

The final case is extremely interesting because this particular student, Case 54, was able to increase his word count from 65 words to 150 words. Case 54 was also able to shift from writing a script in the target language to speaking spontaneously.

> "It is uncomfortable not to have a speech, but when I speak without notes, I have to memorise my speech. I can make my videos faster and I feel more confident in my ability."

Case 54 indicated that he enjoyed all the video production sessions.

> "Because I want to be someone who speaks fluently. So this video project is a good opportunity to speak English and I am happy."

This particular student realised that making the videos in his apartment was easy, but speaking in public places was more motivating because it helped him to improve his confidence. In addition, he used his cell phone as a practice tool, thus increasing his confidence level.

For this student, using the video recording feature and the Yahoo! email account was easy. Case 54 kept all his videos on his computer.

First he checked his audio for grammatical and pronunciation errors, then he checked his videos to observe if he presented a relaxed persona and if he maintained eye contact. Case 54 kept his latest performance only until he received teacher feedback. After that he deleted the video from his phone and kept a copy on his computer. In this regard he explained:

> "I check my older videos once every two weeks. I compare them for grammar and speaking speed."

Case 54 did not gain much from viewing his peers' videos:

> "My peers' English is not native English like, so I think I can't progress by listening to them."

In the future Case 54 does not see any reason to continue with this activity:

> "Because it is not an assessable task. So no feedback. The teacher comments provided incentives so I want to progress. Also I think it is better to use a video camera because the quality is superior."

Case 54 was an extreme case because he wanted to improve his English speaking ability and the cell phone video recording feature and the task enabled him to practise. He was able to make efficient use of his time.

Technology acceptance model survey

One year after the project was conducted, all students were contacted encouraging them to respond to the Technology Acceptance Model (TAM) survey. Such a survey assists in collecting data suitable to define participants' perceived usefulness of technology, attitude towards technology, perceived ease of use, and intention of use (Davis, 1989; Venkatesh & Davis, 2000; Manochehri, Gromik, & Aw, 2012). Unfortunately, the attempt to reconnect with students coincided with the time of the shocking earthquake and tsunami of March 2011 that occurred 20 kilometers from Sendai. Due to the dramatic natural devastation, many students were required to return to their hometowns to offer support. The university was shut down due to structural damage and classes did not resume until August 2011.

Case 54 was the only student outside of Japan at that time. He was participating in a scholarship program in Sydney, Australia. This student, while distressed by the news from Japan, was kind enough to respond to the survey.

One year after participating in the course, Case 54 said that if given the chance, he would study again with the cell phone video recording feature. Since the course, he has at times used the video recording feature.

While Case 54 agreed that the project had increased cooperation with his peers, he disagreed that viewing their videos improved his understanding of speaking skills. He did not recollect that it was either difficult or stressful to use his video recording feature. He strongly agreed that it was easy to learn to utilise the video recording feature, it was easy to operate the video recording feature to achieve his goal, and the project was easy to complete.

However, Case 54 recollects that at the time he was nervous about using the video recording feature in public and he is still nervous about this particular task. Nonetheless, since then, Case 54 has shared some of his videos with his parents and these may relate to personal events. But he had not sent any videos to his peers.

Case 54 agreed that the video recording feature learning system was trustworthy, beneficial, and that the project kept his best interests in mind. He was of the opinion that the experience of learning with a cell phone which motivated him to speak and that this was an efficient way to learn to speak. In addition, he strongly agreed that the video recording feature made it easier to speak in English, as well as to understand the speaking process.

This particular student disagreed that using the cell phone video recording feature improved either his note taking skills or time management. He also indicated that he strongly agreed that cell phone technology was not yet developed enough to replace other forms of teaching. But he indicated a neutral answer to the statement that other devices (such as web cameras or MP3 players) were better to study English with.

While the survey did not provide room for Case 54 to write any additional comments, this student did add that he agreed that the teacher's support and feedback was enough to understand and complete the project.

There are not enough TAM survey responses to confirm or contest Case 54's survey responses; thus, his comments cannot offer any general and final perceptions on the benefits of using the cell phone video recording feature as a learning tool. Case 54's responses can however legitimize the need for further investigation with this learning tool.

Storing Data Sets for Further Analysis

Case study research experts have warned that efficient data collection methods can generate a large amount of data for analysis. Instead of filing the collection method documentation away, Yin (2003) recommends that researchers itemize the documentation in an annotated bibliography. Storing and itemising research documentation enables the researcher to recommend which documents were most

useful under which conditions. All the documentation for this research has been integrated in each relevant chapter. This section discusses which data collection methods were the most effective for generating invaluable data for analysis.

As stated previously, Stockwell (2010) did not use a pre-test, instead relying on a post-test to gather data from his participants. It is the opinion of this researcher that pre-tests are an important aspect of data collection. Pre-tests and surveys not only provide demographic evidence, but they provide an opportunity for needs analysis and a report on the learning objectives of the students. Much of the time researchers are more concerned with their research than the actual learning gains (Gromik, 2009b).

While the pre-intervention survey used in this research was effective in collecting vital responses pertinent for the research objectives, it may not have been efficient. Investigators wishing to use the included pre-intervention survey may want to ensure that the questions are more specific. The issue is not the question format, but more the range of questions and their direct relation to the research.

Weekly diaries or reports have been used in many studies (see Conti-Ramsden, Durkin, & Simkin, 2010, for example). Having students complete diaries or self-reports on a regular basis is an effective method for collecting evidence about outside class student practices. The diary designed for this research project was an effective and efficient tool, since it was able to collect evidence from participants that was directly related to the research objectives and was easily organised for analysis.

In addition, the strategy to collect data from students' video performances was effective. Had the research objective been to analyse students' linguistic output, then more in-depth sorting and cataloguing would have been necessary. Since the research question aimed to observe the effectiveness of the cell phone video recording feature, in-depth analysis was not warranted.

Finally, the post-intervention survey was an effective and efficient tool to gather students' post-intervention perceptions of the project. Increasing the number of related questions between pre- and post-intervention surveys may have improved the effectiveness of this last data collection tool.

Overall, the data collection tools facilitated the gathering of relevant data in a non-rigid manner. The use of SPSS ensured that the data were analysed without research bias and provided all participants a chance to have their opinion recorded.

Chapter 6: Discussion

This chapter discusses the findings that emerged from the evidence collected and analysed in the previous chapter. Before delving into a discussion of the results, the process of reporting results in a discussion chapter is identified. Doing so will help the reader gain a better understanding of the structure, purpose, and the claims this chapter presents. Establishing a structure and discussion method will also help the researcher identify and report on the most pertinent points. As per previous chapter structures, the discussion will present the results in contrast to the findings from the literature (Bitchener and Basturkmen, 2006; Giuffre, 1996). In addition, the discussion will evaluate the findings against the theoretical framework and teaching methodologies to explain whether or not integrating the cell phone video recording feature as a learning tool matches the framework and methodologies (Giuffre, 1996; Merriam, 2009). Implications and limitations as well as the conclusion will be addressed in the following chapter.

Reporting Case Study Research

Target audience

Authors on the topic of dissertation writing warn writers about knowing the target audience. Yin (2003) states that knowing the reader is a vital step in effective case study reporting. Among the four identified groups by Yin, the target audience for this case study includes academic colleagues and the thesis committee. During the lifespan of this case study, no direct funding to the research was received and the topic under review might not appeal to all non-specialists or individuals. The study did, however, receive JCU financial support in order to share the findings at the AACE 2011 conference.

Without going into too great detail, among the six types of case study report structures, it would seem that the "chronological structure" is the most suitable structure for reporting the evidence (Yin, 2003, pp. 152-154). Linear-analytic, comparative, theory-building, suspense, and unsequenced structures are not suitable since they imply certain methods for reporting evidence. While there is some linear structure to this project, there is, hopefully, no suspense that can leave the reader on edge.

Generalisation

Case study does not aim to provide evidence that can be generalised. The findings presented in this chapter pertain to this sample only. Neither the learning outcomes generated by this project nor the use of the cell phone as a learning tool can be generalised to other samples of the student community overall. As cell phone subscribers gain more information technology skills, it may become apparent

that they may be more receptive or reticent to use their cell phones as a learning tool. Further investigation will be invaluable to offer a culmination of findings that can provide a path for cell phone integration in the classroom.

Chronological reporting

Since the data were collected at specific points in time (before the intervention, 13 weeks of cell phone videos, 12 weekly diaries, and after the intervention) it is understandable that explanatory reporting in a logical order is a preferred approach. Chronological reporting presumes the existence of causal sequences occurring over a linear period of time (Yin, 2003, p. 153). Understanding the factors that cause students to use their cell phone video recording feature effectively or not, the effect that this has on speaking performance, and students' final evaluation of the benefits of using the cell phone video recording feature as a learning tool are at the core of this research. The chronological reporting, therefore, investigates students' progression and provides a complete set of information from which a successful discussion can ensue.

Data selection and reporting

In addition to presenting the evidence in chronological order, Gillham (2000) suggests that the discussion provide the reasoning for the analytical process, which affects the transparency of the overall project. Merriam (2009) adds that, based on her experience, qualitative reporting and discussion is basically "interpretive" (p. 22). Without claiming that the findings can be generalised, interpretive discussion also includes contrasting the evidence against theory, practice, and propositions to theorise the potential predictors that could have rendered the video recording feature a suitable learning tool and could contribute to the research community on the issue of cell phone use (Fraenkel & Wallen, 1996).

While words such as 'interpretive' and 'theorise' may seem anathemas to some expert researchers, as concepts these terms have potent roles. Theorizing, inferring, and speculating could to some extent indicate a degree of maturing. In her review of the literature, Merriam (2009) explains inference as an ability to guess what will happen in the future. The objective of this research is not to guess what could happen in the future if students continue to study with cell phones, but rather to present students' opinions about their perceptions of the future of cell phone-based learning. In this case, reporting goes beyond linear thinking and towards explaining the results based on the context where the project took place (Merriam, 2009).

Therefore, direct and indirect variables were collected to establish correlations that could explain some of the variables that motivated students to perform as they did during the project. Evaluation of these categories is inferential because the researcher assumes that some variables may affect others. It is the selection of inferential categories that explains whether or not the researcher can safely conclude that the cell phone is or is not a suitable language learning tool.

In case study research, as with other research, there is a lot of evidence to analyse and sift through. The objective of the discussion section is to organise all the evidence into parts that describe the phenomenon that occurred and the analysis of the intricate variables that played a motivating role in engaging students to agree or disagree with continuing to study with their cell phones. Categorising the data eventually gives the researcher the ability to answer the research question: Was the cell phone video recording feature a suitable tool to enhance students' speaking skills?

