

Language-related anxiety and motivational factors of students of
English as a foreign language: A study with Japanese
undergraduate science and engineering students

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Abstract

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Kei Mihara

Foreign language anxiety and motivation to learn a second or foreign language have been investigated for decades in many different contexts, but previous studies in this field were mainly cross-sectional, and quantitative in nature. The aim of this study was to investigate anxiety and motivation of science and engineering students studying English as a foreign language as part of their undergraduate studies in a Japanese university, in relation to their English proficiency and self-reported English ability. This is a two-year longitudinal study whereby I followed the same students in their first and second years of the undergraduate programme in order to examine changes in their anxiety and motivation over time. For the present study, I adopted a mixed methods research approach by utilising an explanatory sequential (QUAN-qual) design. The integration of two data sets was intended to provide a more complete in-depth picture of the issues under investigation with the qualitative phase aimed to explore in greater depth some aspects emerging from the quantitative data analysis. In the first phase, I administered the Foreign Language Classroom Anxiety Scale (FLCAS) and the Language Learning Orientation Scale (LLOS) to examine the students' foreign language anxiety and motivation. The respondents were also asked to evaluate their English ability. All first-year students from all the departments of the Faculty of Science and Engineering were invited to participate in the quantitative survey, except for my students. They were invited to participate in the same survey one year later. A total of 669 responses were obtained in the first year and 506 in the second year. The findings of the survey data analysis informed the design of the semi-structured interview protocol that was used in the second phase with 26 students (15 in the first year and 11 in the second year).

The quantitative data was analysed statistically with the use of SPSS, and thematic analysis was performed for the purposes of qualitative data analysis. The results indicate that the students revealed higher levels of anxiety about communication compared with anxiety about tests. They were intrinsically motivated to communicate in English and also extrinsically motivated to learn English by finding it useful for their daily lives and academic career or by receiving some reward such as course credits. Although their tendencies regarding anxiety and motivation remained almost the same for two consecutive years, their anxiety increased and their motivation decreased in their second year. The students' self-reported English ability was negatively correlated with their anxiety levels and positively correlated with their motivation levels for two consecutive years, whereas their English proficiency levels were not necessarily correlated with their anxiety or motivation. The results appear to have derived from the participants' academic background (field of study) and learning context. As science or engineering students, their motivation levels slightly decreased due to their academic priority. On the other hand, they were used to talking with native English speakers but not used to giving presentations, which increased their anxiety levels in their second year.

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Chapter 1: Introduction

1. 1 Introduction

To adapt to the increasingly globalised economy, many Asian countries, including Japan, currently offer English language education to students as part of their national education strategies (Kachru & Nelson, 2006). To gain an understanding of those various strategies, Tsui and Tollefson (2007) focused on how Asian countries managed the growing influence of the English language while simultaneously promoting their own language. The first part of the review analysed the impact of globalisation on language policies, culture, and identity in Asian countries. In Malaysia, for example, language policies sensibly deal with the two issues of globalisation and national integration (David & Govindasamy, 2007). Similarly, despite concerns about the linguistic imperialism of English, Japan and South Korea represent the growing global trend of the contextualisation of the English language in national cultural environments (Hashimoto, 2007; Yim, 2007). Learning English has become very important for Japanese students, and globalisation has been a keyword in Japanese government policies and Japanese society since the government announced the Japan Revitalisation Strategy in 2013 (Aoshima, 2016).

As part of this strategy, the Japanese government has globalised Japanese universities, and leading companies are employing students of those universities and developing global human resources to promote global expansion and growth. Since 2014, Japan's Ministry of Education, Culture, Sports, Science and Technology (MEXT) has been investing in the 'Top Global University Project' (TGUP) in order to 'enhance the international compatibility and competitiveness of higher education in Japan' (MEXT, 2017, p. 1). Furthermore, MEXT has encouraged Japanese universities to introduce 'English as a Medium of Instruction' (EMI) and required universities to 'internationalise' (Rose & McKinley, 2018, p. 111) themselves and

provide classes taught in English (Dearden, 2014; MEXT, 2003, 2012; Rose & McKinley, 2018).

The university I work for was not chosen to be part of the TGUP, and currently most classes at the university, except for 'Oral English' classes, are conducted in Japanese. Native English-speaking teachers are employed to teach 'Oral English' classes, and the medium of instruction of those classes is English. The university offers long- and short-term student exchange programmes with several universities in Russia. Although Russia is not an English-speaking country, students who participate in those exchange programmes are required to speak English throughout the programme. As part of this programme, the university accepts students from Russia, and Japanese professors have to use English to teach and interact with those students since Russian students do not speak Japanese. This programme and the current globalisation trends indicate that the university wants students to improve their English communication skills, consequently encouraging professors to provide lectures in English.

1.2 Context of the Study: the Role of the English Curriculum

I work as a professor of language education at a private university in Japan. My main obligations include teaching English as a foreign language (EFL) to Japanese undergraduate students from the Faculty of Science and Engineering, coordinating their learning processes, and reviewing and revising their English curriculum.

This study considers the Faculty of Science and Engineering. This faculty comprises seven departments: the Department of Science, Life Science, Applied Chemistry, Mechanical Engineering, Electric and Electronic Engineering, Informatics, and Civil and Environmental Engineering. All those departments were included in this research as the English curriculum is essentially similar for all those departments. Currently, the English curriculum has the

following features:

1 All the English classes are formed based on the students' levels of English proficiency. Class A is the lowest level, Class B is the second lowest, Class C is the third lowest, and so on. The idea is that students are placed in a class that reflects their English proficiency levels. Multiple-choice tests are used as a placement test regardless of the type of subject. Therefore, 'Oral English' classes are also based on the multiple-choice test results.

2 Learning English is mandatory for first-, second-, and third-year students. Additionally, students must be taught by both Japanese English teachers and native English-speaking teachers. If the students cannot achieve qualifying grades in the compulsory subjects, they have to register for the subject again until they pass the course.

3 'TOEIC 1' and 'TOEIC 2' are compulsory subjects, but students who achieve a score of 600 or higher on the TOEIC® (Test of English for International Communication) Listening & Reading Test (henceforth, TOEIC L&R) are awarded two credits without registering for the subjects. They receive a score of 100 for their final grade of the subjects if they provide their score certificate as proof.

Currently, the TOEIC Bridge® Test (henceforth, TOEIC Bridge) is used as a placement test for first-year students, and they are required to take the test upon entering the university, in early April, in order to be placed in suitable classes. The TOEIC L&R, which first-year students have to take as the end-of-term exam for 'General English 2' in February, is used to determine classes in their second year. In Japan, the school year starts in April and ends in March the following year. Many universities, including the university where this study was conducted, use the semester system and divide the academic year into two: the spring and autumn semesters.

1.3 Problem Statement

As discussed above, in response to globalisation, the university has placed a particular emphasis on English as part of the science and engineering graduation programme curricula. As the university's official website indicates, the academic and administrative staff expect students to play an active part in an increasingly globalised world after their graduation (<https://www.kindai.ac.jp/science-engineering/english/about/undergraduate/policy/>). Thus, in order to develop students' oral communication skills, as an institutional strategy, only native English-speaking teachers are approved to teach 'Oral English' and Japanese teachers of English are assigned to teach the remaining English subjects.

A report issued by the Institute for International Business Communication (IIBC) demonstrated that as of 2013, 69.3% of the 304 Japanese leading companies considered TOEIC L&R scores when employing staff (IIBC, 2013). Similarly, 64 postgraduate schools in Japan (38 national/public and 26 private schools) considered TOEIC L&R scores as part of entry requirement (IIBC, n.d.). For this reason, the university staff have determined that third-year students should attend English classes for a whole year in the third year to enhance their English proficiency when they look for a job or apply to postgraduate school in their fourth year. Currently, third-year students are provided with two subjects in the English curriculum: 'Writing' and 'English for Specific Purposes/ESP.' These are ideally intended for students who go on to postgraduate school and read and write academic articles in English. The university staff also want students to take different types of English subjects. In the current curriculum, first- and second-year students do not have many opportunities to write in English or acquire English skills related to their expertise.

However, as shown in Table 1, the 2015/2016 students' registration record reveals that, in general, the students did not meet the institutional expectations regarding English language

education. While almost all the second-year students registered for 'Oral English' in the spring semester, less than half of those students continued to take the subject in the autumn semester. Instead, most of the second-year students registered for 'Academic Reading' in the spring semester and more than 80% of those students continued to take the subject in the autumn semester. Unlike in 'Oral English 3/4' classes that focus on presentation skills, in 'Academic Reading' class, students are asked to read passages about topics such as global warming, sexual minorities, an aging society, etc.; thus, this class does not differ largely from English lessons in secondary school.

Table 1						
<i>Students' Registration of English Subjects in 2015/2016</i>						
	Spring semester				Autumn semester	
First year	General English 1	*	1,144		General English 2	1,193
	Oral English 1	*	1,146		Oral English 2	1,160
Second year	TOEIC 1	*	1,009		TOEIC 2	1,048
	Academic Reading 1		956		Academic Reading 2	789
	Oral English 3	**	1,006		Oral English 4	441
Third year	Writing 1	***	449		Writing 2	156
	ESP 1	***	747		ESP 2	307
<i>Note.</i> * These subjects are compulsory.						
** Students have to take at least one of the two.						
*** Students have to take at least one of the four.						

The same is true of the English subjects for third-year students. In their third year, students have to take at least one of the following four subjects: 'Writing 1,' 'Writing 2,' 'English for Specific Purposes/ESP 1,' or 'English for Specific Purposes/ESP 2.' Some of the 'ESP' classes are taught by professors in the science or engineering fields. As shown in Table 1, almost all the third-year students registered for 'Writing 1' or 'ESP 1' in the spring semester and less than half of those students continued to take 'Writing 2' or 'ESP 2.'

In order to encourage students to attend as many elective English classes as possible,

class schedules are organised in such a way as to ensure that no other class timings clash with that of the English classes. For example, 'Oral English 3/4' classes are scheduled from 9:00 to 10:30 am on Monday only if no classes of science or engineering subjects are scheduled for second-year students during that period. Therefore, it was not likely that the students did not continue to take the English subjects simply because they wanted to register for other subjects instead of English in that period. Therefore, I surmised that the students studied English seriously for earning credits to graduate, but that they tended not to register for English subjects once they had earned enough credits. Additionally, the students might have avoided taking classes conducted in English. Table 2 shows the third-year students' registration for English subjects in the 2015/2016 academic year.

Table 2								
Students' Registration of Writing 1/2 and ESP 1/2 in 2015/2016								
Writing 1/2 classes		Spring semester	Autumn semester		ESP 1/2 classes		Spring semester	Autumn semester
1		25	11		1	**	82	34
2		25	10		2	**	58	***
3	*	9	2		3		39	7
4		10	5		4		33	3
5		22	10		5		35	9
6		23	1		6		35	7
7		37	9		7		18	5
8		30	7		8		16	2
9		57	21		9	**	20	11
10		46	9		10	**	21	***
11		38	13		11		19	5
12	*	8	5		12		16	4
13		29	12		13	**	80	19
14	*	11	3		14	**	44	22
15		29	12		15	**	64	60
16		22	14		16	**	49	54
17		28	12		17		41	24
Note. * The teacher was Japanese but taught in English.					18		25	2
					19		35	29
** Professors in the science or engineering fields were in charge of these classes.					20		17	10
*** Classes 1 and 2 were combined in the autumn semester, and so were Classes 9 and 10.								