This chapter first presents evidence concerning the general structure of the research in terms of setting, project design, and research method. Then it presents the data collection and analysis process, followed by the answer to the research question. Thereafter it discusses the data to support the positive outcome that the cell phone video recording feature was perceived as a suitable tool to enhance students' speaking skills. The data are presented and discussed in terms of pre-intervention, intervention, and post-intervention. The final section of this chapter summarises the main points by providing a graphical representation of the research outcome and the connections between each variable identified.

Research Contextualization

Cell phone technology acceptance

"Mobile witnessing" is defined as a subscriber's video recording of a live political or non-political event with a cell phone (Reading, 2009, p. 63). As was the case in Iran and Egypt during 2011 demonstrations, individuals took their phones to the streets and documented live events as if they were journalists. Gromik (2009a) engaged his students to take their cell phones to the streets of Sendai to video document aspects of their daily life. While these Japanese students did not report displays of political anarchy, one student did comment that the video recording feature could be used as a tool to report real-life experiences as opposed to general propaganda promoted by mainstream media (Gromik, 2009a).

As revealed in the literature review chapter, the Japanese government subsidized the cell phone industry to increase the general population's access to cell phones. The ubiquitous presence and acceptance of this technology by Japanese consumers, and more pointedly Japanese undergraduate students, led this researcher to want to investigate the possibilities of integrating cell phone technology in large English communicative language classes.

As Friedman (2005) and Bridger (2008) have explained, technological advances mean that owners of mobile devices have access to all the tools necessary to access and create information that can be published over the internet. Also, as the Economist Intelligence Unit (2009) reported, technology companies will cease to invest in laptops and shift their research and development funds to smartphone research.

The congruence between all these factors leads this researcher to believe that the smartphone, due to its increasing capabilities, will become the laptop of future generations and that it could offer a vast area for educational research.

Research setting

Tohoku University policies require undergraduate students to undertake two years of English studies. In addition, the university requires that the same course be made available to all faculties, but each class must be made up of students from the same faculty. It is up to individual students to select their preferred courses.

The sample selection and size is affected by students' preferences. Structured as case study research, it was decided that all responses and performances would be included for analysis, as this would bring out extreme cases. That is, examples of participants that either underperformed or performed beyond the norm.

Previous cell phone-focused studies were conducted in Tokyo, Japan's capital city (see Stockwell, 2010, or Ito & Okabe, 2006, for examples) and in Osaka, the business capital of Japan (see Thornton & Houser, 2005). Conducting a cell phone-focused research in a non-major capital city was perceived as appropriate as it offered a different view on the use of cell phone technology. Conducting research in Sendai and at Tohoku University enabled the researcher to evaluate the findings of previous research from a different angle. Since the students coming to Tohoku University were from different cities, it would be possible to observe if their behaviour differed from that of students located in Tokyo or Osaka.

Communicative English is an official university accredited course offered to all second year students. There are no prerequisites to participate in this course, but the course description makes it clear that the course does not focus on grammar or writing. Its primary purpose is to provide students with an opportunity to speak and to express their opinions in the target language.

The researcher had no control over the sample size and distribution. This was not a flaw in the research; on the contrary, it increased the reliability and validity of the project. Based on this researcher's experience and communication with colleagues teaching in Japan, it appears that it is normal for university undergraduates to select their courses. Thus, the sample selection is reflective of normal Japanese university protocols.

Project design

The project applied a basic research method for structuring the project, and collecting and analysing the evidence. Findings from Leijen, Lam, Wildschut, Simons, and Admiraal (2009) and Strand, Fox-Young, Long, and Bogossian (2013), support the decision for a simple case study research method. Strand et al. (2013) required Australian nursing graduate students to use a flip camera to capture their internships at various hospitals. In Leijen et al.'s (2009) case, undergraduate dance students had access to a digital video camera to record their dance practicum. In both cases, participants used the technology to collect evidence of their performances for self-evaluation purposes. Both studies also applied a task-based learning approach. Their findings concur with findings from this research that video cameras afford students great learning opportunities.

There seems to be a common interest by researchers to design and develop controlled learning environments. Stockwell (2007, 2008, 2010) presents a progress report for developing a Moodle learning environment for cell phone learning. Nah, White, and Sussex (2008) report on students' satisfaction with using a wireless application protocol (WAP), which is a website where students can access listening resources and interact. Leijen et al. (2009) utilised DiViDu as video repository software for students to access, and Strand et al. (2013) relied on an LMS to collect and store participants' videos.

In contrast, this research maximised the use of internet-based systems to store participants' cell phone videos. Setting up an email account enabled learners and the teacher to communicate more directly via this channel. In addition, having all the videos stored on an email account allowed the teacher to catalogue the videos in terms of weekly productions. This facilitated students' retrieval of the videos.

The findings from this research indicate that using a simple email account was sufficient to allow students to send and store their videos in a secured environment, where their peers could retrieve the audiovisual files to write the transcripts and upload them on the email account for peers to view.

Mobile learning with cell phone technology is not about creating a controlled learning environment. Mobile learning is about using available internet sites for interaction and sharing audiovisual resources that can be used for further learning.

Students and cell phone subscribers can create their cell phone video recorded performances anywhere and at any time and they can select which site they would like to share these video resources. Mobile technology and social networking sites available on the internet provide learners with an array of places to display audiovisual files that reveal and/or create their identity to the general public.

Research method

The research was designed in three stages. First, research was conducted with a group of nine advanced English learners. These students had to produce cell phone videos on self-selected issues pertinent to their daily lives. These videos were uploaded to the internet on the DailyMotion video storage website (Gromik, 2009a). Structured as action research, students commented on their experiences with creating videos, expressing their opinions in the target language, and uploading their videos on public medium. This feedback was instrumental in developing a new project on a larger scale.

Another study included 70 Japanese low-intermediate English learners. First, there was an issue of privacy, as defined by the Japanese government, and second there was an issue with the sample size. These problems prevented the researcher from requesting students to upload and exchange their videos online.

Because not much was known about integrating cell phones in the Communicative Language English class, the above pilot studies were structured as action research. Student-teacher interaction was sought to increase the understanding of the possibility of undertaking such a project.

Based on the findings from prior research, the final study investigated the possibility of using an email account as a storage location for the videos. In addition, it was decided that a case study would be a better fit than action research, because both the teacher and students would be observed, their performances would be analysed individually, and none of the findings would be conclusive. As Ouspensky (1950) explained, life is not finite and neither is research.

Since there were two prior studies conducted before this current project, it was anticipated that minor limitations had been addressed. Also, because some of the findings were published, the research and data collection methods have benefited from collegial scrutiny, thus improving validity and reliability of findings.

Data collection

The data were collected from four sources: the pre- and post-intervention surveys, the weekly diaries, interviews and observations, and the cell phone video performances for each participant (see also Leijen et al., 2009 and Strand et al., 2013 for a similar method). The mixed-method for data analysis was included as part of the case study research in order to determine whether converging evidence might offer more insight into students' performances. It was anticipated that collecting a range of evidence would offer a better approach for reporting evidence from extreme cases. The point of utilising feedback from extreme cases was to compare and contrast their experiences against the norm, and then be able to present the variables that make their experiences extreme. As Yin (2003) explained, it is only after the norm has been identified through larger study analysis that individual experiences can emerge and be understood.

Data analysis categories

The data collection method and the data analysis section relied on the literature available at the time to determine the best data collection and analysis method used for similar research. Based on the review, the data were catalogued and analysed with the IBM SPSS software.

The data analysis applied both descriptive and inferential statistical techniques to extrapolate results. While some of the findings were reported in a chronological order based on the data collection method, the more in-depth analysis was based on trends in responses emerging from the analysis.

The literature did not provide strategies for dealing with missing participant responses. This was not anticipated and was a challenge for the analysis process. Since the researcher had no control over the selection of participants, there was also no control over their participation in the project. As stated previously, not all students were able to complete all the video performances. Listwise data analysis is a statistical technique that enables the researcher to keep participants' responses. By keeping all the students' responses and performances, it was possible to observe which students did not fully participate and observe the influences that may have contributed to their reduced participation.

Removing them from the analysis would have been a grave violation of case study research. Extreme values are both students who participate beyond expectations as well as those that do not wish to perform at all but still respond to surveys.

Discussion

This section discusses the findings. First, it answers the research question and then it supports this answer by discussing the most pertinent results. The discussion presents the findings in contrast to the current literature and attempts to present new explanations to support the proposition that the cell phone video recording feature is a suitable language learning tool.

Research question

"Is the cell phone video recording feature a useful language learning tool?" Evidence collected from both the students' weekly diaries as well as the post-intervention survey responses revealed that, based on students' experiences, the cell phone video recording feature was a useful tool for language learning.

Participants also indicated that, while at the time of the project-based task the cell phone screen and speakers were not sufficiently developed for viewing the final audiovisual students' performances, they perceived that in the future the cell phone video recording feature will be much improved and will make the task more conducive to enhancing speaking abilities and skills.

Proclaiming the cell phone video recording feature as the cause for the students' enhancement of their speaking skills would not provide a precise reality of this phenomenon. To reach a more conclusive understanding would require inferential analysis.

Pre-Intervention Survey: Discussion Concerning Access to and Perception of Technology

The data regarding access to technology revealed that only four percent of the students did not have access to a computer. While Guy's (2009) research was conducted in the US, her findings concur with this case study's findings that the majority of students have increased access to technology ranging from desktops to more mobile devices.

Wang and Higgins (2006) reported that, based on their limited sample, "22 students had not yet figured out all of the functions of their mobile phones" (p. 11). The findings from this pre-intervention survey revealed that all 67 students had an opinion about all the features available on their cell phones

and were able to rate these in terms of preference. It is true, however, that some students did not know where the information concerning the memory size of their cell phone was located (46%). But as some students reported in the interview, they could easily access this information from the cell phone's manual. Evidence also seems to suggest that since students do not receive cell phone operation training from vendors, this could explain the reason that some students may not be fully aware of their cell phone features. Discussions with peers and relatives were the most used method for learning more about phone features.

Wang and Higgins challenged Thornton and Houser's (2005) claim that "99% of the participants reported sending email on their mobile phones" (p. 11). The results from this case study indicate that 100% of the students send emails from both their cell phones and their PC; Fujimoto (2012) reports that 90% of the participants send SMS messages. Data from the Japanese Ministry of Internal Affairs and Communications (MIAC, 2008) indicate that this society has full access to both technologies.

In addition, Wang and Higgins (2006) stated that a reason that could have influenced Thornton and Houser's (2005) findings is the fact that 100% of their students were female. In this research, 88% of the students were male (n = 59) and 12% female (n = 8). There was no statistical difference between male and female participants in terms of access to and experience with technology. Males and females appeared to be sending the same number of emails per day.

Since Wang and Higgins' writing in 2006, it would seem that cell phones have become widely affordable so that they could be easily accessible to the population at large. While the literature review indicated this to be accurate worldwide, Walsh, White, Cox, and Young (2011) observe that this worldwide adoption is also the case with young Australians.

However, having access to a mobile device does not mean that the technology is advanced and that students will use it for educational purposes. Guy's (2009) study revealed that 77% of the participants never used mobile devices to study, and Fujimoto (2012) reveals that only 20% of the participants had used their cell phones for learning purposes. The findings from this research concur with Guy's data, and thus this research proposes that further investigation in the area of student training with cell phone use for educational purposes be conducted.

Rating of cell phone device

In their article, Wang and Higgins explain that in 2006, the technology was not suitable. They identify areas where cell phones are experiencing limitations (such as in tunnels or elevators). Okabe and Ito (2005) and their respondents, do not seem concerned about these limitations. On the contrary, Okabe and Ito's respondents use the technology to its fullest capability by taking photos with the camera feature to document their daily life, a phenomenon that has exploded on a global scale. Hence, subscribers are able to take photos and email them directly, without the aid of a PC, to their peers. But Wang and Higgins' point is still valid today, and students' perceptions of the limitations of the cell phone video was addressed.

The findings from the pre-intervention survey concur with Haverila's (2012) findings. For both the Finnish students in Haverila's research and the participants in this research, texting and calling were

the most highly appreciated and used features. Similarly, both Finnish students and participants in this case study did not make use of the video recording feature to its full potential. After completing 13 cell phone videos, the participants in this case study rated the feature favourably. They thought that the technology was either of high or good enough quality to undertake the project. However, correlation analysis indicates that cell phone improvements could increase students' perceptions of the quality and suitability of the cell phone as a learning tool. This will be discussed at a greater length later in the post-intervention survey section.

As Wang and Higgins have explained, it can be argued that in 2005 and 2006 cell phone technology may not have been suitable for mobile-learning. However, since then researchers have made some headway and provided substantial evidence that learning with a cell phone is now suitable. The learning methods that can be suitable for mobile-learning remain to be explored. After all, at the beginning of this research a minority of the students (40%) did not agree with the idea of studying with their cell phones. By the end of the project, however, 79% of the participants had agreed with studying English with their cell phone.

Prior experience with technology and knowledge of target language is no longer a predictor

The first hypothesis states that prior exposure to and knowledge of the target language as well as prior experiences with cell phone technology do not affect technology endorsement by students. Addressing this hypothesis is important since some critics might argue that if students rated any of the skills highly because of their prior knowledge and experiences, then the results could be contaminated and jeopardise the investigation.

English education background effect on pre-intervention survey responses

The evidence revealed that there were no significant correlations between prior educational background and students' rating of reading and writing skills as not important skills to develop. The evidence did indicate some significant interaction between prior educational background and students' positive rating of speaking and listening skills.

Among all the possible inferences that can be deduced from the above observation, two methods have offered some potential explanations. First, students' responses during the interviews indicated that studying English was a university requirement. In addition, some students indicated that they had enough experience writing, reading, and translating studies, so they wanted to challenge and improve their speaking abilities. Second, based on the investigation of the research site and this researcher's experience teaching in Japan, it was revealed that in general during the students' six years of English exposure, the majority learn to read, write, and memorise grammatical points and lexical items. Therefore, when offered a chance to learn communicative skills, these students will most likely rate these skills more highly because they want to make sure that the teacher knows their educational objectives.

MEXT established the Japan English Teaching program in 1978 with the aim of inviting native English graduates to teach in Japanese classrooms. It is possible that some students made an association between their prior experience learning with a native English teacher and rating speaking and listening as important skills to develop. It is also possible that, since the teacher in this project is a native English speaker, students may have wanted to indicate their learning intentions.

Prior experience with technology effect on pre-intervention survey responses

It might be redundant to reiterate the same point but, again, analysis of a potential relationship between prior experience with technology and students' responses on the pre-intervention survey was conducted to observe if these might indicate a bias towards students' endorsement of learning with technology. Some critics might argue that because students are familiar with cell phones, they may indicate a preference to learn more about this tool.

The evidence analysed suggests that there is no significant connection between students' age at which they had access to technology and their experience with it. This would seem to indicate that students with early access to a cell phone had similar experiences with using the technology as their peers who accessed a cell phone at a later stage of their life. In addition, age was not an influential factor for students' indicating a preference to learn with their cell phones. Such evidence could suggest that students with a longer history with cell phones did not necessarily have more experience with cell phones and this did not motivate them to want to investigate the potential of this technology further.

Studying English with a cell phone

There was a disparity between students who wanted to study with a cell phone and those who did not. However, based on students' feedback, it appears that students could provide informative responses. Without prompting and based on their experiences, some students could identify positive reasons for studying with a cell phone. Not only could they learn more words (as researchers such as Thornton & Houser, 2005 or Kennedy & Levy, 2008 have anticipated), but students understood that the mobility of the cell phone allowed them to study at anytime and anywhere, that the design and features of a cell phone could empower them to learn more on the move, or at least in locations away from institutional premises.

This research revealed both negative and positive responses about studying with a cell phone. The negative responses provided informative evidence. Students stressed that cell phones are private tools that should provide access to entertainment and communication (as per Wang & Higgins, 2006 findings). In contrast, by the end of the course, after learning English with a cell phone, students were able to provide a positive range of options for using cell phones as learning tools. They mentioned that it might be possible to study or complete tests from home. The project enabled them to visualize other learning applications for cell phones and to think of future possibilities for learning with cell phones.

Students' prior exposure to the target language influenced their decision to want to learn to improve their communicative skills. Their experience with technology did not indicate any significant differences that could alert to a potential bias among the students. Combining prior target language knowledge and prior cell phone experience as influential predictors over students' likelihood of wanting to study English with a cell phone did not reveal any significant relationship that could indicate a bias among students.

The literature review revealed that researchers seldom conduct surveys to collect information concerning participants' prior knowledge and experiences with technology. Collecting such information is essential to research as such evidence can validate or disclaim any prior technology experience influence on the participants' ability to perform a specific task or to behave in a certain manner. The findings from Strand et al. (2013) concurred that in some cases there is no correlation between demographic background and ICT expertise. Similarly, the evidence collected for this research revealed that there were no significant differences between these particular groups of students and that they responded to the questions based on their personal interest. It could also be concluded that students did not answer the questions to please the researchers, instead their answers were genuine reflections of their opinions.

It must also be pointed out that the affordable access to cell phones and their user-friendly operation system meant that the technology has passed the adoption test and received acceptance. As Okabe and Ito (2006) reported, kids, teens, young adults, housewives, and businesspeople all use the technology and all of its features to a similar extent and for similar purposes (see also Foster, 2009). Okabe and Ito's findings were corroborated with evidence from Italy, China, and Australia. Cell phone users and their wish to stay connected and share with friends and relatives their daily activities would suggest a high acceptance of the technology and therefore using it would have little influence over outcome.

Learning Strategies and Production Process from the Weekly Diaries

The research question asks: "Is the cell phone video recording feature an effective language learning tool?" To determine the effectiveness, it is necessary to analyse students' use of the video feature to produce an audiovisual performance. The identified variables were preparation time and recording sessions. These time markers were not used as indicators that some students were better than others. Nor were these time markers an indication that producing a video was a race. Instead, these were used to observe students' general production process, and to understand if the technology was helpful or a hindrance. For both of these variables, students ticked or circled the appropriate number on the weekly diary to indicate the amount of time spent preparing their videos, or the number of attempts made before achieving their best performance.

Preparation time

Preparation time indicates the full amount of time needed to prepare the whole video, from writing a script to finishing the final best performance. It was assumed that the shorter the amount of time, the faster students would be at preparing their videos. As the findings revealed, this was not necessarily correct, since some students did not need to prepare anything, they simply spoke more spontaneously. These particular students had improved to the extent that they no longer needed to write a script. In addition, some students who perceived this activity as not useful or as impinging on their personal time finished their videos faster than more studious participants.

The evidence revealed that in the beginning, students may have been unfamiliar with the video production process and that their lack of practice in accessing their prior knowledge and skills with the target language may have slowed them down. Over time, students were able to reduce their average preparation time. The evidence also indicated some correlation between theme and preparation time. It would seem that if the theme was challenging, such as "How will you improve your next speech?" then students needed more time to prepare. By contrast, with less challenging themes, such as "Describe your favourite shop in Sendai," students required less preparation time.

The overall evidence does not provide conclusive findings. Comparing preparation time between T1 and T2 reveals the Engineering A group needed more time to prepare their videos compared to the other groups. This may be reflective of either the students' target language abilities, or that they wanted to do their best with each production opportunity.

By comparison, the other three groups (Arts & Letters, Law, and Engineering B) were able to make significant improvements. They were able to reduce their preparation time over the 12-week period. This could mean that they were able to understand the production process or they became more effective with creating a script and speaking in front of their cell phones.

Recording session

The recording sessions indicated the number of recordings attempted before achieving the best performance according to a student's abilities. The purpose is simple enough and it aimed to collect the number of attempts for producing a final product. Making more attempts to create the perfect video was not necessarily an indication of students' inability to speak. On the contrary, making more attempts could also indicate that a student reviewed the video to observe if there were any errors, such as verbal or visual errors. It might also be an indicator that students became more aware during the speaking phase, and that they were able to recognise when they had made an error. Recording sessions indicated that students may have noticed some errors and they decided to stop or re-record a video in order to improve their performance. Then again, some students may have decided that re-doing a video would require more effort on their part and these students may decide that the first attempt was the best they would be willing to do.

Between Week 2 and Week 4, most students were able to reduce the number of attempts before achieving a satisfactory result. However, what is also apparent is that students' reported attempts of recording sessions are erratic. For example, at Week 7 (Describe your favourite shop in Sendai) students needed few attempts to record their performance, compared to Week 8 (Describe your favourite painting) at which point students needed more recording attempts before producing their

best videos. There does not seem to be any major difference between the themes, and yet students behaved differently.

It could be argued that students are more familiar with food and coffee shops than they are with art. It also could be suggested that coffee shops do not require the use of extensive vocabulary or grammatical structures to convey liking or disliking a particular venue, compared to describing a picture which may require more intricate details.

The total recording session average indicated no significant differences between T1 and T2 for the Arts & Letters, Law, and Engineering A groups. By contrast, the Engineering B group was able to make significant progress with reducing their recording attempts between T1 (n = 7) and T2 (n = 4.5). This would seem to reveal that for this particular group, regular practice was beneficial in gaining control over the number of recording sessions needed to achieve a satisfactory performance.

To understand the reasons that may cause such erratic behaviour with preparation time and recording sessions, it is necessary to refer to the other preparation elements. Students used strategies to prepare their scripts and to remember their speeches. Data for these strategies were also analysed in relation to the themes. The purpose was to observe if different themes engaged students to use different strategies.