It was observed that three 'Writing 1/2' classes (Classes 3, 12, and 14) had fewer students than the other classes. The teacher who taught those three classes was a native Japanese speaker, but he spoke only English in class. It was his own intention to teach in English whereas all the other 'Writing' classes were conducted in Japanese. When I was the chief coordinator of English classes, one of his students requested me for a class change. This student explained that the Japanese teacher spoke English and also asked his students to speak English in his 'Writing' class. Based on the registration record and this student's comments, I believe that the students were not comfortable being taught in English.

Furthermore, regarding 'ESP 1/2,' it is observed that English classes taught by professors in the science or engineering fields generally tended to have more students than those taught by teachers of English. Those classes focused on each professor's area of specialisation and their expertise rather than on their English skills. From Table 2, therefore, it can be inferred that the students were less interested in improving their English skills than acquiring expertise in their field of study. However, in this case as well, the registration record indicates that the students were enrolled in 'ESP 1' in the spring semester because it was mandatory, and that they discontinued it in the autumn semester possibly because they earned enough credits by taking 'Academic Reading' in their second year.

These tendencies, which go against the institutional aims described above, raise two questions: (1) why do most second-year students prefer to continue taking 'Academic Reading' and not 'Oral English' classes in the autumn semester? (2) why do most students choose not to take any English courses in the autumn semester of their third year?

The students' choices regarding English classes may be due to foreign language anxiety, low motivation to learn English, etc. The tendency to avoid 'Oral English' classes and classes conducted in English may be due, at least partly, to the students' anxiety about communicating

in English, whereas enrolment in English classes beyond the mandatory classes may be a matter of motivation to learn and improve English communication skills. If the students had higher levels of anxiety about oral English communication, it is understandable that half of the second-year students did not take 'Oral English 4' although most of them continued to register for 'Academic Reading' in the autumn semester. As more students chose 'ESP 1' instead of 'Writing 1' in their third year, it can be deduced that the content of 'ESP' seemed more appealing to them. However, as less than half of those students registered for 'ESP 2' in the autumn semester, neither 'ESP' nor 'Writing' motivated them to learn English. Otherwise, learning English in itself was not interesting to the students. From Tables 1 and 2 alone, it is not clear why the third-year students did not register for English subjects in the autumn semester. Furthermore, it is likely that science and engineering students have different types of foreign language anxiety and motivation as compared to the students from different disciplines such as, for example, the English department. Thus, I decided to investigate science and engineering students' foreign language anxiety and motivational orientations to learn English.

1.4 Assumptions

First, I assumed that the students tended to have high levels of foreign language anxiety, especially regarding oral communication, and that this anxiety negatively affected their motivation. It is often stated that Japanese students are shy and reluctant to speak in public, and there is also a general feeling among English teachers that science and engineering students are quieter and less talkative than students of other disciplines. They seldom volunteer answers or speak up in class. Yashima, Noels, Shizuka, Takeuchi, Yamane, and Yoshizawa (2009) examined Japanese university students' English language-related anxiety

and motivation. They found that 63.8% of their participants felt embarrassed to volunteer answers in English language classes when compared with 9% of the American students of Spanish language classes as reported by Horwitz, Horwitz, and Cope (1986). They also noted that the students' lack of confidence in speaking English in class 'negatively correlated modestly with most of the motivational subtypes' (Yashima et al., 2009, p. 52).

Second, I assumed that the students' motivational orientations to learn English were more instrumental than integrative, and more extrinsic than intrinsic. I assumed that the students were motivated to learn English to pass an examination or find a job; such a type of motivation is called instrumental motivation (Dörnyei, 1990, 1994; Gardner, 1985; Gardner & Lambert, 1959, 1972; Oxford & Shearin, 1994). Additionally, I assumed that the science and engineering students did not display any interest in the cultural issues of English-speaking countries, and that they wanted to learn English for obtaining external rewards such as good grades rather than for enjoyment. As an example of extrinsic motivation, Ryan and Deci (2000a) referred to students doing the work simply because they believe that the work is valuable for their chosen career. The authors argued that many school-based activities are not designed to be intrinsically interesting, and that teachers must learn how to motivate students to 'value and self-regulate such activities' (Ryan & Deci, 2000a, p. 60). I assumed that compared with students of other disciplines, the science and engineering students tended to feel motivated to learn English by finding it valuable for their chosen career. In line with the contention of Sarker, Davis, and Tiropanis (2010) that university students, in general, increasingly view a university degree as 'a necessary first step to starting their career' (p. 2), I assumed that this tendency was stronger in the Japanese science and engineering students than in students of other fields of study. I know of several students who have chosen the Faculty of Science and Engineering simply because they think it would give them an

employment advantage upon graduation.

Third, I assumed that the students' English proficiency was affected by the levels and types of their motivation. From my experience, I can state that highly motivated students are likely to make serious efforts to learn English, and that students with utilitarian purposes such as achieving a good score on the TOEIC L&R are more likely to study English harder.

1.5 Research Aim and Questions

The aim of this research is to investigate Japanese undergraduate science and engineering students' foreign language anxiety and motivational orientations, in relation to their English proficiency and self-reported English ability. This study poses the following research questions:

RQ1 What are the nature and levels of foreign language anxiety reported by Japanese undergraduate science and engineering students studying English in a Japanese university?

RQ2 What types of motivation do the Japanese undergraduate science and engineering students have, to learn English as part of their undergraduate curriculum?

RQ3 How are the Japanese undergraduate science and engineering students' levels of foreign language anxiety correlated with their types of motivation to learn English?

RQ4 What differences can be found between science students and engineering students with respect to foreign language anxiety and motivation to learn English?

RQ5 How is the Japanese undergraduate science and engineering students' self-reported English ability related to their foreign language anxiety and motivation to learn English?

RQ6 What are possible changes in the Japanese undergraduate science and engineering students' foreign language anxiety and their types of motivation to learn English

during the first two years of their undergraduate course?

1.6 Nature of the Study

This research is a two-year longitudinal study, and the data collection took place over two consecutive years when the participants were in their first year and their second year of the course. This research employs a mixed methods approach, with an explanatory QUAN-qual sequential design (Creswell & Creswell, 2018). Thus, it involves collecting, analysing, and integrating quantitative and qualitative data. Data were collected by using questionnaires and semi-structured interviews. The two types of data were collected from the same set of students twice, that is, in their first and second years, in order to check for changes in the students' levels of foreign language anxiety and motivational orientations regarding learning English during this period. The quantitative data were analysed for each class (level of English proficiency), subsequently grouped by department (major) into a complete data set (first year and second year). Qualitative research was conducted using semi-structured interviews to investigate the results of the quantitative analysis. A detailed rationalisation of why this approach was chosen for this research will be provided in Chapter 3.

1.7 Definitions

Certain technical terms or concepts are sometimes used with slightly different meanings in research. To avoid confusion, this section explains several technical terms to clarify the definitions of the main concepts.

1.7.1 Foreign Language Anxiety

This research deals with foreign language anxiety, as proposed by Horwitz, Horwitz, and

Cope (1986). As described in more detail in Chapter 2, foreign language anxiety has been classified as situation-specific anxiety; a trait within a specific context of learning a foreign language in the classroom. Horwitz et al. (1986) were the first to study this type of anxiety separately as a phenomenon peculiar to foreign language learning (Young, 1991). They created the Foreign Language Classroom Anxiety Scale (FLCAS), whose items 'are reflective of communication apprehension, test anxiety, and fear of negative evaluation in the foreign language classroom' (Horwitz et al., 1986, p. 129). Those three specific types of anxiety, or factors, are described below in brief.

Communication Apprehension

This is 'a type of shyness characterized by fear of or anxiety about communicating with people' (Horwitz et al., 1986, p. 127), for example, anxiety experienced while speaking, listening to, or learning a spoken language.

Test Anxiety

This type of anxiety 'refers to a type of performance anxiety stemming from a fear of failure' (Horwitz et al., 1986, p. 127). Some previous studies treated test anxiety independently or separately from the other two factors of foreign language anxiety (Önem, 2010; Sarason, 1972; Schunk, Meece, & Pintrich, 2014; Zeidner & Matthews, 2005), but Horwitz et al. (1986) included it as a factor of foreign language anxiety. Oral tests, or speaking tests, can provoke both communication apprehension and test anxiety in students simultaneously.

Fear of Negative Evaluation

Regarding this type of anxiety, Horwitz et al. (1986) cited Watson and Friend's (1969)

definition. It was defined as ‘apprehension about others’ evaluations, distress over their negative evaluations, avoidance of evaluative situations, and the expectation that others would evaluate oneself negatively’ (Watson & Friend, 1969, p. 449). Fear of negative evaluation is similar to test anxiety but ‘is not limited to test-taking situations’ (Horwitz et al., 1986, p. 128). For this reason, it can be found in a larger variety of situations and includes evaluations by classmates (peers) as well as teachers.

In this research, I examined Japanese undergraduate science and engineering students’ anxiety regarding learning English as a foreign language. Therefore, when I use the term ‘foreign language anxiety’ in this paper, it always refers to ‘anxiety about learning English.’ As I will explain in Chapter 3, this research used the FLCAS created by Horwitz et al. (1986) to measure the students’ anxiety. When I translated the FLCAS for the purpose of this study, I changed the expressions ‘foreign language’ or ‘language’ into the term ‘English’ as this research only deals with English.

1. 7. 2 Motivational Orientations

In this study, Japanese undergraduate science and engineering students’ motivational orientations to learn English were measured by means of the Language Learning Orientations Scale (LLOS) created by Noels, Pelletier, Clément, and Vallerand (2000). It is based on the self-determination theory proposed by Deci and Ryan (1985, 2000, 2002) and Ryan and Deci (2000b, 2002). This theory consists of three main concepts: (1) amotivation, (2) extrinsic motivation, and (3) intrinsic motivation. Those concepts are described below in brief.

Amotivation

Amotivation simply means a lack of motivation and refers to a state of not having the

motivation to engage in an activity (Ryan & Deci, 2002). Dörnyei and Ushioda (2011) explained that amotivation 'refers to the lack of any kind of motivation, whether intrinsic or extrinsic' (p. 23).

Extrinsic Motivation

Extrinsic motivation 'involves performing a behaviour as a means to some separable end, such as receiving an extrinsic reward (e.g. good grades) or avoiding punishment' (Dörnyei & Ushioda, 2011, p. 23). In the self-determination theory, extrinsic motivation has four types of regulations, and they are different in terms of autonomy. External regulation is the least autonomous, introjected regulation is slightly more autonomous, identified regulation is even more autonomous, and integrated regulation is fully autonomous and closest to intrinsic motivation in this regard. However, Noels et al. (2000) divided extrinsic motivation into three types: (1) external regulation, (2) introjected regulation, and (3) identified regulation. This research employs the model offered by Noels et al. (2000).