Strategies

There were four different strategies associated with video production. Strategies to prepare a speech or script attempted to understand whether or not students were able to speak spontaneously or if they needed to write a script to assist them. It also aimed to identify whether or not students wrote their script in Japanese first or directly in English.

Strategies to improve speech production referred to students' use of certain strategies to help them improve their speeches. In their attempts to speak in the target language, did students try to improve the audio or the visual element of their performances? It was anticipated that over time students may select similar strategies to improve their speech.

Strategies to remember the speech denotes that students used certain strategies to speak without reading their notes. There are many strategies suitable for remembering a speech and it was assumed that over time students would be able to find a strategy most efficient for them.

Error identification refers to students' ability to notice speaking production errors. If students are able to notice their errors and to identify the type of error they are making, then it is hoped that these students gain a better understanding of their speaking abilities and in the long term they would be able to improve their skills. To improve they would need to recognise their errors.

All the strategies were coded from least effective to most effective or more refined strategy. For example, a student indicating that they did not notice any errors would indicate that they did not pay attention to their pronunciation or that they did not recognise any potential grammatical errors. Students able to notice their errors or to identify certain strategies demonstrate a higher degree of mastery over their speaking delivery.

Preparation strategy

To prepare, students could write their scripts in Japanese first and then translate them into English with the assistance of a book or a friend. They could write in Japanese and then translate the scripts without any assistance, or they could write them directly in English. Students could also indicate that they did not prepare a script, preferring instead to speak spontaneously.

The strategies were coded from 1 (no strategies used) to 5 (speak spontaneously). On average during the lifespan of the project, students mainly wrote their script in Japanese and translated it in English with the assistance of either a book or a friend.

There does not seem to be any consistency between the groups. While the preparation strategy is on average the same, students' choice between writing their script in Japanese and then translating it into English cannot be linked to the challenge of the theme. For example, the theme for Week 6 "How will you improve your next presentation?" would seem to be more demanding than the Week 7 theme "Describe your favourite coffee shop." Yet while both the Engineering B and Arts & Letters groups indicate a small shift from direct translation with a textbook to translation with the help from a friend, the Law and Engineering A groups do the opposite, shifting from what seems a more advanced strategy for a harder task to a more basic strategy for an easier task.

Nonetheless contrasting the evidence at the beginning and the end of the intervention, the conclusion is that at T1, students were more likely to translate their scripts directly from Japanese into English. At T2, respondents indicated using a dictionary or working with a friend. This slight shift would indicate that students may feel more confident working with peers as opposed to working independently. This is a positive outcome, because while during the weekly activities, students shifted between strategies, overall, through the regularity of producing cell phone videos, students did gain more confidence to work with peers and to attempt to speak with limited reliance on their notes.

Speech memorisation strategies

The weekly diary provided students with a range of memorisation strategies from which to choose. They could also add their own. All the strategies were coded from 1 (no strategy used) to 9 (speaking spontaneously). Students did not add any strategies to the list.

The few students who indicated speaking spontaneously reported that they thought about the content of their speech first, after which they made a first attempt which they reviewed. If there were no major errors, they would send it to the email account. If there were any noticeable errors they would attempt to improve their performance.

The evidence collected indicated no difference or attempts to shift from memorising their speech alone to more spontaneous speaking abilities between T1 and T2. Some students indicated practising many times.

The data also revealed that while culturally Japanese students do not like to lose face in front of their peers, and this may have motivated students to memorise their speeches alone, others worked with peers. The video evidence and the data revealed that some students formed work teams to help them with either the video recording process or to assist them in remembering their speeches.

Strategies used to improve speech

In relation to the strategies students reported in their weekly diaries, it is noticeable that students explored a wide range of strategies. The strategies used the most were to practise many times and to speak clearly. Next were speaking fluently and improving speaking speed. Because the task required students to produce an oral video performance, it is obvious that they would put a greater effort into attempting to improve their speaking abilities. Since peers were required to listen to the files, it is also understandable that students would attempt to improve their speaking clarity and flow. Students self-selected the strategies that they anticipated would improve their speaking abilities, and the video feedback might have given them some samples of areas that they needed to improve. Patil (2008) suggested that providing students with opportunities to improve their speaking skills was paramount, as this would reduce students' fears of error production. It would seem that the video production task and the listening task both provided students with confidence, and this may have motivated them to invest more in improving their speaking fluency and speed.

While it would seem that all the students selected similar strategies to improve their speaking styles, their use of strategies differed each week for each theme. Nonetheless, the evidence suggests that students are questioning their previous use of these strategies and attempting to define new strategies that are more useful and conducive to improvements as defined by them. The need to improve certain aspects of their speaking styles is not imposed on them by the teacher, but by reflecting on the viewing of their peers' videos and from their conversations with peers who viewed their performances. As Ohlsson (2011) explained, belief about personal abilities is usually an abstract concept that requires a person to replace prior belief based on previous or current experiences. This is a gradual process (p. 294). Teruya (2006) noted that language learners already have prior experiences with their first language and can therefore juxtapose this knowledge to establish a new model of meaning construction in the target language. The visual reality created by the video engaged the students to reflect on their prior beliefs about speaking skills and to question their usefulness in terms of their efficacies to allow them to achieve an improved performance.

Error identification

The data revealed that in some cases, the students were not able to identify errors. Either the students did not produce any errors in certain videos or they were not able to recognise the errors they had produced. Students' inability to be aware of errors would suggest that they may have an insufficient prior knowledge of English grammar. In the case of this research, it is unclear whether or not students' prior language exposure influenced their inability to recognise their errors. Nonetheless, the data indicated that in the beginning of the project, students were more likely to select "no visible error." However, with more training, students began to notice errors. Hulstijn (2001) explained that implicit retention occurs either during task completion or during test taking, which would engage intentional or purposeful retention. It could be argued that the task of producing a script, a video performance, and the opportunity to review the performance may stimulate students' implicit as well as intentional retention.

The types of errors students were most likely to recognise were pronunciation and fluency. The next type of error they noticed was grammatical errors. It would seem that students assumed that since they had written a script, then their speech would be free of grammatical errors. However, upon closer scrutiny they realised the existence of such errors.

It would seem obvious that students would identify significantly different errors from their peers, since the task was an individual performance and was dependent on personal preference. However, the evidence collected over 12 performances does seem to suggest that as students learned to control external variables, such as recording time and background noises, they were able to focus more on recognising and correcting more advanced errors. More advanced type errors were categorised as pronunciation, grammatical errors, or pausing effectively.

The evidence presented confirms that there is a correlation between visual and audio cues and error recognition. The video production process presented participants with an opportunity to reflect on their prior knowledge to recognise potential errors, to correct these errors, and to change their production strategy in order to reduce the appearance of these errors in future videos.

In terms of technical errors, some students became more critical of the locations they selected. They were able to identify the influence of background noises or poor lighting. As they gained more confidence, some students began to explore new locations for recording their speeches. Some selected their preferred location based on their need for privacy, such as near a river, while others selected the location to match the storyline, such as in a bookstore. These findings would seem to concur with Uzunboylu et al. (2009) who assert that due to the project, their participants became more alert when observing environmental degradation. Similarly in this research, students became more aware of the suitability of film location selection and the best use of the technology to produce appropriate videos. However, at the time of writing, literature regarding the influence of location selection over narrative performance to enhance acquisition is not easily accessible and could be an area for further research.

Summary of production process

Students created 13 videos over a 14-week course. The average amount of preparation time for each video was reported to be 31.63 minutes with the lowest amount of time being 14.58 minutes and the highest preparation time being 72.5 minutes. The average total amount of time students spent

preparing their videos was 72 hours of homework over 14 weeks. Simple skills, such as tying shoelaces, can be acquired with practice in a few hours. However, Ohlsson (2011) explained that learning high level skills, such as flying a plane, require 10 years of training. The point being that, "expert performance cannot be reached with less than this amount of practice" (p. 256). Ten years may be a long time, but this learning period emphasises the theory of lifelong learning.

Without belittling these participants' 72 hours of learning in comparison to 10 years of intensive training, it must be highlighted that, in contrast to general communicative activities conducted in class, these students received a well-rounded learning task that required them to write a script, evaluate its content as well as its grammar, to practise and remember the script, to reflect on the idea expressed, and to review their audiovisual performances. The learning benefit for students was that all these activities were conducted in the target language.

The production process evidence also seemed to suggest that due to the regularity of the task, students were able to develop self-management skills (Rubin, 2001) and metacognitive strategies (Wenden, 1999). These strategies are used by students to plan, revise, and appraise their learning (Wenden, 1999). The variables selected as part of the production process may have led students to become more aware of their learning goals, strategies, and performances, thus enhancing their speaking skills and abilities.

In conclusion, the production process revealed that students made use of the various strategies available to them to improve their speaking ability and this may have led to a positive perception of the use of the cell phone video recording feature. In addition, students identified the use of this feature positively because, apart from assisting them in reviewing and reflecting on their performances, the video evidence provided them with feedback on their ability to speak. What ensues is a discussion of students' oral performances.

Linguistic Improvements

Overall Words Spoken

Once the video was transcribed, students' output was analysed in terms of words spoken per second and the range of vocabulary used during the speech. The data for words spoken per second indicated that students were able to speak more words per second at T2. This indicates that students were able to speak faster. They had more control over their speaking ability. The increasing speed did not affect pronunciation. The evidence also revealed that there was a correlation between the difficulty of a theme and the speaking speed. Students were more comfortable speaking faster on topics that were familiar to them or within their linguistic range. The overall data confirm that over time, more regular practice was conducive to improving speaking speed.

Lexical item analysis

Upon entry at the university level, little is known about the vocabulary knowledge students have acquired over their schooling term (Kawauchi, 2006). For this reason, analysing students' vocabulary range was not deemed necessary at this stage of the research since it would not indicate if students

were able to progress. It is apparent that students would be creating individual scripts and therefore the likelihood of similar speeches being produced is unlikely. Thus, it was anticipated that the selection of lexical items would include a wide range of words and that all word selection would be a rather objective task, and may not relate to class content.

Analysing the types of words students used seemed more fitting with the objective of the research. If students were to shift from explaining simple ideas to expressing complex opinions (Cummins, 1984), one possible option for observing this shift was to observe the types of words they used, ranging from K1000 to K2000 and possibly words from the AWL (Cobb, 2011).

K1000

K1000 words are 70% of all lexical items required to maintain a basic conversation (Cobb, 2011). The evidence suggests that there was no significant difference in the use of K1000 words between students and groups. The mean at T1 was 34 K1000 words used compared to a mean of 41 K1000 words at T2. The analysis of variance indicated that all students were able to increase their use of K1000 words. As anticipated, the themes engaged the students to objectively select words that best fit their needs to enable them to effectively express their opinions. Over the length of the term, it was apparent that students were beginning to use more K1000 words to express their opinion. It would be expected that as students become more confident in communicating their ideas, they should be able to speak more words to express their opinions fully. The data seem to confirm this inference. As students became more proficient at speaking, they used more words to explain their opinions more clearly.