External Regulation. This is the least autonomous type of extrinsic motivation, employed for purposes like achieving some reward or satisfying some external demand.

Introjected Regulation. This is slightly more autonomous than external regulation, employed for purposes like taking some pride in oneself or avoiding feeling guilty.

Identified Regulation. This is an autonomous type of extrinsic motivation, employed for purposes like considering the experience as valuable or personally important.

Intrinsic Motivation

Intrinsic motivation 'deals with behaviour performed for its own sake in order to experience pleasure and satisfaction, such as the joys of doing a particular activity or satisfying

one's curiosity' (Dörnyei & Ushioda, 2011, p. 23). It is self-determined and more autonomous than extrinsic motivation. Noels et al. (2000) divided intrinsic motivation into three categories: (1) knowledge, (2) accomplishment, and (3) stimulation. This three-part classification was proposed by Vallerand (1997) and Vallerand, Pelletier, Blais, Brière, Senécal, and Vallières (1992, 1993).

Intrinsic Motivation (Knowledge). This type of motivation is based on the feelings related to exploring or developing new ideas or gaining new knowledge.

Intrinsic Motivation (Accomplishment). This type of motivation is based on the feelings related to accomplishing a goal or mastering a task.

Intrinsic Motivation (Stimulation). This type of motivation is derived from the feelings stimulated by performing a task, such as excitement and fun.

1.8 Significance of the Study

As mentioned in the Introduction section of this chapter, English language education is becoming important in Japanese universities due to rapid globalisation, and the university I work for is no exception to this trend. To offer effective English language education, it is necessary to accurately grasp students' current situation and discover how to best support them for improving their English skills as they form the future workforce of science and engineering institutions and business organisations.

Undergraduate science and engineering students' foreign language anxiety and motivational orientations, which this research investigated by analysing both quantitative and qualitative data, are key factors that are likely to have an impact on their English learning. Employing a mixed methods approach helped me to probe deeply into these issues. Furthermore, as the two types of data were collected for two consecutive years, the results did

not show the students' temporary situations but demonstrated how the participants' foreign language anxiety and motivational orientations changed over time.

In the particular case of the present research, anxiety-related motivational issues had not yet been investigated at the Higher Education organisation where the study was located, and therefore this research plays a pioneering role in this respect. Thus, I expect that the findings of this research provide some indications about the necessary components required to determine strategies that can be employed by the faculty to encourage students to study English as a foreign language. The findings can be applied to improve the educational targets of the Faculty of Science and Engineering. It is important for the academic and administrative staff to identify students' foreign language anxiety-related problems and discuss their motivation-related issues in order to support students effectively and take action to prevent negative outcomes such as student dropout and repetition of the same course. In the past, the university offered the same English curriculum to all students from all faculties. Although there have been efforts to tailor the English curriculum to the needs of students from different departments, it is hoped that the findings of the present research provide some directions towards the reformulation of the English curriculum to suit the specific characteristics of the students from the Faculty of Science and Engineering.

1.9 Organisation of the Thesis

This thesis is organised into seven chapters. Following the introduction, Chapter 2 is concerned with the theoretical framework of the study based on the review of the relevant literature. Chapter 3 explains the methodology and the rationale for the methodological decisions adopted for this research. Chapters 4 and 5 are concerned with data analysis and findings of the quantitative and qualitative data, respectively. Chapter 6 presents a discussion

regarding the findings in relation to the research questions and in articulation with the pertinent studies. Finally, Chapter 7 concludes the thesis with a summary and implications of the findings, an acknowledgement of the strengths and limitations of the study, and suggestions for further research.

Chapter 2: Literature Review

2.1 Introduction

The aim of this research is to investigate Japanese undergraduate science and engineering students' foreign language anxiety and motivational orientations in relation to their English proficiency and self-reported English ability. To demonstrate an understanding of previous research on this topic, a comprehensive literature review of existing studies in the relevant fields is conducted. This literature review first explains the history of research conducted in this area. By discussing the results and findings of empirical studies, this chapter explores the relationship between foreign language anxiety and motivational orientations in a variety of learning contexts, and how proficiency levels of English have been observed to be related to these two items. By doing so, this chapter tries to set a solid theoretical framework for this research.

The participants in the present study had been learning English as a foreign language (EFL) for six years or more before starting their Higher Education science or engineering studies. As I will explain in more detail in Section 2.4.1, Kachru (1985) proposed three concentric circles of World Englishes: (1) the inner circle, (2) the outer circle, and (3) the expanding circle. In the inner circle where English is used as their first language, or in the outer circle that consists of post-colonial regions, immigrants and their children learn English as a second language (ESL). In contrast, Japan is categorised as the expanding circle, where students learn English as a school subject to pass examinations and also to progress their career after graduating from university.

Previous studies reviewed in this chapter are not limited to research conducted in EFL contexts. In some studies, the target language was not English but other languages such as French and Japanese. In other studies, the participants were learning the target language as

a second language, not as a foreign language, such as in Canada. However, I consider all those studies relevant to this study and therefore I include them in the literature review.

Due to the differences between English and Japanese, American students learning Japanese as a foreign language in the US are expected to experience difficulties similar to those experienced by Japanese students learning English in Japan. According to Jorden and Lambert (1991), it takes American students many more hours to learn languages such as Japanese and Arabic than languages such as French and Spanish. In addition to the differences in linguistic rules, American learners of Japanese have to be concerned with the fact that 'Japanese is spoken within a society whose rules of social conduct are very different from those in the West' (Jorden & Lambert, 1991, p. 4). Furthermore, it appears that differences between EFL and ESL contexts are not as distinct as in the past. Japan used to be a monolingual society, but recently the number of people immigrating to Japan has been increasing. As a result, people in some areas of major cities currently have to use English in daily life and work contexts due to a large number of immigrants in the areas.

The next section of this chapter introduces Krashen's (1987) Affective Filter hypothesis, which categorises anxiety and motivation as affective filters and explains their roles in the process of second or foreign language acquisition. In this regard, this hypothesis is closely related to the aim of this study: to investigate Japanese undergraduate science and engineering students' foreign language anxiety and motivational orientations, in relation to their English proficiency and self-reported English ability. Subsequently, this chapter discusses previous research regarding the various types of foreign language anxiety, followed by an analysis of previous studies on motivational factors for learning a second or foreign language.

Foreign language anxiety, also called xenoglossophobia, was separated from general anxiety by Horwitz, Horwitz, and Cope (1986). Since then, language-related anxiety has been

extensively examined in a variety of learning contexts (Aida, 1994; Kitano, 2001; Liu & Huang, 2011; MacIntyre & Gardner, 1989; Park & French, 2013; Saito & Samimy, 1996). Those empirical studies on language-related anxiety provided useful information for the research design of this study. Furthermore, motivation about learning a second or foreign language has been discussed not only in bilingual countries such as Canada (Gardner, 2001; Noels, Clément, & Pelletier, 2001) but also in other countries or regions such as Iran (Papi, 2010), Japan (Norris-Holt, 2001), Hong Kong (Yung, 2019), and New Zealand (de Burgh-Hirabe, 2019). Whether the target language was English or not, those empirical studies demonstrated meaningful results and posed questions that I found worth exploring in this research. Both anxiety and motivation have often been examined worldwide in relation to English proficiency levels.

The second section of this chapter establishes links between foreign language anxiety and motivational orientations for learning English by examining previous studies in this field. The section explores how foreign language anxiety is correlated with different types of motivational orientations and to what extent they are linked to each other. Similarly, the section also aims to examine how motivational orientations are associated with different types of foreign language anxiety and to what extent they are related to each other. Establishing links between foreign language anxiety and motivational orientations helps me to examine how they may be correlated with the participants' English proficiency levels.

2.2 Affective Filters Impacting Language Learning

Several decades ago, Dulay and Burt (1977) first proposed the notion of affective filters under the name of 'affective delimiters' (p. 99). They explained that 'internal affective factors delimit to a significant extent the external linguistic input which the learner takes into account

to reconstruct the target language system' (p. 100). Shortly after, Krashen (1982, 1985, 1987) proposed the Affective Filter hypothesis, in which he claimed that 'filters' such as anxiety, motivation, and self-confidence are affective variables influencing second or foreign language acquisition. In other words, high anxiety, low motivation, and little self-confidence are 'filters' that can prevent learners from achieving success in second or foreign language acquisition.

The Affective Filter hypothesis is one of the five hypotheses of Krashen's Monitor Model, which has been a well-known and widely accepted theory of second or foreign language acquisition. Although 'many teachers and administrators accept the theory as the word of God and preach it to the unenlightened' (McLaughlin, 1987, p. 58), Krashen's Affective Filter hypothesis was often criticised. Krashen (1985) stated that learners cannot fully utilise the input they receive for language acquisition when they are 'unmotivated, lacking in self-confidence, or anxious' (p. 3). He also referred to 'the strengthening of the affective filters at about puberty' (Krashen, 1982, p. 44). Those statements may be interpreted to imply that children are better language learners because they are more motivated, not lacking in self-confidence, and less anxious than adults due to their weaker affective filters. However, that is not necessarily true, and therefore 'affective variables cannot account for the imperfect second language acquisition of adults' (Scovel, 1988, p. 96).

On the other hand, after discussing various criticisms and contributions of Krashen's Monitor Model, Lai and Wei (2019) concluded that it 'is a very systematic and comprehensive theory on the basis of his years of observation, research and teaching' (p. 1463). Although students' foreign language proficiency levels may not necessarily be correlated with their levels of foreign language speaking anxiety, high anxiety is likely to be regarded as a filter that negatively affects their oral performance (Çağatay, 2015; Woodrow, 2006).

Similarly, low motivation is regarded as a filter that hinders students from learning a

second or foreign language, and high motivation is considered to be related to students' language acquisition ability. Noels, Clément, and Pelletier (2001) found a statistically significant correlation between students' motivational intensity and their final grades. It appears that anxiety, motivation, and proficiency levels are closely related to each other.

However, people are different from each other (Kluckhohn & Murray, 1948), and 'many teachers see associations between personality attributes and the successful acquisition of a second language' (Gardner, 1985, p. 25). Considering that Krashen's (1987) affective filters are 'deeply shaped by an individual's upbringing as well as inherent traits' (Patrick, 2019, p. 42), individual differences should be considered when investigating a relationship between second or foreign language anxiety, motivation, and proficiency levels. Consequently, in addition to language aptitude and motivation, individual differences have also been identified as a key factor in second or foreign language acquisition. However, as Dörnyei and Ryan (2015) indicated, explaining individual differences by describing personality traits is relatively limitative, and therefore it might be appropriate to analyse individual differences from different perspectives. For example, McAdams and Pals (2006) noted that individual differences develop from various levels of situatedness. Thus, one possible option is to regard individual differences as situation dependent. The next section focuses on anxiety, which, in the particular case of foreign language anxiety, can be categorised as situation-specific anxiety.

2.3 Language Learning Anxiety

This section discusses anxiety regarding foreign language learning from individual and cultural perspectives and explains the various types of anxiety.

2.3.1 Language Anxiety Related to Personal and Cultural Variables

According to Spielberger (1966), human anxiety has traditionally been classified into two categories: (1) trait anxiety and (2) state anxiety. Trait anxiety refers to ‘relatively stable individual differences in anxiety proneness’ (Spielberger, 1972, p. 39). People with higher trait anxiety is likely to feel more anxious in a variety of situations than those with lower trait anxiety. In contrast, state anxiety is ‘a transitory emotional state’ (Spielberger, 1972, p. 39) that is experienced at a particular moment. Subsequently, Spielberger, Anton, and Bedell (1976) proposed a ‘situation-specific’ type of anxiety (p. 318). This type of anxiety ‘is aroused by a specific type of situation or event such as public speaking, examinations, or class participation’ (Ellis, 2008, p. 691). Horwitz (2001) stated that ‘language anxiety is a specific anxiety rather than a trait anxiety’ (p. 112), and argued that anxiety about learning a second or foreign language is more suited to being classified as situation-specific anxiety than being classified as trait anxiety.

Previous empirical studies suggested that a variety of variables can negatively impact students’ levels of foreign language anxiety, including the person who they speak to, the place where they speak, the task that they are asked to perform, and their teacher’s native language (Çağatay, 2015; Jackson, 2002; Woodrow, 2006; Yentürk & Dağdeviren-Kırmızı, 2020). Talking to native speakers is more likely to raise their anxiety levels than talking to their classmates (Çağatay, 2015; Woodrow, 2006), out-of-the-class anxiety is not the same as in-class anxiety by nature (Woodrow, 2006), speaking in front of the class and being the centre of attention can raise students’ anxiety levels (Jackson, 2002), and being taught by a native English-speaking teacher can make them feel more anxious than being taught by a non-native teacher (Yentürk & Dağdeviren-Kırmızı, 2020). All those variables indicate that foreign language anxiety, especially speaking anxiety, is situation-specific. It is also likely that teachers’ lack of awareness regarding this type of anxiety can increase the debilitating effects of

students' anxiety about language learning (Ansari, 2015; Trang, Baldauf, & Moni, 2013). Teachers see a positive side of anxiety whereas students have a negative view of foreign language anxiety (Trang et al., 2013).

On the other hand, Jiang and Dewaele (2019) demonstrated that Chinese university students' anxiety was 'mostly predicted by learner-internal variables' (p. 22). In fact, the results of the above-mentioned empirical studies can be interpreted differently. For example, not all students had the same opinion about out-of-the-class anxiety as well as in-class anxiety (Woodrow, 2006), and thus there are individual differences in this respect. There also seem to be cultural differences. Jackson (2002) investigated the reticence of Chinese university students in Hong Kong, and stated that some students were 'concerned about their ability to express their thoughts in English, others were more anxious about being the center of attention and would be as brief as possible when responding' (p. 74). In this regard, Jackson (2002) referred to 'modesty,' which is 'one of the values that is promoted in traditional Chinese culture' (p. 74). Similarly, Woodrow (2006) demonstrated that EFL learners from Confucian heritage cultures such as China and Japan had higher anxiety levels than other groups. Thus, one of the concerns of the present study is to find a possible effect of Japanese undergraduate science and engineering students' anxiety on their English learning.

2. 3. 2 Types of Language Anxiety

Although high anxiety can be a filter that hinders students from learning a second or foreign language (Krashen, 1987), previous empirical studies suggested that this might not always be the case. In terms of language learning, anxiety can be divided into two categories: (1) debilitating anxiety and (2) facilitating anxiety (Alpert & Haber, 1960; Scovel, 1978; Zheng, 2008). The idea behind this categorisation is that an excessive amount of anxiety can be

detrimental and result in poor learning and performance, whereas moderate levels of anxiety can motivate students and enhance their learning and performance.

Previous empirical studies on learning a second or foreign language generally demonstrated that anxiety had debilitating effects on students' learning, resulting in their poor performance (Aida, 1994; Horwitz, 1986; Liu & Huang, 2011; MacIntyre & Gardner, 1989; Saito & Samimy, 1996). Teimouri, Goetze, and Plonsky (2019) meta-analysed previous studies about the relationship between anxiety and achievement, and concluded that 'anxiety is best conceptualized as a negative predictor of language achievement' (p. 381). In some cases, however, anxiety is not a cause but rather a result of students' low self-evaluation or their lower proficiency as compared to their classmates (Ansari, 2015; Tianjian, 2010). MacIntyre (2017) denoted that 'the available evidence points to anxiety as both a consequence and a cause of language performance' (p. 27). In any case, Horwitz (2017) questioned the existence of 'facilitative' anxiety (p. 218), and MacIntyre (2017) stated that 'anxiety is best conceptualised only as debilitating' (p. 27).

Conversely, some empirical studies have focused on the facilitating side of anxiety. The findings of those studies suggest that anxiety may lead to an improvement in performance (Marcos-Llinás & Garau, 2009; Park & French, 2013). Likewise, Nassif (2019) indicated that some level of foreign language anxiety 'may not be as debilitating as traditionally thought' (p. 314).

Other studies have indicated that anxiety can be both debilitating and facilitative. Ohata (2005) conducted interviews with seven experienced ESL/EFL teachers, and noted that many of them referred to 'several factors of individual learner differences' (p. 145). For example, students' perceived level of English proficiency, their personality, task difficulty, and cultural differences may influence whether their anxiety can be debilitating and facilitative. In Teimouri's

(2017) empirical study, students' motivational orientations were related to debilitating and facilitative effects of anxiety. Anxiety had a debilitating effect on students whose motivation was promotion focused, since 'anxiety represents a misfit and thus is harmful to their motivation' (Teimouri, 2017, p. 689). Conversely, for students with prevention focused motivation, 'anxiety plays a facilitative role by keeping them alert to the presence of possible negative outcomes' (Teimouri, 2017, p. 702). For this reason, it is worthwhile to investigate students' anxiety in relation to their motivational orientations.

2. 3. 3 Research in Foreign Language Education: the FLCAS

Anxiety has received attention in the field of second or foreign language teaching and learning since the 1980s. Various instruments have been developed to measure foreign language anxiety (Al-Saraj, 2014; Matsuda & Gobel, 2004; Salehi & Marefat, 2014), but they were all similar to, and were created based on, the Foreign Language Classroom Anxiety Scale (FLCAS) developed by Horwitz et al. (1986).

The FLCAS uses a 5-point Likert scale from 1 (Strongly disagree) to 5 (Strongly agree) and contains 33 items, which 'are reflective of communication apprehension, test anxiety, and fear of negative evaluation in the foreign language classroom' (Horwitz et al., 1986, p. 129). Although Horwitz et al. (1986) implied that Items 9, 18, 24, and 27 were indicative of speech anxiety, they did not clarify which item should be categorised into which of the three factors: communication apprehension (CA), test anxiety (TA), and fear of negative evaluation (NE). This led subsequent researchers to 'misinterpret' (Park, 2014, p. 264) the instrument. Some studies used it as one-factor model and did not categorise the items (Morgan & Katz, 2021; Nassif, 2019; Russell, 2020), whereas others categorised the items into two, four, five, or eight factors in their own way (Khodadady & Khajavy, 2013; Mak, 2011; Matsuda & Gobel, 2004;

Nakanishi, 2020; Tóth, 2008; Yashima et al., 2009).

There have also been factor analytic studies about the FLCAS. For instance, Cao (2011) compared Huang's (2008) three-factor model, which consisted of CA, TA, and NE, and Zhao's (2007) four-factor model, which contained 'anxiety of English classes' (p. 77) as a fourth factor. Cao (2011) concluded that Huang's (2008) three-factor model had 'the better fit by comparing the fit indices' (p. 84). In contrast, Park (2012) examined a one-, two-, and three-factor model as well as two four-factor models. Model 1 did not categorise the items, Model 2 consisted of CA and NE, Model 3 comprised CA, TA, and NE, and Models 4 and 5 were made up of CA, TA, NE, and 'Foreign Language Class Anxiety' (p. 212) as a fourth factor. Although Models 1, 2, 3, and 4 contained the 33 items, Model 5 excluded Item 6 and contained only 32 items. Park (2012) concluded that none of the models provided acceptable fit indices, but that the four-factor models, Models 4 and 5, were more acceptable than Models 1, 2, and 3.

All those results reveal that there is a lack of consensus regarding categorisation. In fact, Horwitz (2017) herself mentioned that 'since the 33 original FLCAS items [...] were not chosen to represent a three-factor model of Language Anxiety, it is clearly not possible to classify the FLCAS in that way' (p. 36). On the other hand, in Huang's (2008) three-factor model, Liu's (2006) three-factor model, and Park's (2012) three- and four-factor models, the following 12 items were categorised in the same way like this:

Items 1, 9, 14, 18, 24, 27, and 32 of the FLCAS were categorised into CA,

Items 8 and 21 were categorised into TA, and

Items 2, 19, and 31 were categorised into NE.

Except for Item 32, I agree with this categorisation. First, Items 1, 9, 14, 18, 24, and 27 include the word 'speak' and only those items ask students how they feel when they speak English. However, Item 32 asks students how they feel about being around native English speakers,

and thus it is not necessarily associated with their speaking anxiety. Second, of the 33 items, only Items 8 and 21 contain the word 'test' and ask students how they feel about tests, and thus those items are clearly related to their test anxiety. Third, of the 33 items, only Items 2 and 19 include the word 'mistake' and ask students how they feel when they make a mistake, and only Item 31 includes the expression 'laugh at,' which shows contempt in Japanese culture. In this sense, Items 2, 19, and 31 are associated with students' anxiety about being negatively evaluated. For those reasons, I categorised six items (Items 1, 9, 14, 18, 24, and 27) into CA, two items (Items 8 and 21) into TA, and three items (Items 2, 19, and 31) into NE, to produce the score of each of the three anxiety factors.

In this categorisation, 22 out of the 33 items are not categorised into any of the three anxiety factors. However, it is not problematic, considering that Horwitz et al. (1986) 'did not argue that Communication Apprehension plus Test Anxiety plus Fear of Negative Evaluation formed an equation that resulted in Foreign Language Classroom Anxiety' (Horwitz, 2017, p. 31). In fact, Khodadady and Khajavy (2013), Mak (2011), and Yashima et al. (2009) used 23, 27, and 29 out of the 33 items respectively to produce the score of each of the four or five factors they created, although they asked their participants to complete the 33-item FLCAS. Although the FLCAS has been widely used in a variety of contexts, it has also been critiqued by several researchers. Luo (2018) summarised the criticism as follows:

First, data from some studies [...] seemed to suggest that the FLCAS may contain some redundancy. Second, the FLCAS mainly addresses anxiety related to speaking with very few or no items dedicated to anxieties arising from listening, reading, or writing. Third, the FLCAS is a generic FL anxiety scale that does not take into consideration the characteristics of specific target languages. (Luo, 2018, p. 374)

To mitigate the second drawback, Pichette (2009) employed the FLCAS to obtain information about oral communication, and used the Foreign Language Reading Anxiety Scale (FLRAS)

and the Daly-Miller Writing Apprehension Test (WAT) as measures of written communication. As for the third drawback, Liu (2006) created a 36-item FLCAS by adding three items to reflect the Chinese context.