K2000

While it is apparent from the data collected that students were able to increase their use of K1000 over 13 weeks, the use of K2000 words (or the 90% lexical items to express more complex thoughts) was more dependent on the theme students had to address. Similar to the K1000 evidence, students shifted from a mean of 2.97 of K2000 at T1 to a mean use of 4.82 at T2. This would seem to indicate that as students became more confident with their speaking ability and their use of K1000 that they began to use more advanced words to express more complex opinions. The evidence collected confirms this deduction. Theme 3 “What did you do during Golden Week,” 7 “Describe your favourite shop in Sendai,” and 10 “Describe your favourite invention” motivated students to use more K2000 words. These three themes required students to discuss issues with which they were familiar, and this may have prompted them to feel more confident using more advanced lexical items.

Academic word list

According to Cobb (2011) the AWL includes academic words needed to understand academic texts and communication. The evidence revealed that at the beginning of the project, students did not use many academic words. The data were stagnant for the first three weeks, revealing that students relied mainly on K1000 and K2000 words to express their opinions. The AWL data indicated that students used a varied range of AWL lexical items, which was expected.

What is apparent is that the use of AWL increased drastically depending on the theme students addressed. For example, themes 5 and 9 revealed the highest correlation between use of AWL and theme. Theme 5 encouraged students to evaluate their peers' opinions in their class speeches. Theme 9 encouraged students to present their ideas for how to save the environment. It could be assumed that these two themes in particular engaged students to use more AWL items in order to express their ideas more succinctly. The last three themes also engaged students to increase their use of AWL items. Therefore, while at T1 students used between 0 and 4 AWL, at T2 they used between 0 and 9 AWL items. Although this is not a significant increase, it must be pointed out that those students independently selected AWL lexical items to be used in their speech. The evidence also suggested that students reflected on the content they produced and that they spent time selecting specific words, thus the task engaged the students to investigate lexical items, a task not directly set by the researcher, and thus revealed independent learning strategies. For such a scenario to occur, it indicates that the themes were within the topic familiarity and lexical range of the students.

The fact that students were able to increase their use of K1000, K2000, and AWL words indicates that the project design was conducive to good learning, that students either possessed a wide vocabulary range or they possessed the necessary study skills to improve their acquisition of lexical items. Davis (2004) and Hofer and Swan (2006) suggested that digital storytelling motivates and engages students to share their opinions with their peers. Since all participants were required to view their peers' videos, this may have motivated them to use more appropriate lexical items. Hofer and Swan (2006) add that technology gives students the opportunity to voice their opinions. This seems to concur with students' perceptions that the cell phone was a suitable tool to enhance their speaking abilities because it gave them an opportunity to share their opinions with their peers.

Learner Perspectives from Post-Intervention Survey

The post-intervention survey aimed to collect students' feedback concerning their perceptions of the educational benefits of producing cell phone videos. The majority of students' responses indicated positive perceptions with the experiences. The responses were not all positive, thus it would be naïve to claim that the project was perfect. Below is a discussion of the results from the data analysis.

Perception of speaking experience

The survey responses from Collins and Hunt's (2011) study, report that the majority of their participants were able to perceive some improvement with their speaking confidence. Similarly, the data from this case study indicated positive results based on students' perceptions of their experience

of producing video performances with their cell phones. The majority of the students reported experiencing an improvement with their pronunciation, volume control, speaking speed, fluency, and pausing as well as beginning to master the ability to speak without notes. Based on the evidence collected it could be suggested that producing and reflecting on the video performance enabled students to notice areas for further improvements. In addition, students indicated that viewing their peers' videos did enable them to reflect on various speaking styles. This finding concurs with Kay (2012) whose literature review revealed that students perceived podcasting positively because of "the excitement of producing video podcasts for their peers" (p. 824). Also Kay reports that the literature indicates that students "believed that video podcasts helped build connections with the instructor and other students" (p. 824). Therefore, the conclusion from the responses of the participants in this study confirm that they thought their English speaking abilities had improved due to regularly producing and viewing cell phone-based video performances.

Perception of technology

By the end of the project, participants believed that the cell phone screen was too small to view videos, and that the quality of the audio was poor. However, these students also reported that learning to speak with the cell phone video recording feature was better than learning with other types of technology. By the end of the project the majority of participants agreed that they had improved their familiarity with using the cell phone video camera feature and that it was easier for them to produce a video with a cell phone. However, they were of the opinion that producing cell phone videos in the target language was not as effective as speaking with a native speaker.

Perception of the themes

Respondents were asked to rate the themes. All themes received positive ratings. At the time of completing the weekly diary some students did not feel that they had had a positive experience. After reflecting on the overall project, students thought that all the themes were reasonable and within their grasp of general knowledge.

Research and literature on the topic of speaking activities stipulates that the best teaching method is to engage students to discuss authentic issues that are directly related to their social experiences. In addition, it is best if the issue to be addressed is within the range of their linguistic expertise (Nunan, 1988). Students' performances revealed that the design of the project had the students' best learning outcomes in mind. The project was within their reach, they were provided with sufficient time to complete the task, and to produce the video. Therefore students' perception of the themes was positive because they could manage discussing the issues in the target language. This in turn enabled them to become more confident. Mak's (2011) research on the issue of speaking anxiety-reduction concurs that time for reflection and preparation is paramount for students to be able to gain speaking confidence.

In conclusion, research conducted with cell phones has attempted to create moments of learning regularity beyond the classroom settings. Thornton and Houser (2005) attempted to expose their

participants to lexical items on a regular basis. Similarly, Stockwell (2007, 2008, and 2010) analysed his participants' regular use of cell phone technology to learn more lexical items. But these studies focus on independent decontextualized lexical items that may have no connection to a student's experience at the time of learning. Instead, by providing students with topics for discussion and a project-based learning approach, it was anticipated that they would be able to consolidate their speaking skills.

To concur with Thornton and Houser and Stockwell, the data and students' responses confirmed that completing the same task on a regular basis, in addition to regular Communicative English classes, does lead to an improvement in students' speaking skills. As Ohlsson (2011) confirms, the "adaptation of a skill through practice is necessarily gradual" (p. 257). However, unlike those authors' research foci, this research revealed that initially the participants had a general understanding of speaking skills as abstract rules and particular tasks that had to be performed in order to demonstrate the utilisation of these skills. Over time, with practice, reflection, and support, these participants were able to consolidate their speaking skills and the regularity of the task allowed students to benefit from the use of the cell phone video recording feature and the themes to practice and enhance speaking abilities.

When the cell phone video recording feature is embedded in project-based learning and relates to the learning outcomes, it is likely to empower students to use, reflect, and refine their skills and knowledge of the target language.

Theoretical framework

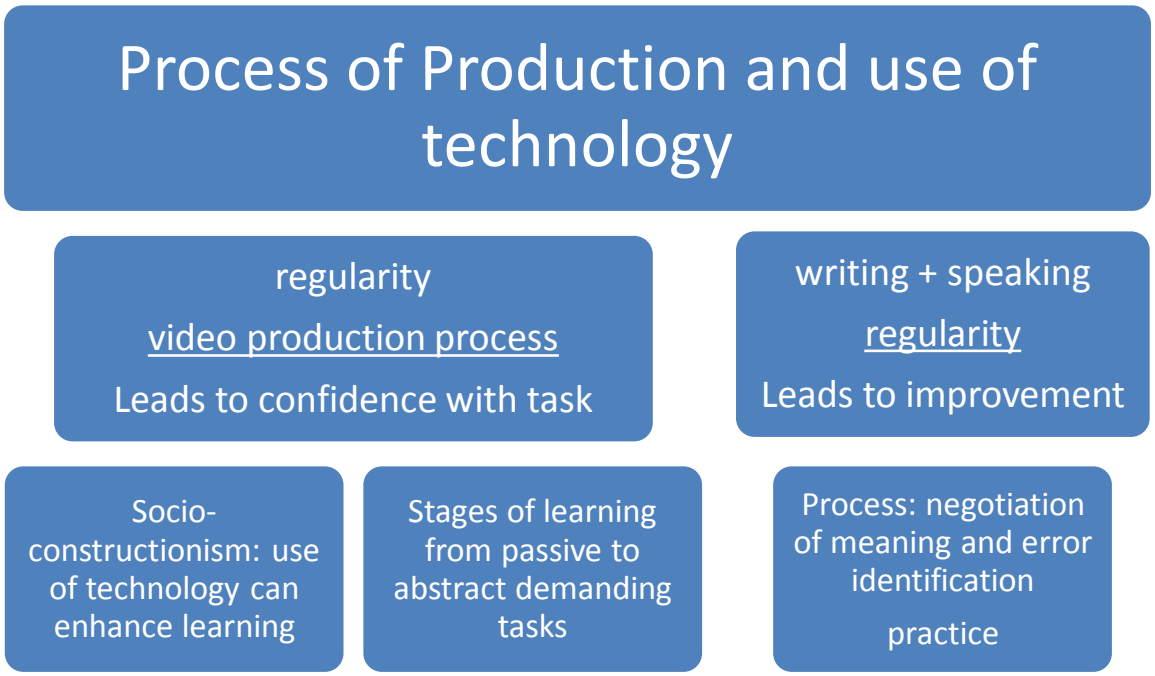


Figure 34. Video production process, learning activities and outcome

Socio-constructionism as a theory states that learning occurs when the learner consciously constructs knowledge through action, interaction and the use of objects (Papert, 1991). Learning occurs because production takes place, or as Papert (1991) asserts, "constructionism boils down to demanding that everything be understood by being constructed" (p.1). In this case, learning occurred because participants had to produce an oral performance about an authentic, real-life theme. The participants were able to deliver their responses in the target language by using the cell phone video recording feature. Reviewing the final product engaged the individual producer to reflect on his/her own oral performance. In addition, viewing peers' oral performances proved to be a motivating factor in improving participants' perceptions of good speaking styles with limited teacher directives.

The outcome of these participants' use of the cell phone video recording feature to record their oral performances concurs with Vygotsky's (1978) theory of socio-constructionism in the sense that it is with the use of a tool that learners are able to construct knowledge. It is also via interaction with peers that students are able to negotiate meaning and develop a new understanding, in this case, of language awareness and speaking skills.

It is the regularity of producing and viewing oral performances that enables participants to gain confidence and improve their presentation and speaking skills. Participants' feedback indicated that as they gained more video and script production familiarity, they also gained more confidence to speak in public spaces in the target language, which is something that in the past they were not able to do.