In the particular case of my study, however, one of the problems in my organisation was that the students were not likely to register for 'Oral English.' Students are engaged in listening, reading, and writing activities in any type of English class, and they are required to speak English in 'Oral English' class. As I would like to focus on students' speaking anxiety, the FLCAS is suitable for my study. Russell (2020) stated that 'the FLCAS is an appropriate tool to measure language anxiety in any type of instructional setting' (p. 341).

In the university where this research was conducted, all English classes are formed based on the multiple-choice test results. Although students have never complained about this procedure, some teachers argue that it is better to use a speaking test to form 'Oral English' classes. Their contention is that there are students who can achieve a high score on the TOEIC L&R but may not be able to speak English fluently, and that those students face difficulty in participating in activities in a higher level 'Oral English' class. If their contention is true, students in higher level classes may have higher levels of communication apprehension despite having low levels of test anxiety. For this reason, the present study aims to find a possible correlation between Japanese undergraduate science and engineering students' foreign language anxiety (such as communication apprehension and test anxiety) and their levels of English proficiency (i.e., the class they were placed in).

2.4 Motivation in Language Learning

Similar to anxiety, motivation is included in the affective filters that can impact students' second or foreign language acquisition (Krashen, 1987). This section focuses on motivation

and how it has been investigated in relation to second or foreign language learning as well as foreign language anxiety.

2. 4. 1 Concepts of Integrative and Instrumental Motivation

In terms of language learning, motivation is similar to anxiety in that ‘nurture and nature are at play’ (Patrick, 2019, p. 42). In other words, motivation in language learning can be influenced by individual differences in upbringing and also differences in personality traits. With regard to the upbringing of students, motivation to learn a language can be examined from the perspective of ‘integrativeness’ and ‘instrumentality’ (Gardner & Lambert, 1959, 1972). Integrative motivation refers to a desire to integrate into the target language community by using the language, whereas instrumental motivation is related to the accomplishment of a task such as passing an examination or finding a job (Dörnyei, 1990, 1994; Gardner & Lambert, 1959, 1972). Due to such differences in characteristics, in bilingual societies such as Canada, ‘an integrative orientation would sustain better the long-term motivation needed for the very demanding task of second-language learning’ (Gardner & Lambert, 1972, p. 132), whereas instrumental reasons contribute more significantly to motivation in EFL contexts such as Japan (Dörnyei, 1990).

Previous studies conducted in Japan were in line with Dörnyei (1990, 1994). Since the main reason of Japanese secondary school students for studying English is to pass entrance examinations for university, they are more likely to have instrumental motivation (Norris-Holt, 2001). The same is true of university students. Yashima (2000) investigated English learning motivation of Japanese university students studying informatics, and found that ‘instrumental orientation’ was most highly correlated with their motivation, and that ‘intercultural friendship orientation’ was the second most correlated. The latter type of orientation reflected the role of

English as a lingua franca, without clearly specifying the target community. Similarly, Irie (2003) reviewed previous studies on motivation, and indicated that Japanese university students tended to appreciate the instrumental value of learning English to pass examinations or pursue a career. Irie (2003) also suggested that although Japanese students were interested in communicating with native English speakers and visiting English-speaking countries, this seemed to be 'different from the traditional type of integrative motivation' (p. 97). Integrative motivation traditionally refers to a desire to integrate into the target language community (Gardner & Lambert, 1972), but it is now interpreted more broadly as a generally favourable attitude towards cultures and speakers of the target language community (Gardner, 2001).

Previous studies on motivation also suggested that integrative motivation in this broader sense was common among Japanese university students (Irie, 2003). However, the situation in Japan is different from Montreal, Canada, where Gardner first developed the concept of integrativeness. In countries like Japan, where English is taught as a school subject, 'the "integrative" metaphor does not have any obvious meaning' (Dörnyei, 2009, p. 24). Instead, Ryan (2009) argued that for Japanese students, the 'idea of an L2 community tied to location and nationality [...] is not as powerful a motivating factor as a vaguely defined English-speaking community' (p. 138). From those studies, it can be inferred that Japanese students are generally likely to view English as a lingua franca instead of the language of a specific English-speaking country.

As mentioned earlier, Kachru (1985) proposed three concentric circles of World Englishes: (1) the inner circle, (2) the outer circle, and (3) the expanding circle. The inner circle includes countries such as the UK and the US, where English is the first language of most residents or is a dominant language. This circle is regarded as 'the traditional cultural and linguistic bases of English' (Kachru, 1992, p. 356). The outer circle, which is also called the

extended circle, consists of post-colonial countries or areas, such as the Philippines, Singapore, and Hong Kong, where English is not the first language but plays an important role in society. This circle is distinguished from the expanding circle, which includes countries such as Japan and Russia, where English is studied as a foreign language to be used as a *lingua franca*. In the past, when Japanese students went abroad to learn English, they always chose an English-speaking country. However, currently, a growing number of Japanese students go to the Philippines to learn English at a low cost and this 'increase has been supported by demand from students and services industry workers who want to put themselves in an English-speaking environment' (The Japan Times, 2018). Considering that the Philippines is not solely an English-speaking country but is included in what Kachru (1985) referred to as the outer circle, it appears that the term 'English' does not refer to the specific language used in the inner circle but rather a *lingua franca* that has an instrumental value. However, it is not clear why those students are motivated to go to the Philippines even though they can learn English in Japan. While it is true that the Philippines is a low-cost country and is closer to Japan than English-speaking countries, learning English in Japan is less expensive.

Furthermore, the traditional concept of instrumentality/instrumental motivation itself was questioned by Zoltán Dörnyei while he was developing the L2 Motivational Self System, which consists of three components: (1) the ideal L2 self, (2) the ought-to L2 self, and (3) the L2 learning experience (Dörnyei, 2005, 2009). The ideal L2 self represents individuals' imagined ideal future self about L2 (second language) learning, and demonstrates their desire to reduce the discrepancy between their actual self and ideal self. In contrast, the ought-to L2 self represents the attributes that individuals believe they ought to possess in order to meet others' expectations or to avoid possible negative L2 learning outcomes, and consequently involves extrinsic types of instrumental motivation (Dörnyei & Ushioda, 2011).

In this system, instrumentality/instrumental motivation is categorised into two types in line with Higgins's (1987, 1998) promotion/prevention distinction. One is termed 'instrumentality-promotion,' which is the type related to the ideal L2 self. The other is called 'instrumentality-prevention,' which is the type concerning the ought-to L2 self (Dörnyei & Ushioda, 2011). Instrumentality-promotion is associated with 'professional/career advances that the individual desires' (Dörnyei, Csizér, & Németh, 2006, p. 93), whereas instrumentality-prevention is not internalised and is associated with 'a mere sense of obligation, duty or a fear of punishment' (Dörnyei et al., 2006, p. 93). In terms of Japanese undergraduate science and engineering students, instrumentality-promotion is related to achieving a high score on the TOEIC L&R to secure a good job or to be admitted to a postgraduate school, whereas instrumentality-prevention is related to obtaining enough credits to graduate.

Considering the above-mentioned distinction between the ideal and ought-to L2 selves, students' motivational orientations can affect their levels of foreign language anxiety. Being instrumentally motivated can decrease or increase students' foreign language anxiety levels, depending on the type of their instrumental motivation. The ought-to L2 self is likely to raise their anxiety levels whereas the ideal L2 self is likely to reduce their anxiety levels. In reality, Papi's (2010) empirical study demonstrated that 'the more the students' behavior is motivated through their ought-to L2 self in learning English, the more anxious they are' and that 'the more developed the students' ideal L2 self, the less anxious they become in using and learning English' (p. 475).

However, there are cultural and individual differences in the ideal and ought-to L2 selves. Taguchi, Magid, and Papi (2009) indicated that traditionally the ought-to L2 self was considered to play an important role for Asian students due to the collectivistic nature of their cultures. They explained that Chinese students 'view themselves not only in individualistic

terms like many Westerners do, but also as a direct extension of their family' (Taguchi et al., 2009, p. 80). I presume that Japanese students are similar to Chinese students in that 'they feel a great obligation to their parents to study' (Taguchi et al., 2009, p. 80). Furthermore, Kim (2009) investigated two Korean ESL students in Toronto, Canada, and found some individual differences in their ideal and ought-to L2 selves. For one participant, 'the ideal L2 self and the ought-to L2 self function on different planes' (p. 285), which was not the case with the other participant. The ideal L2 self of one participant was related to one of his goals of communicating with other L2 speakers but the ought-to L2 self was connected with his different goal of securing an English-related job in Korea. In contrast, being employed by a steel exporting company was the only goal of the other participant, and it was not only related to his ought-to L2 self but also subsumed into his ideal L2 self. Therefore, one of the topics under investigation in the present study is the relationship between Japanese undergraduate science and engineering students' motivational orientations and their levels of anxiety associated with their ideal and ought-to L2 selves.

There is a third component in Dörnyei's (2005, 2009) L2 Motivational Self System: the L2 learning experience. It is related to individuals' learning environment and their experience about L2 learning such as the influence of their teachers, the curriculum, the peer group, or their own previous experience of success (Dörnyei & Ushioda, 2011). In the university where this study was conducted, there are a lot of assignments that are completed by students in pairs and groups in the 'Oral English' class, and I often hear that students are happily engaged in activities if they are on good terms with their partner or group members, and vice versa. Papi's (2010) empirical study demonstrated that negative L2 experience led to high levels of anxiety among students whereas positive L2 experience lowered their anxiety levels. Thus, negative L2 learning experience may be included in Krashen's (1987) affective filters. It is

important to investigate how students' experience about learning English can affect their levels of motivation in relation to anxiety.

2. 4. 2 Concepts of Intrinsic and Extrinsic Motivation

Motivation is also classified into intrinsic and extrinsic motivation (Deci, 1971; Deci & Ryan, 1985). Intrinsic motivation refers to an action or behaviour driven by internal factors, for the sake of enjoyment, satisfaction, or fulfilment (Deci, 1971), and it has been studied in a variety of contexts since the early 1970s. In contrast, extrinsic motivation is related to external factors such as securing rewards or avoiding negative consequences (Deci & Ryan, 1985). This type of motivation is based on rewards such as prizes or good grades as well as external factors such as high expectations from parents or teachers and avoidance of punishment (Deci & Ryan, 1985).

Intrinsic motivation is derived from the subject itself rather than external rewards; consequently, it is long-lasting and deep-rooted (DeLong & Winter, 2002; Ehrman, 1996). In contrast, extrinsic motivation is temporary in nature and does not last for a long time; however, it is easier to motivate students extrinsically and produce changes in their behaviour (DeLong & Winter, 2002; Ehrman, 1996). However, it is often necessary to escalate rewards to maintain an appropriate level of extrinsic motivation within students, and providing rewards could negatively affect students' motivation. For instance, in Deci's (1971) research, 24 psychology students were divided into two groups and asked to solve a puzzle called Soma on three different days. The motivation of the group with a reward (one dollar) increased on the second day, but on the third day it became lower than on the first day. The motivation of the group without any payment decreased on the second day, but on the third day it became higher than on the first day. Deci (1971) concluded that providing an external reward could have a negative

influence on intrinsically motivated learning behaviour.

On the other hand, it should be noted that intrinsic-extrinsic dichotomies can lead to misunderstandings. Deci and Ryan (1987) pointed out that intrinsically motivated activities are self-determined, but that extrinsically motivated activities can also be self-determined. 'One could willingly and freely pursue some extrinsic end (in which case it would be autonomous), or one could be pressured toward a goal (in which case it would be controlled)' (Deci & Ryan, 1987, pp. 1033–1034). Autonomous learners are 'by definition motivated learners' (Ushioda, 1996, p. 2). Considering that both intrinsic and extrinsic motivation can be autonomous, it is not always the case that students who have intrinsic motivation tend to be more autonomous and more motivated learners than students driven by extrinsic motivation. Extrinsically motivated students may have higher levels of motivation than intrinsically motivated students.

Ehrman (1996) also indicated that these two types of motivation 'are not mutually exclusive' (p. 138). Students who begin to study English as a compulsory subject may come to find it enjoyable. Conversely, students who enjoy learning English may start to improve their English skills to pursue their career. Thus, it is worth examining how the students' motivational orientations are related to their levels of motivation, and it is also worthwhile to investigate whether or not their types of motivation will change during the first two years of their undergraduate course.

Expanding on their earlier work on motivation, Deci and Ryan (1985, 2000) developed the 'self-determination' theory. This is a theory of motivation that deals with three motivational orientations: (1) amotivation, (2) extrinsic motivation, and (3) intrinsic motivation. To explain the three concepts, Deci and Ryan (2000) developed the 'self-determination continuum' (p. 237). As depicted in Figure 1, Amotivation, which is on the left-hand side of the continuum, comprises a lack of motivation. The degree of self-determination or autonomy increases from

left to right. Intrinsic motivation, which is on the right-hand side of the continuum, is more autonomous than extrinsic motivation, which is located in the middle.

Figure 1
The Self-Determination Continuum (Deci & Ryan, 2000, p. 237)

Behavior	Nonself-determined					Self-determined
Type of Motivation	Amotivation		Extrinsic Motivation			Intrinsic Motivation
Type of Regulation	Non-regulation	External Regulation	Introjected Regulation	Identified Regulation	Integrated Regulation	Intrinsic Regulation
Locus of Causality	Impersonal	External	Somewhat External	Somewhat Internal	Internal	Internal

Extrinsic motivation includes four types of regulations. External regulation is the least autonomous type of extrinsic motivation. Externally regulated behaviours are performed to obtain some sort of reward, to satisfy some external demand, or to avoid punishment. Introjected regulation is slightly more autonomous than external regulation. Behaviours of introjected regulation are performed to avoid feeling guilty or to attain some pride in oneself. It is a type of 'regulation by contingent self-esteem' (Ryan & Deci, 2000b, p. 72). At the same time, identified regulation is an autonomous type of extrinsic motivation. Regulation through identification means that the behaviours are highly valued and accepted as personally important and useful. Finally, integrated regulation is fully autonomous and highly similar to intrinsic motivation. It has many qualities in common with intrinsic motivation, although it is still categorised as extrinsic motivation. The reason for this is that behaviours of integrated regulation are performed to achieve some outcomes that are separable from their inherent enjoyment. In other words, those behaviours are performed to achieve goals that are valued in society. Some studies have combined identified regulation, integrated regulation, and intrinsic motivation to form 'an autonomous motivation composite' (Ryan & Deci, 2000b, p. 73).

However, as explained in Chapter 1, Noels et al. (2000) did not include integrated

regulation in the Language Learning Orientation Scale (LLOS). Unlike Deci and Ryan (1985, 2000), they divided extrinsic motivation into three types of regulation: (1) external regulation, (2) introjected regulation, and (3) identified regulation. Indeed, the fourth type of extrinsic motivation, integrated regulation, is difficult to distinguish from the third type, identified regulation. In Noels et al. (2000), integrated regulation was not included 'because earlier studies of motivation in education had difficulty distinguishing the construct from identified regulation' (p. 79). For the same reason, in many other questionnaire-based studies, 'the variable of integrated regulation is omitted' (Takahashi & Im, 2020, p. 675), although Ryan and Deci (2017) still included it as a type of extrinsic motivation.

2. 5 Language Proficiency in Relation to Language Anxiety and Motivation

Previous empirical studies suggested that students' language proficiency is related to foreign language anxiety and certain types of motivation. Khodadady and Khajavy (2013) demonstrated that Iranian EFL learners who were intrinsically motivated to learn English felt less anxious than extrinsically motivated learners, and that their anxiety was negatively related to their achievement. Thus, in their study, the participants who were intrinsically motivated had higher English proficiency than those who were extrinsically motivated. The findings were corroborated by Karatas, Alci, Yurtseven, and Yuksel (2015), who investigated Turkish university students of English and noted that their academic achievement was closely related to intrinsic motivation and autonomous learning. Similarly, Takahashi and Im (2020) examined Japanese university students and produced the same results. Of the constituents in Deci and Ryan's (1985, 2000) self-determination theory, 'intrinsic motivation predicted intended effort most strongly' (Takahashi & Im, 2020, p. 688), which led to higher English proficiency.

Those studies used in-house data. Khodadady and Khajavy (2013) measured the

participants' achievement by their final scores on the textbook-based tests in the four main English skills (listening, speaking, reading, and writing), Karatas et al. (2015) obtained the data called 'Proficiency Exam Result' from the school administration, and Takahashi and Im (2020) used the participants' scores on the Global Test of English Communication (GTEC) created by a Japanese company.

On the other hand, Sadighi and Maghsudi (2000) and Tóth (2007) used the Test of English as a Foreign Language (TOEFL[®], henceforth TOEFL) scores to investigate the participants' motivation and their English proficiency. Sadighi and Maghsudi (2000) showed that integratively motivated Iranian EFL students performed significantly better than instrumentally motivated students on the TOEFL, although they admitted that the results of their study 'cannot be applied to all groups of language learners and all language learning situations' (p. 49). Tóth (2007), in turn, concluded that 'measured (objective) proficiency—operationalised by TOEFL scores—was found to be a weaker predictor of participants' anxiety level than self-rated (subjective) proficiency' (p. 139).

Considering the situation in Japan, where English is taught as a school subject and therefore instrumental reasons contribute more significantly to motivation (Dörnyei, 1990), I assumed that the results of my research would be completely opposite to those of Sadighi and Maghsudi (2000). That is, I assumed that instrumentally motivated students would perform significantly better than their integratively motivated counterparts. Thus, one of the topics under investigation in the present study is the relationship between the students' motivational orientations and their English proficiency levels. I examined this issue by investigating the differences between classes formed by proficiency level. In the university where this study was conducted, all the English classes for first-year students are formed based on the results of the TOEIC Bridge and all the English classes for second- or third-year

students are formed based on the results of the TOEIC L&R. Similar to the TOEFL, they are multiple-choice tests developed by the Educational Testing Service (ETS) in New Jersey, US.

2. 6 Previous Empirical Studies and Rationale for the Study

There is a relatively large body of research regarding second or foreign language anxiety and motivation. However, there are certain areas that deserve closer attention and should be investigated further.

Although extrinsic motivation has traditionally been treated as an antagonistic counterpart to intrinsic motivation, the self-determination continuum suggested that 'extrinsic motivation could lead to more intrinsic involvement either by the internalization of motives or by discovering new intrinsic aspects of a task through longer engagement in it' (Schoaib & Dörnyei, 2005, p. 33). Therefore, it is important to investigate students' motivation over a longer period to determine if there is any shift from extrinsic to intrinsic motivation. It also seems appropriate to investigate students' motivation from a longitudinal perspective, since this attribute is not seen as a static but rather as a dynamic process that can evolve over time by going through some fluctuation (Dörnyei & Ottó, 1998; Schoaib & Dörnyei, 2005; Ushioda, 2001).

Foreign language anxiety is also 'an emotion that fluctuates over time' (MacIntyre, 2017, p. 23), and therefore 'focusing on fluctuations in language anxiety levels [...] could be a fruitful trajectory' (Gkonou, Dewaele, & Daubney, 2017, p. 221). For this reason, I decided to conduct this research as a two-year longitudinal study. I also considered that it would be worthwhile to investigate students' motivational orientations to learn English as a foreign language based on Deci and Ryan's (1985, 2000) self-determination theory, since relatively smaller numbers of studies have examined foreign language anxiety in relation to this theory.

I was conscious that I would be undertaking this study in Japan, where research about motivation to learn English as a foreign language has been frequently conducted with university students. Existing literature reveals that motivation to learn a second or foreign language has most often been examined in Asian countries. Boo, Dörnyei, and Ryan (2015) investigated publications that focused on motivation for second or foreign language learning, by analysing established journal articles and book chapters written in English, published between 2005 and 2014. They found that of the studies' participant groups, university students comprised the largest participant group, and that Chinese and Japanese were the two most studied nationalities. Their findings also indicated that the studies were almost exclusively related to English learning, often in monolingual contexts such as Japan.

Previous empirical studies suggested that there were differences in motivation regarding second or foreign language learning between Asians and Westerners. Unemori, Omoregie, and Markus (2004) found that there was a significant difference between Japanese students and European-American students in this regard. Similarly, Lockwood, Marshall, and Sadler (2005) demonstrated that Asian Canadians had stronger prevention orientations and were motivated by negative models whereas European Canadians were motivated by positive models. If students' motivation is significantly affected by cultural contexts as the above-mentioned previous empirical studies suggested, there might also be some differences between Asians and Westerners with regard to anxiety. Although many studies recently examined foreign language anxiety in Asian countries (AlNatour, 2018; Al-Saraj, 2014; Lu & Liu, 2011; Yashima et al., 2009), it is still worth exploring 'links among motivation, anxiety and identity' (Gkonou, Dewaele, & Daubney, 2017, p. 221) in the Asian context.

As discussed above, foreign language anxiety and motivation to learn a second or foreign language have been investigated for decades in many different contexts. Some

studies have examined foreign language anxiety or motivation separately, whereas in some other studies researchers have investigated both foreign language anxiety and motivation. However, in many cases, previous studies on foreign language anxiety and motivation have been questionnaire-based and quantitative in nature, and thus 'have not captured the full range of participants' ideal L2 selves' (Takahashi, 2013, p. 3). For this reason, I decided to add a qualitative phase to the present study to investigate Japanese undergraduate science and engineering students' foreign language anxiety and motivational orientations. Table 3 presents a comparison between this study and some previous studies that investigated both foreign language anxiety and motivation. My research is a longitudinal study, whereas all the other studies were cross-sectional.