As stated previously, English communicative classes in Japan usually engage students to complete basic drill-based speaking tasks. They are seldom provided with the opportunity to speak spontaneously about a real-life issue. Cummins (1984) outlined a teaching and learning method that could enable students to progressively shift from low-level demanding tasks, such as completing drill-based speaking practices on a particular theme or for a particular context, to more demanding tasks. These more demanding tasks required students to rely less on visual cues to explain more abstract concepts. The whole concept of this project adhered to Cummins' model and the evidence revealed that some of the participants were able to shift from writing a script and producing their videos in the comfort of their domicile to producing spontaneous speeches in open public places. As students gained more confidence, they were able to realise their abilities and own the authentic process of their speech production. It could be speculated that through the regular act of speaking and viewing their performances and those of their peers, the participants were able to understand the purpose and use of certain lexical items and retain these for future performances.

Activity theory, a theory extended from Vygotsky's concept of mediation, can also highlight the reason for students' performances with the cell phone-based video production project. As Figure 35 presents, Engestrom (1999) designed a constructionism model that explained the process of learning.

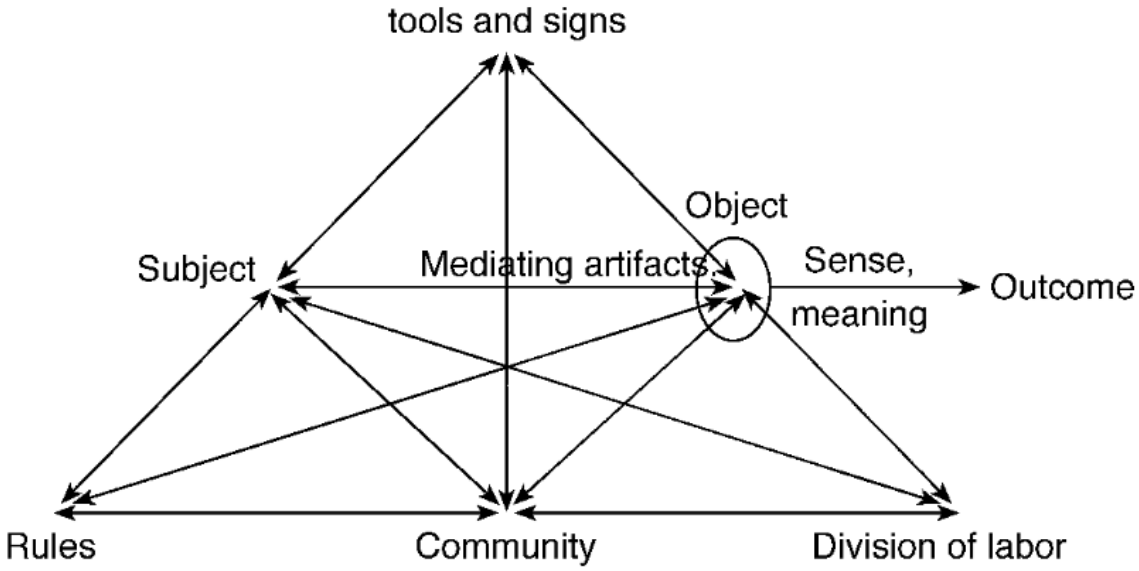


Figure 35. Retrieved from Engestrom (1987, p.78)

In Engestrom's (1987) model, the subject (learner) is part of a community that must perform a task which itself is confined within a set of rules. Through the use of instruments, in this case the cell phone video recording feature, the learners constructed language to create an object or outcome. The interesting aspect of this model is the "rule" element. First, the task sets the rules; however, as the students begin to own the video and speaking production process and share their performances with their peers, new rules in terms of language learning, speaking styles, and visual cues emerge. The rules are no longer bounded by the task, but are formulated by the students themselves. The "division of labour" refers to the classroom, task organisation, and roles that classroom participants will play during the learning process. In this particular project, the evidence suggests that the division of labour element appears later in the project. This is due to the fact that, in the beginning participants may not be familiar with each other, may not have the confidence to speak in the target language in front of their peers, and they may want to have more control over the video production process. However, once these students understand the speaking and video recording production process, they begin to form working groups. These working groups are formed either for video recording assistance or for moral support. The emergence of collaboration reinforces the language acquisition process because learners have more input by sharing and participating in the negotiation of meaning to improve the quality of their performances. Therefore, the establishment of collaboration rules and responsibilities increase, as students gain more confidence with their abilities to produce videos and oral performances.

For students to be able to shift to a more advanced, less text-reliant performance and to construct authentic target language output, they need to be encouraged to become self-reliant (Kinginger, 2002). From a language learning perspective, language awareness and acquisition is most likely to occur if the participants have creative input and control of the learning process (Kinginger, 2002). For both models, constructionism and Cummins' paradigm, meaningful language performance occurs because learning eventuates in a real context for the purpose of expressing an opinion, and the language challenges stimulate learners to explore new forms and structures (Swain, 2000).

The participants were able to explore new forms and structures because, as Wenden (1999) explained, they had an opportunity to plan, monitor, and evaluate their performances. These students were able to "manage, direct, regulate and guide their learning" (Wenden, 1999, p. 436). The task provided the participants with opportunities to face language challenges, to consider solutions based on their personal experiences or from viewing their peers' videos, and based on their experience with producing videos, they were able to "determine how to approach the task" (Wenden, 1999, p. 437; see also Rubin, 2001). Batstone (2002) extends on the language learning process by highlighting that the problem solving stage occurs because "learners begin to internalize information about language by converting some of their input into 'intake'" (p. 3). The projects' regularity of delivering a video performance enabled the participants to reflect on and solve any language learning difficulties, which in turn leads to retention and enables them to perform to the best of their abilities.

The language learning process was instigated by students' need to express their opinions on authentic issues embedded within real context. The fact that peers viewed classroom members' video performances was also a motivating factor for improving individual performances over time. Finally, the cell phone video recording feature was the tool that enabled students to share their performance with their peers. The whole learning process required students to have control over their learning development and to demonstrate improvement in their spoken performances. The regularity of the task gave them confidence to speak more spontaneously.

In summary, the concept of constructionism and activity theory, intertwined with Cummins' concept of target language speaking levels and language learning theory, makes it apparent that video production for delivering target language oral performances enables students to gain control of the digital device, to reflect on the most suitable location, speech content, and any needed paraphernalia to aid the visual cues, and to choose (based on certain preconceived ideas) the best performance in order to share the final outcome with peers and the teacher.

Chapter 7: Conclusion

Limitations

Amongst the three areas that require a researcher's attention, Yin (2003) states that construct validity is the most imperative. While the writing process and case identities are research features that a researcher should address, construct validity requires peer review in order to confirm the evidence presented (Yin, 2003). However, Yin explains that "even if you as a case study investigator, have followed most of the basic techniques – using a case study protocol, maintaining a chain of evidence, establishing a case study database, and so on – you still may not have produced *exemplary* case study" (Yin, 2003, p. 161); research limitations are unavoidable (Brutus & Duniewicz, 2012; Ioannidis, 2007).

As stated in the literature and in other chapters, this study received regular peer review, through presentations at international events and publications. While collegial feedback increases construct validity, it does not automatically produce exemplary research. This chapter identifies some areas that have led to limitations. These limitations are not presented as weaknesses, but rather to identify opportunities to present "alternative explanations of results" (American Psychological Association, 2001, p. 26).

Sample size

The research literature has not yet agreed on the perfect sample size number. Sample size depends on the method, the research questions, and aims of the study. Sample size can also be affected by environment, conditions, funding, collegial interest, and collaboration, as these variables could have facilitated the management of a larger research program. Nonetheless, since this is a case study, the sample size was appropriate and revealed sufficient evidence to determine the merit for utilising cell phone technology as a language learning tool.

Brutus and Duniewicz (2012) identify sample size as a limitation on internal and external validity. At the time these data were collected, the sample size was appropriate for this study's objective. However, once the data were analysed, sample size became a limitation since it prevented the application of linear regression analysis. Performing a linear regression was attempted and revealed some interesting results to add to the other triangulated data. Due to the small sample size of this research, the evidence could not be included, but these results could form the basis of a future investigation.

Contextualization

In their review of the literature on leadership, Brutus and Duniewicz (2012) observed that research locality influenced the ability to generalise findings. This study reviewed the literature most relevant to the Japanese education system; however, the findings from this context may not apply to other contexts. This being stated, it is possible to replicate the study in a different context and to gauge the influential variables based on the demographics of the context under study. For example, Gromik (2012) conducted a similar study with a sample size of eight participants at a university in the Middle East. While the findings were general, the conclusions drawn concurred that theme-based approaches were conducive to better speaking performances.

Delayed reaction

A more pertinent limitation concerns the data collection approach. The literature review was conducted in a timely fashion to provide a guidepost for the construction of the project. The data were collected in line with mixed research data collection recommendations. However, it was not until the data were analysed that understanding students' interaction with their cell phones triggered some epiphanies. For example, the interviews revealed that the majority of students kept their videos but did not watch them again. By the time the researcher appreciated the significance of these data, it was too late to go back to the research site to investigate further the implications of these students' decisions.

Lexical item range

The literature from Japan has mentioned that the range of lexical items that Japanese university entrants are familiar with is unknown (Kawauchi, 2006). It was beyond the scope of this study to record individual students' familiarity with vocabulary. Further research could attempt to record the range of words students are familiar with in order to analyse if prior exposure and vocabulary acquisition can influence students' abilities to write effective scripts, and in turn determine if this influences video production.

Attempting to measure students' prior knowledge of discrete items such as vocabulary may prove problematic since researchers may not be able to determine which words to test for recognition. Students are exposed to a wide range of vocabulary items during their six years of schooling. MEXT creates a list of words every year and the publishing companies attempt to create learning materials to increase students' exposure to these words. Attempting to determine the range of lexical item familiarity may prove an act of futility because, a) a researcher would need to access the government's word list, and b) these words may not meet the lexical list produced by Cobb (2011) and Nation (2011).

Alternative tests

Technology acceptance model.

The Technology Acceptance Model (TAM) (Davis, 1989; Venkatesh & Davis, 2000) is a survey designed to assess and predict participants' use of technology. Data collected with TAM assist in defining participants' perceived usefulness of technology, attitude towards technology, perceived ease of use, and intention of use (Manochehri, Gromik, & Aw, 2012).
In the post-intervention survey, some of the participants had indicated that they would be willing to communicate about their experiences with the project at a later date. During the last stage of the research it was anticipated that the TAM would be used. However, due to the devastating earthquake and tsunami that hit northern Japan in March 2011, it became impossible to communicate with nearly all of the participants. In future research, it might prove invaluable to assess participants' pre- and post-intervention acceptance and perceptions of the benefits of using certain types of mobile technology, as it would highlight future intention of use. Mobile-assisted learning often investigates students' use and perception of the educational benefits of a project at a specific point in time. Research seldom investigates the long-term effects of using technology and whether this will affect students' abilities to use technology for independent learning purposes. TAM is a data collection tool that may provide more evidence regarding acceptance, perception, and long-term intention of use.

Critical thinking.

The participants in this research project sometimes video recorded their oral performances indoors. In addition, they were encouraged to attempt to film their performances outdoors. Student interviews revealed that students reflected on the content and location before filming their final and best performances. The findings, however, did not indicate the effect of filming outside on critical thinking, for example.

The research conducted by Cavus and Uzunboylu (2009) utilised the "California Critical Thinking Disposition Inventory Scale" to evaluate participants' perceptions regarding mobile learning (p. 436). Their findings revealed that students' critical thinking improved because they were able to use the technology anywhere to record real-life events, and therefore through regular use of technology and their observation skills, participants were better prepared to think more critically.
Collecting data similarly to Cavus and Uzunboylu (2009) may have generated better evidence, which could have provided a more in-depth understanding of students' cognitive processes when using technology for educational purposes. It is anticipated that the correlation between cell phone video production, content discussion, and critical thinking will be evaluated in future research to determine the nature of the relationships.

Speaking anxiety.

The decision to film their videos inside or outside may have influenced participant anxiety. In the weekly diaries, students indicated whether or not they enjoyed the task for that week and, if they had filmed their performance outside, they were encouraged to rate the degree of nervousness of performing in a public place. At the time the research was conducted, and the data were collected, the meaning of this information was not fully comprehended by the researcher and therefore it was not considered sufficiently informative for analysis.

However, upon searching for more literature, research concerning speaking anxiety was collected and reviewed. Some of the literature discussed speaking anxiety in terms of mental disorder (Blote, Kint, Miers, & Westenber, 2009). This was not perceived as appropriate or useful for research or for understanding students' anxiety with speaking in public. Nonetheless, research by Mak (2011) provided a more suitable definition of speaking anxiety; "a state of apprehension, a vague fear" (Scovel as cited in Mak, 2011, p. 202). Mak suggested that speaking anxiety may lead students to evaluate themselves and their attitudes towards a particular activity negatively. Students may be apprehensive that their negative performance may lead to them failing the course or developing a sense of personal failure. The students' feedback suggests that if students are provided with sufficient time, allowed to think-out-loud in their mother tongue, and do not feel peer pressure, then anxiety about speaking publicly will be reduced.

While project participants in this research had sufficient time and were allowed to select an appropriate location to video record their performances, it may not mean that they felt less anxious about producing videos of their speaking performances. Once students had produced their videos, they uploaded them on the class Yahoo! email account, where other students could view their performances. This second stage may have created some form of anxiety and warrants further investigation for validation.

A case against extreme values

In the book *Outliers*, Gladwell (2008) identified Chris Langan as a genius, an outlier amongst the population sample on intelligence. However, Gladwell also asks in his book "so what?" (p. 102). The most important issue regarding outliers, Gladwell explains, is not that these people are statistically above their peers, but more pointedly it is the difference that exists between them and their peers that is of interest. To understand the constitution or motivation of an outlier, it is important to understand their background. Gladwell dedicates a whole chapter to Chris Langan's background, investigating his family, educational, and intellectual experiences.

The participants in this research were either positively or negatively motivated by the research project and this was one factor that identified them as significantly different from their peers. One participant explained he was not motivated to complete the video homework and this led him to either have a low word count per second or to not produce a video. It was only after he was questioned that he made some efforts with his future homework. But the influential factor that may have prompted his thinking not to be inspired by the video homework was not fully evaluated. Gladwell points out that people's prior experiences may influence the way they use their intellectual prowess. At the time of the research, this was not fully grasped and not identified as an external influential variable.

It was beyond the scope of this paper to investigate the full background of each extreme case identified in this research. This is not necessarily a flaw of the research, but in future research, attempting to understand the background of each case will be investigated, without of course prying into a participant's past to the point where they may suffer any uncomfortable reflections.
Another issue concerning the limitations of using cases concerns the recognition of suitable cases. Yin (2003) and Flyvbjerg (2006) do not provide a rigorous method for identifying extreme cases. In this thesis, the data analysis method made use of statistical evidence to extract valid and reliable samples of extreme values. While at this stage it is again beyond the scope of this study, the selection of suitable extreme cases was noted as a considerable area for future research.

There is no universally accepted, defined strategy for delineating appropriate limitations. Nonetheless, the benefit of writing a limitations section is that it provides future opportunities for research that could contribute reliable evidence to the academic community and it reveals to readers possible weaknesses in the study that need to be taken into account. This chapter was able to present some areas for further research focusing on the cell phone video recording feature that are directly connected with improving students' speaking abilities, enhancing participants' logical reasoning, evaluating their performances, and ensuring that the project does not cause students any distress. This section also presented an area of case study that necessitates further investigation. The next section presents the implications of this research in terms of direct connection between improving students' learning outcomes and the use of the cell phone video recording feature.

Implications from the Findings

The purpose of the implications section is to advance the research knowledge base of the field of cell phone integration in the EFL classroom and beyond (Drotar, 2009). Yin (2003) explains that the implications section provides the writer with an opportunity to propose or present further areas for investigation. Eisenhardt (1989) adds that theory building requires good research method and analysis to offer new evidence to the academic community. Structured as a case study, this research has adhered to case study structure and recommendations in order to provide reliable insights for further investigation. This section discusses the greater implications arising from the discussion section.

As a case study, this research investigated the use of the cell phone video recording feature as a language learning tool for Japanese EFL learners. While the research methodology selected limits the generalisability of the evidence reported in this study, it does articulate implications for future studies. It is thus the intention of this section to report on implications that would support the validity of the research conducted, in the hope of instigating further research. Regular cell phone and Web 2.0 developments are some of the pertinent issues emerging from the findings from this research and are discussed below.

Petersen and Divitini (2005) explain students can use their mobile technology to keep in touch with their regular courses. Some of the participants were part-time students with full-time jobs, and these authors argued that technology would allow these students to stay connected with their studies through texting or emailing. In addition, not only would students be able to text their homework to their teacher but, given the mobility afforded by the technology, they would be able to find and provide real contextualized content samples retrieved from their environment. This study concurs with Petersen and Divitini's (2005) research and extends from it. Mobile-focused research has promoted

the concept of learning anytime and anywhere at the learner's convenience and this study has demonstrated that studying anytime influences regularity of access to learning, an issue seldom clarified. In this case study, this ease of access was an advantage that led to students having increased opportunities to prepare, learn, and perform in the target language. Reference was made, in the discussion chapter, to Ohlsson's (2011) explanation of the need for constant practice. Using cell phone technology affords students the opportunity to constantly practise and revise their performances. Research by Thornton and Houser (2005) and Stockwell (2008), for example, did report on language gain over an extended period of time, but they did explore the implications of regularity and its effect on learning outcomes. Thornton and Houser (2005) state that their participants "learned significantly more" due to receiving emails, but their evidence only leads to the suggestion that maybe "the effect of regular study encouraged by e-mail" can be an influencing factor (p. 223). In contrast, the evidence from this case study indicated that there was a correlation between practice, preparation, and speaking performance. Thus, this study presents to the academic community a new area of research, the effect of regular video-based production on learning outcomes.

Another implication raised by this study and preliminary cell phone research is the issue of student access to real-life contextualized content (Petersen & Divitini, 2005; Uzunboylu et al., 2009). Previous research in the field of vocabulary learning selected random lexical items that were texted via email to students to acquire (Chen & Chung, 2008; Levy & Kennedy, 2005; Lu, 2008; Stockwell, 2008; Thornton & Houser, 2005, for example). As the literature review chapter revealed, sending random lexical items to students was not perceived as educationally beneficial, since these were presented out of context and purely as a means to test technology. This study revealed not only that using a theme-based learning approach proved to be a successful method for students to explore authentic topics within a context or setting, but also that the theme assisted students in using and exploring lexical items that were either previously known to them or acquired through the production experience for that specific theme in order to explain their opinions clearly. This study concurs with Uzunboylu et al. (2009) as well as the research of Leijen et al. (2009) that theme-based, project-oriented study will most likely lead to increased retention of content and lexical items. Students will no longer need to text responses or observations from the field; they can now either take a picture or make a video about the content they wish to share with their peers. By uploading their audiovisual documents online, they can share authentic content in a desired target language to a global audience. This possibility places greater emphasis on the learner as a producer to improve their own target language spontaneous speaking abilities. Thus, this study suggests to the MALL researchers that target language learning must be encapsulated within a content-focused project to improve learning outcomes.

Finally, in terms of the theoretical framework, this study concurs with the beliefs of Vygotsky (1978), Papert (1991), and Engestrom (1999) that students learn best when provided with the tools and social interaction to construct new knowledge to share with their peers. Cummins' (1984) theory of language learning also contributed to this study by promoting the idea that given the chance, students will be able to shift from basic non-demanding tasks to more challenging, context-reduced performances. Extending on Engstrom's analysis of Gutierrez, Baquedano-Lo´ Pez, and Tejeda (as cited in Engstrom, 2001), the findings of this study could promote the investigation of peer collaboration for cell phone video production of shared content. An Engstrom diagram below (Figure 36) demonstrates the potential collaboration outcome during production. While two students produce different videos, their shared experiences could lead to the production of a new "potentially shared object". These

students could use the combination of both videos to produce a new video richer in audiovisual output.

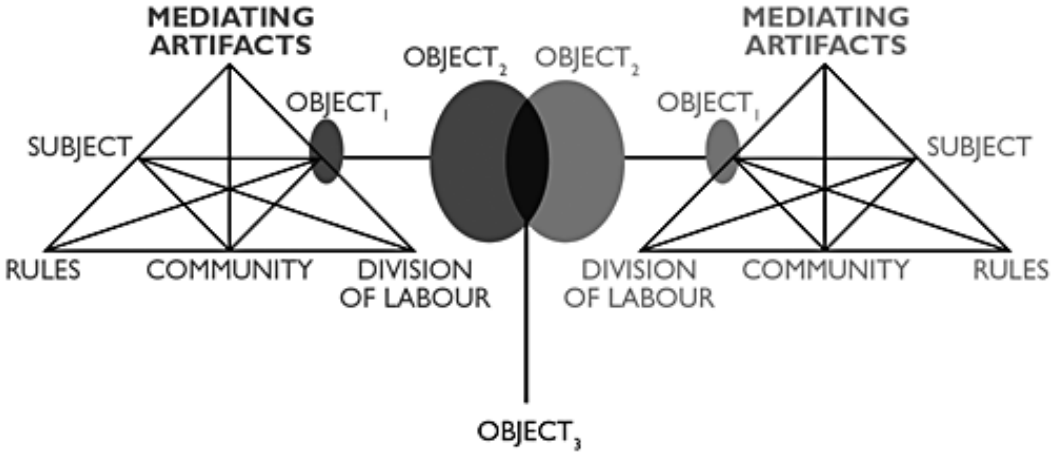


Figure 36. Potential shared object through collaboration during cell phone video production (from Engestrom, 1999).