Table 3			
<i>Comparison between Previous Studies and the Present Study</i>			
Studies	Sources of data	Participants	Contexts
Khodadady and Khajavy (2013)	FLCAS + LLOS / final scores on the textbook-based tests in the four main English skills	Iranian EFL learners	Language institute
Liu and Huang (2011)	FLCAS + motivation questionnaire	Chinese EFL learners	University
Tóth (2007)	FLCAS + self-report questionnaire measuring motivation and other characteristics / aptitude test / TOEFL	Hungarian English major students	University
Wei (2007)	FLCAS + motivation questionnaire	Chinese EFL learners	University
Yashima et al. (2009)	FLCAS + LLOS	Japanese EFL learners	University
The present study	FLCAS + LLOS / semi-structured interviews / TOEIC Bridge and TOEIC L&R	Japanese EFL learners	University

Yashima et al. (2009) conducted a quantitative study of Japanese university students' foreign language anxiety and motivational orientations to learn English, the relationship between these two variables, and the gender differences by administering the FLCAS and LLOS; however, they did not examine anxiety and motivation in association with the

participants' English proficiency levels. Khodadady and Khajavy (2013) also employed the FLCAS and LLOS in their quantitative study of foreign language anxiety and motivational orientations of Iranian students learning English as a foreign language at a private language institute. They examined the participants' English abilities across all four skills but did not take into account their self-perceived English proficiency. Tóth's (2007) study was also quantitative and investigated Hungarian English major students' foreign language anxiety and other variables such as their language aptitude, personality, motivation to learn English, English proficiency, and self-perceived English proficiency. Tóth (2007) measured the participants' anxiety and English proficiency by the FLCAS and TOEFL respectively, but developed a questionnaire originally to evaluate other variables including motivation.

Thus, based on this, I decided to employ the FLCAS and LLOS in this research to conduct the quantitative data analysis regarding Japanese undergraduate science and engineering students' foreign language anxiety and motivational orientations. To measure their English proficiency, I decided to use the students' scores on the TOEIC Bridge or the TOEIC L&R, both of which were used as a placement test in the university where this study was conducted. I also decided to conduct semi-structured interviews for qualitative analysis.

2.7 Chapter Summary

According to previous research, foreign language anxiety and motivational orientations are positively or negatively correlated with each other. Being extrinsically motivated is generally considered to reduce students' anxiety levels, but extrinsic motivation can be a cause of anxiety if students are motivated to avoid punishment. Similarly, it is likely that the ideal L2 self decreases students' anxiety levels whereas the ought-to L2 self increases their anxiety levels.

Students' English proficiency can also be positively or negatively correlated with foreign

language anxiety and motivational orientations. For instance, high anxiety and low motivation are categorised into Krashen's (1987) affective filters that hinder students' second or foreign language learning; however, anxiety is not always detrimental, and it can facilitate students' second or foreign language learning and performance in some cases. Likewise, intrinsic motivation is generally considered to have a more positive relation to students' second or foreign language learning, but a type of extrinsic motivation can affect their second or foreign language performance more positively in some cases.

Furthermore, motivational orientations affect students in a variety of ways. For example, Cerasoli, Nicklin, and Ford (2014) found that intrinsic motivation had a positive influence on students' quality-type tasks whereas extrinsic incentives affected their performance quantity. Shaw and Gupta (2015) revealed that external rewards had beneficial effects such as improvement of standardised test scores. On the other hand, identified regulation, which is an autonomous type of extrinsic motivation, was found to be most closely associated with academic performance or work performance (Burton, Lydon, D'Alessandro, & Koestner, 2006; Zhang, Zhang, Song, & Gong, 2016). Thus, there is a need for further research in this area.

In the next chapter, I will identify the main gaps in the previous studies that this research aims to contribute to filling in, and present the methodological rationale and the research methods adopted for this study.

Chapter 3: Methodology

3.1 Introduction

In this chapter, I present the methodological rationale for this research, namely, the approach, the research design, and the methods of data collection and analysis. The methodological approach will be justified in terms of alignment with both the research questions and my positioning as a practitioner researcher. This chapter concludes with a discussion of the ethical issues involved in this research and the strategies that I implemented to address such issues.

3.2 Aim of the Study and Research Questions

The aim of this research is to investigate Japanese undergraduate science and engineering students' foreign language anxiety and motivational orientations, in relation to their English proficiency and self-reported English ability. This study poses the following research questions:

RQ1 What are the nature and levels of foreign language anxiety reported by Japanese undergraduate science and engineering students studying English in a Japanese university?

RQ2 What types of motivation do the Japanese undergraduate science and engineering students have, to learn English as part of their undergraduate curriculum?

RQ3 How are the Japanese undergraduate science and engineering students' levels of foreign language anxiety correlated with their types of motivation to learn English?

RQ4 What differences can be found between science students and engineering students with respect to foreign language anxiety and motivation to learn English?

RQ5 How is the Japanese undergraduate science and engineering students' self-reported English ability related to their foreign language anxiety and motivation to learn

English?

RQ6 What are possible changes in the Japanese undergraduate science and engineering students' foreign language anxiety and their types of motivation to learn English during the first two years of their undergraduate course?

3.3 My Position as a Researcher

My philosophical positioning as a researcher should be mentioned here. The present research is inclined towards what Phillips and Burbules (2000) termed as 'postpositivism.' Postpositivism involves 'a certain pluralism of method' (Phillips & Burbules, 2000, p. 86), and postpositivists hold that combining quantitative and qualitative methods provides a better understanding of the studied issues. Positivists consider that even in human affairs, there is an 'ultimate reality' (Phillips & Burbules, 2000, p. 13) or an 'external reality that can be described and explained objectively' (Sharma, 2010, p. 702). Conversely, postpositivists recognise subjectivity and regard human beings 'as animate subjects that are studied and investigated contextually' (Panhwar, Ansari, & Shah, 2017, p. 256). I share the postpositivist view that positivism alone cannot explain everything objectively.

Mertens (2020) indicated that whilst constructivism is primarily qualitative, postpositivism is primarily quantitative. Panhwar et al. (2017) indicated that the postpositivist approach 'gives more weightage to the quantitative data, confirms/disconfirms their findings with qualitative data through the triangular process' (p. 257). Considering that the research questions posed in this study are mostly quantitative and likely to be confirmed and further explored with qualitative data, I regarded the postpositivist approach as the most appropriate for this research.

3.4 Type of Study

For the present study, I adopted a mixed methods research approach by utilising an explanatory sequential (QUAN-qual) design (Creswell & Creswell, 2018): collecting and analysing quantitative data first, and then carrying out qualitative research to further explore the aspects emerging from the quantitative data analysis that would go otherwise unexplored. The integration of two different data sets was intended to provide a better understanding of the phenomenon under examination. In the case of this study, the key idea is that the findings of qualitative data analysis help explain the results of quantitative data analysis. Previous studies in this field tended to be mostly quantitative in nature; therefore, I intended to gain a more complete picture and probe more deeply into the issues under investigation by adopting both quantitative and qualitative research methodologies. The primary purpose of mixed methods research is 'complementarity' through the adoption of 'methods used to address different aspects of the same question' (O'Cathain, Murphy, & Nicholl, 2007, p. 8).

Of several types of mixed methods designs presented by Creswell and Creswell (2018), I chose an explanatory sequential mixed methods design. This is a quantitative dominant design and 'is the type of mixed research in which one relies on a quantitative, postpositivist view of the research process, while concurrently recognizing that the addition of qualitative data and approaches are likely to benefit most research projects' (Johnson, Onwuegbuzie, & Turner, 2007, p. 124). According to Creswell and Creswell (2018), a key strength of the explanatory sequential mixed methods design is 'explaining the mechanism—how the variables interact—in more depth through the qualitative follow-up' (p. 222). By examining the Japanese undergraduate science and engineering students' foreign language anxiety and motivational orientations to learn English, I aimed to explain how these variables interacted with each other. One key idea was that the findings of qualitative data analysis would help

explain the results of the quantitative data analysis. Thus, the sequential QUAN-qual design was considered the most appropriate for the purpose of this study and for answering the research questions. The pragmatic foundations of mixed methods research and postpositivism are not mutually exclusive regarding nature and structure of knowledge. That is, both philosophical approaches recognise that not all can be explained objectively, and that there are different ways of interpreting reality.

3. 5 Phase 1: Quantitative Phase

This section explains the methods and protocol followed in the quantitative phase of the study. I first justify the sampling technique used in this study, and then explain how the questionnaire data were collected and analysed.

3. 5. 1 Sampling

The participants in the quantitative phase of this research were students from the Faculty of Science and Engineering's seven departments who entered the university in 2018. Data were collected for two consecutive years by using convenience sampling, which is a type of nonprobability sampling, whereby participants are chosen due to 'easy accessibility, geographical proximity, availability at a given time, or the willingness to participate' (Etikan, Musa, & Alkassim, 2016, p. 2).

Initially, I planned to use probability sampling so that all students from this faculty were given fair opportunities to be included in the sample. Regarding sampling in mixed methods research, Graff (2017) stated that probability sampling is 'used most often in QUAN research to obtain a sample that most accurately represents the entire population' (p. 56). However, the Faculty of Science and Engineering admits approximately 1,100 students every year, which is

quite a large population, but not all students are willing to participate in surveys. Furthermore, I conducted this research by myself and I also had time constraints. Thus, I decided to use convenience sampling, which 'can be useful when the researcher has limited resources, time and workforce' (Etikan et al., 2016, p. 1).

Patton (2015) described five problems with convenience sampling, which include a high possibility of being biased and of not representing the population. This is ascribed to the fact that 'convenience sampling is neither strategic nor purposeful' (Patton, 2015, p. 309). To alleviate this drawback, I followed a procedure similar to stratified random sampling, which is a type of probability sampling. In this method, the entire population is divided into smaller groups that are not overlapped, and subsequently a sample is drawn from each group separately. Each of the strata is mutually exclusive and collectively exhaustive. Each stratum is treated as an independent population, and therefore they can be compared with each other.

In this study, each of the participants belonged to only one department and was placed in only one class. I collected quantitative data by administering the questionnaires in each of the 'Oral English' classes. Their participation was totally voluntary and thus the data were not collectively exhaustive, but each of the strata was mutually exclusive in this manner. After grouping them into seven departments, I divided them into two groups: (1) science and (2) engineering. Finally, I compiled them into a complete data set of the Faculty of Science and Engineering. Following this procedure made those small groups more organised and more representative of the entire population than choosing participants just because of the ease of accessibility.

3. 5. 2 Quantitative Data Collection

This section first discusses the tools I used in the quantitative phase of this research,

and then explains the data collection process.

Tools

For the purpose of quantitative data collection, I created a questionnaire survey form that consisted of three sections: the anxiety section, the motivation section, and a third section. For the first and second sections, I employed two instruments: (1) the Foreign Language Classroom Anxiety Scale (FLCAS) and (2) the Language Learning Orientation Scale (LLOS). These instruments have been widely used in a variety of learning contexts as valid and reliable tools to measure students' foreign language anxiety and motivational orientations to learn a second or foreign language, respectively.

As discussed in Chapter 2, the FLCAS was developed by Horwitz et al. (1986). It consists of 33 items scored on a 5-point Likert scale, each rated from 1 (Strongly disagree) to 5 (Strongly agree). As the items 2, 5, 8, 11, 14, 18, 22, 28, and 32 are negative, the scores must be reversely computed. The higher the total score, the higher the levels of foreign language anxiety. Horwitz (2013) also explained that students 'with averages around 3 should be considered slightly anxious, while students with averages below 3 are probably not very anxious' (p. 264).