Digital video cameras allow for teamwork during all video production phases (Gromik, 2009a; Leijen et al., 2009). However, the use of one digital video camera requires individual groups to work on individual projects, thus limiting the potential of team collaboration. The emergence of cell phone technology embedded with the video camera function has led to research of individuals using their personal phone and video recording feature to share information. For example, Strand et al. (2013) report on a project conducted with Flip video cameras as an assessment tool. As Engestrom (1999) explained it could be possible for two students to use their phones to produce their individual videos (see Figure 36). Through the use of either the video editing system available on some phones (or through the use of cell phone apps) or social networking sites, students would be able to develop and refine a shared object. Future research could explore the implications of cell phone video production through collaboration and its effect on language output. The ramifications of such a study could provide further evidence concerning negotiation of meaning and its effect on "live" video performance.

After experiencing language learning with a cell phone, some of the participants were able to reflect on the implications of this learning method. Some think that the technology will be useful to the medical industry. Research emerging from the medical field indicates that cell phone videos can play a vital role in assisting doctor to patient connectivity (Luxton, McCann, Bush, Mishkind & Reger, 2011). Students' perceptions of the future implications of cell phones could be an area worth investigating since it could establish future trends and intended use.

This chapter has presented some implications for further research with the cell phone video recording feature. The issue is no longer about learning on the move but rather understanding the effect of regular access to technology and information on language production in authentic settings. Evidence

has suggested that project and cell phone-based learning can promote better content exposure and awareness for students. Evidence and the theoretical framework applied also indicated that in future studies it would be possible to investigate collaborative cell phone video production. As cell phone technology continues to develop, the convergence between technology and software will allow students to become collaborative producers of authentic content, which can be shared and improved upon via social networking sites.

Conclusion

This research project emerged from the recognition that communicative language learning in Japan was not as effective as it could potentially be and out of interest in finding a solution to enhance Japanese university students' abilities to speak effectively in English. It became apparent that after six years of English exposure, the students who attended my classes were either shy, not competent speakers, or had limited knowledge of the target language. Therefore this author began to investigate methods to give these students the confidence to speak. At first, video production was used, but this was not the best method because there was limited access to digital video cameras and they could not be loaned out for students to use off campus. Cell phone technology presented a better option. Initially research was conducted to evaluate the feasibility of using cell phones as learning tools and eventually the research question emerged: Is the cell phone video recording feature a suitable language learning tool?

After consulting the literature on cell phone integration in the Japanese language classroom, it became apparent that most articles focused on testing cell phone technology for learning lexical items. While this method contributes towards positive language learning outcomes, it did not match this author's teaching objective to enhance speaking abilities. This author believed that since Japanese students possessed six years of prior English language exposure, they ought to be able to use that prior knowledge to speak spontaneously on topics familiar to them using vocabulary and grammatical structures within their linguistic grasp. Video production and more specifically, the production of cell phone based video recordings, was deemed to offer potential language learning advantages since it allowed students to record themselves speaking in the target language. This would enable them to control the video production process as well as observe and reflect on their speaking ability. In addition, and in contrast to previous cell phone research, using the video recording feature to speak about a particular theme or issue situated the language learner in the position of producer of content rather than consumer of third-party products or services.

Learning occurs when speakers either interact to discuss a theme or use a tool as a medium to express their opinion. During this interaction, the speakers negotiate meaning, explore current knowledge awareness, and attempt to produce new knowledge. The theoretical framework of socio-constructionism fit within this language learning belief and teaching objective. Socio-constructionism explained that verbal and physical interaction with peers and tools promoted better knowledge production. Vygotsky (1978) and his peers (see Engestrom, 2001; Lantolf, 2006; Papert, 1991) have explained that through the construction of new knowledge, collaboration and negotiation are vital elements that engage the learner to gain an appreciation for improving certain or specific skills. This

research placed the cell phone video recording feature as the tool to motivate students to speak in the target language, after which the video became a tool to engage the producer or the viewers to explore better strategies to create their next videos and improve speaking skills.

The research had a specific objective to understand the feasibility of using the cell phone video recording feature and it was set within a specific context and clientele, Japanese university students. Since the research attempted to investigate a novel and unique approach to enhancing speaking abilities in a real-life context, a case study methodology was applied (Yin, 2003).

Case Study

The participants were 67 second year Japanese students with comparable prior English language exposure and educational background. There were four classes of participants from the Arts and Letters, Law, and Engineering faculties.

Case study results cannot provide generalisations but they offer an objective view of individual experiences with the technology and the task. The findings support the following conclusions:

1- Access to mobile phones

Increasingly, learners have greater access to cheaper and more advanced cell phones which include more features such as video and voice recording and file storage. Learners are becoming more familiar with basic or useful features but they may not be fully aware of the advantages of using other features available on their phones. Access to a cell phone does not necessarily infer that students are willing to use this tool for language purposes. Therefore, training and support are required to engage and motivate students to understand the potential of various features for educational purposes.

2- Individual to group work transition

At the start of the project, participants completed their video productions alone. They attempted to master their video recordings privately, as well as practise their speaking abilities. Uploading and storing the students' self-selected best videos in a private classroom email account motivated students to view and reflect on best video production strategies. Storing the videos in the email account also motivated some students to form teams and to mutually engage in joint production to negotiate speech repertoire and improve speech delivery and video quality.

Joint production: Once students formed teams, they were able to share tasks and negotiate meaning and sentence structures that best fulfilled their needs. Participants formed bonds and collaborated in the production process by sharing tasks, such as offering assistance with video recording.

Negotiate speech repertoire: Participants shared their prior knowledge, skills, and understanding of best speaking strategies.

Speech delivery and video quality: Participants who collaborated in teams helped each other with remembering speeches, assisted with facial expressions and gestures, or acted out a minor role. They also assisted in the video recording process by holding the cell phone video camera.

3- Output production

The use of the cell phone video recording feature did enhance students' learning strategy use and use of lexical items. The opportunity for participants to view their own and their peers' videos enhanced their ability to improve the quality of their video productions. Students could view the production strategies as well listen to a wider range of lexical items selected by their peers.

Learning strategies

It is apparent that the majority of students used more low level learning strategies, such as writing their speeches in Japanese and translating them into English with the aid of a dictionary. Nonetheless, students did increase their social interaction skills by collaborating with peers. While it could be argued that not all students developed more extensive learning skills, Wong and Nunan (2011) explain that students are more likely to gain "greater awareness" of the task they are undertaking if they are "conscious of the process underlying the learning" they are completing (p. 146). As the evidence suggested, students became more effective with their production process.

Linguistic improvements

The viewing option may have contributed to improving students' speaking abilities and increasing their words per second output. In addition, since the task was a repeated activity, the participants were able to use the target language on a more regular basis and this enabled them to become familiar with certain sentence structures, to retain high frequency words, and to explore new vocabulary items. The linguistic analysis indicates that over time, students were able to improve their linguistic output in terms of lexical item selection with an increase in use of words from the Academic Word List, as well as a tendency to increase the number of words spoken per second. This being stated, it must be emphasised that both lexical item use and words spoken per second were dependent on the weekly themes students needed to address, as these may or may not have been motivating factors.

Learner perspectives

Based on the students' perspectives about using the cell phone video recording feature, it can be stated that they perceived the activity as a positive experience. The post-intervention survey indicates that students rated preferred themes positively, they were able to recollect the reason a certain cell phone video was memorable, and they were able to visualise courses and places of employment that would benefit from using the cell phone video camera to record visual evidence.

Proposition

The proposition for this research concerned the use of the cell phone video recording feature as a possible tool to enhance Japanese university students' English speaking abilities. While the evidence reported and the conclusions drawn from the data analysis indicate some significant differences between the task at the beginning of the term compared to the completion of a similar task at the end of the term, it is the overall student response in the post-intervention survey that reveals whether or

not the video recording feature was a suitable tool to enhance their English speaking abilities. The majority of the students and the responses to various questions posed to them indicate that, according to their opinions, the cell phone video recording feature was a suitable tool to enhance their English speaking abilities.

As summarised above, these particular students concurred with the opinion that the use of the cell phone video recording feature, the task, the themes, and their improved spoken output did lead them to conclude that the video recording feature was suitable for learning a language.

Recommendations for future research

There is no doubt that future research in the area of cell phone based learning and its various features will be needed. As the literature review indicated, the recent focus is primarily on cell phone text based learning; however, as this research has revealed, other features such as the cell phone video recording feature can be useful tools. Also, since the research was conducted in a specific context (a Japanese university), and the findings cannot be generalised to other educational milieu, further research in other contexts, such as high schools or from different countries, would provide invaluable corroborating evidence that the cell phone video recording feature is a useful learning tool.

Advancements in mobile technology afford students access to all forms of software and online services that enable them to create any type of information with the click of a few buttons. This research contributes to the field of mobile technology because it explored and reported on the use of the video recording feature, a feature which until now has received little research interest.

As more educators continue to investigate the potential of mobile technology, they will come to realise the educational benefits of using certain cell phone features as a means to enhance their students' language awareness. In addition, as technology continues to advance, educators might appreciate the value of live, face-to-face, cell phone-based communication.

Concluding statement

At the beginning of this research, the Economist Intelligence Unit (2009) revealed that there were approximately 1.5 billion cell phones worldwide. Three years later, The Economist Intelligence Unit (2012) forecasts "94 mobile-phone subscriptions for every 100 people" (p. 118). Forty percent of these mobile phones will be "feature-rich, internet-enabled smartphones" (p.118). Standage (2012) reports that during 2013, "the number of internet-connected mobile devices … will exceed the number of desktop and laptop personal computers" (p. 123). Giles (2012) describes Google Glass as a pair of glasses "that also incorporates a camera, a microphone and a computer" (p.132). At the start of this research, using the cell phone video recording feature was perceived as a potential vision of the future. By the end of this research, it seems the future has arrived and the possibilities for learning and teaching with new technology are considerable. Further research the area of technology-based video production is required to investigate the emerging challenges researchers, teachers, and students will experience.

This thesis has presented areas for future research not currently addressed in the research literature. In particular, it has advanced the notion that the cell phone video recording feature can enhance language learners' speaking abilities in a target language and warrants further research. The evidence from 67 students demonstrates that mobile-based learning does enable them to consider the speech production process, to review their oral video performance and thus lead them to enhance their speaking abilities.

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