The LLOS, developed by Noels et al. (2000), consists of 21 items scored on a 7-point Likert scale. Students are asked to rate the extent to which each of the items corresponds with their reasons for learning the second or foreign language on a 7-point Likert scale ranging from 1 (Does not correspond at all) to 7 (Corresponds exactly). A high score implies a high degree of correspondence between each item and their reasons for studying the second or foreign language. This instrument was developed based on Deci and Ryan's (1985, 2000) self-determination theory. Noels et al. (2000) created three items related to amotivation, and also

proposed three items for each of the subtypes of extrinsic and intrinsic motivation. Vandergrift (2005) stated that the self-determination theory's extrinsic and intrinsic orientations of motivation 'constitute a useful framework for studying motivation in educational contexts' (p. 73). Thus, I used this instrument to investigate what types of motivation the Japanese undergraduate science and engineering students had to learn English as part of their undergraduate curriculum.

I utilised both scales after translating them into Japanese, for which I employed the same method as Tóth (2008), who produced a Hungarian version of the FLCAS, tested it for response validity, and found it to be reliable. Khodadady and Khajavy (2013) translated the FLCAS and LLOS into the participants' language, Persian, based on schema theory. However, I adopted Tóth's (2008) method, since her lucid explanation of the method assisted me in applying her method relatively easily. After translating the instruments into Japanese, I asked two bilingual colleagues to translate the instruments, and made alterations after comparing the three translations. Subsequently, I asked two other bilingual colleagues to translate my original translation back into English. I contrasted their translations with the original and made necessary modifications. Although the participants in this study had been studying English as a school subject for six years or more, they were not used to questionnaires written in English. Thus, to facilitate their understanding of the questionnaires, I translated the instruments into Japanese.

Prior to administration, in order to check for 'face validity' (Johnson, 2013, p. 1226) of the instruments, I carried out a pilot test with four postgraduate engineering students by employing think-aloud protocols. I asked them to read aloud each item of the instruments and to inform me if there was anything they found difficult to understand or did not like. Tóth (2008) interviewed three students majoring in English, but I asked postgraduate engineering students

since the prospective participants belonged to that major. Based on their comments, I made necessary modifications to ensure that the undergraduate students easily understood the questions.

The questionnaire survey form contained a third section and asked the respondents to rate their level of English on a three-point scale: (1) higher, (2) average, or (3) lower. This information was necessary since the aim of this research is to investigate Japanese undergraduate science and engineering students' foreign language anxiety and motivational orientations, in relation to their English proficiency and self-reported English ability. As Tóth (2007) indicated that 'measured (objective) proficiency—operationalised by TOEFL scores—was found to be a weaker predictor of participants' anxiety level than self-rated (subjective) proficiency' (p. 139), I examined the participants' self-reported English ability in addition to their actual English proficiency to verify whether the results of my research could corroborate Tóth (2007). In the second year of this study, the third section of the survey form included a question that asked the respondents if they had been learning English for a specific purpose for the past year. This information was necessary to investigate the issues related to motivation. The questionnaires can be found in Appendix A.

Data Collection Process

I administered the questionnaires in person, not online, because students at the university where this study was conducted were more familiar with paper-and-pencil questionnaires at the time the study was conducted. For example, class evaluation questionnaires are currently administered online, but they were administered in class until fairly recently. In this research, the questionnaire surveys were conducted during the 90-minute 'Oral English' classes: 'Oral English 1' in the first year and 'Oral English 3' in the second year.

With the permission of the university, one month before the surveys, I requested the teachers of the 'Oral English' classes to spare 15 minutes from a 90-minute class for the purpose of this study. In 'Oral English' classes, students engaged in various activities such as puzzles and quizzes, and they were asked to complete the questionnaires between those activities. The teachers of these classes were my colleagues over whom I had no authority or managerial responsibility. I explained to them that I would like to administer the questionnaires during the first or second week of June. I contacted them directly in person or via email.

Similarly, with the permission of the university, one week before the surveys, I notified prospective participants of the surveys through the university's online noticeboard to ensure that they understood the aim of my research and the treatment of the participant responses. In the questionnaire surveys, prospective participants were the students who registered for 'Oral English 1' in the first year and those who registered for 'Oral English 3' in the second year. Therefore, with the Participant Information Sheet (Appendix D), I sent a message to all the students who were enrolled in 'Oral English 1' in the first year and 'Oral English 3' in the second year. With the help of the administrative staff, the message was sent in a PDF file as an attachment to all the students who were enrolled in the subject.

Some teachers who preferred to distribute the questionnaires by themselves received the survey forms either in their mailbox or in person beforehand. I visited the classroom to give a brief explanation to the students. When some other teachers asked me to distribute the questionnaires, I visited each respective classroom at an appointed time, distributed the questionnaires, gave explanations, and returned later to collect the completed or uncompleted survey forms. The surveys were conducted by following the ethical guidelines of that period. As mentioned above, paper-and-pencil class evaluation questionnaires were administered in class twice a year, and it was a common practice that teachers distributed the survey forms to

their own students and collected them by themselves. If the questionnaires had been administered online at that time, I would have had to give extra explanation to conduct the surveys smoothly. I visited the classrooms to explain to the students that I was the researcher who was conducting the surveys, and that their 'Oral English' teacher was not part of this research. Since my own students were excluded from the study, I had no authority over the prospective participants.

There were approximately 1,100 students in total, but I distributed the survey forms to only the students who registered for 'Oral English 1' in the first year and to those who registered for 'Oral English 3' in the second year. 'Oral English 1' is a compulsory subject, and all the first-year students are enrolled in this course. 'Oral English 3' is a subject for second-year students and only those who have successfully completed their first year are allowed to register for this course. I excluded two classes in the first year because I taught 'General English' to those classes, and I was not able to collect data from three classes in the second year because the teachers who were in charge of the classes refused my request. However, fortunately, those five classes were from five different departments. Moreover, in the second year, there were two departments from which fewer than 20 students participated. From those two departments, a relatively smaller number of students took part in the surveys in the first year, too. Still, I collected sufficient data from the other five departments for the study period (two consecutive years). Thus, I would argue that the participants in the quantitative surveys were representative of the study population of the Faculty of Science and Engineering.

3. 5. 3 Quantitative Data Analysis

To analyse the quantitative data, I used the computer software IBM SPSS Statistics (Version 23.0) to conduct the following analyses: (1) internal consistency reliability, (2)

descriptive statistics, (3) Pearson correlation matrix, (4) multiple comparison analysis, and (5) *t*-tests. I examined the internal consistency of the questionnaires to evaluate their reliability, and the other four test results were necessary to provide answers to the research questions posed in this study. I will provide a detailed explanation of these statistical procedures in Chapter 4, as I present the findings for the different aspects under analysis in that chapter. In this chapter, I briefly explain why I chose these tests for conducting quantitative data analysis.

As for its reliability, the FLCAS has demonstrated 'internal reliability, achieving an alpha coefficient of .93 with all items producing significant corrected item-total scale correlations' (Horwitz et al., 1986, p. 129). Similarly, with regard to the LLOS, 'the Cronbach alpha index of internal consistency was acceptable for all subscales' (Noels et al., 2000, p. 68). Noels et al. (2000) demonstrated this through the alpha reliability coefficients of .82 for amotivation, .75 for external regulation, .67 for introjected regulation, .84 for identified regulation, .85 for intrinsic motivation (knowledge), .88 for intrinsic motivation (accomplishment), and .85 for intrinsic motivation (stimulation). Despite those results, I decided that it would be better to investigate the internal consistency of the FLCAS and LLOS to evaluate the reliability of these two instruments in this study.

Descriptive statistics can provide simple summaries about the sample. Therefore, I performed descriptive statistics to present the characteristics of the data sets, and used the results to answer Research Questions 1, 2, and 6. Pearson correlation matrix can be used to measure the linear correlation between two variables. Thus, I calculated the Pearson product-moment correlation coefficient for the total, as well as for each item of the FLCAS and LLOS, to investigate the relationship between anxiety and motivation. The results were necessary to obtain further information related to Research Questions 1, 2, and 3.

Since multiple comparison analysis can make three possible pairwise comparisons, I

performed multiple comparison analysis to compare the three groups when I examined three issues: (1) the participants' self-reported English ability (higher, average, and lower), (2) their having a specific purpose or not (yes, no, and uncertain), and (3) their class level being changed or not (lowered, the same, and raised). These results were necessary to answer Research Questions 5 and 6.

Finally, *t*-tests can be computed to compare two groups. In this research, I used two types of *t*-tests: independent samples *t*-tests and paired samples *t*-tests. The former type should be employed when the samples are independent of each other, and therefore I used it to compare science students with engineering students. On the other hand, the latter type can be performed to compare the same group at different times, and thus I employed it to compare the first year data with the second year data. The results were necessary to obtain further information related to Research Questions 4 and 6.

In terms of demographics, the participants were native Japanese speakers and had been learning English for six years or more as a school subject before entering the university. Most of the participants came directly from secondary school; therefore, their ages ranged from 18 to 20 in the first year and from 19 to 21 in the second year. Male students accounted for approximately 85% of the total population of the Faculty of Science and Engineering, and thus the participants represented the entire population in terms of gender ratio.

In the first year, 669 students (583 males and 86 females) participated in the study. Since I distributed 1,034 survey forms to prospective participants, the response rate was 64.7%. On the other hand, in the second year, 506 students (444 males and 62 females) took part. As I distributed 902 survey forms, the response rate was 56.1%. Of these participants, 332 students (291 males and 41 females) participated in the study twice: both for the first and second years. In both years, a lot of questionnaires were submitted incomplete. Some handed

in blank questionnaires, some answered only some of the questions, and others circled the same number to every item on the survey form. I excluded those incomplete questionnaires, and used only the completed questionnaires for data analyses. The data were analysed for each class (level of English proficiency), and were subsequently grouped by department (major) into a complete data set (first year and second year).

3. 6 Phase 2: Qualitative Phase

This section explains the methods and protocol followed in the qualitative phase of the study. I first justify the selection process of the interviewees, and then explain how the interview data were collected and analysed.

3. 6. 1 Participants

Previous studies in this field were mostly quantitative in nature; therefore, I conducted qualitative research to probe more deeply into the issues under investigation. I conducted semi-structured interviews to collect qualitative data by using convenience sampling, which is a type of nonprobability sampling, whereby participants are chosen due to 'easy accessibility, geographical proximity, availability at a given time, or the willingness to participate' (Etikan et al., 2016, p. 2).

Initially, I planned to use 'purposive sampling' (Patton, 2015, p. 265). In this type of sampling, participants are intentionally selected based on a number of criteria considered 'most informative in regard to research questions' (Graff, 2017, p. 57). Therefore, 'purposive sampling is typically used in qualitative research' (Etikan et al., 2016, p. 4). Initially, I planned to invite two or three students from each of the seven departments: one higher level student, one lower level student, and one mid-level student from those who volunteered to participate.

However, there were two departments from which no students volunteered, which made it impossible to use purposive sampling. As I was not able to recruit the same number of interviewees from each of the seven departments, I decided to use convenience sampling. Although this sampling technique is frequently employed in quantitative studies, it is applicable to qualitative studies as well as quantitative studies (Etikan et al., 2016; Suen, Huang, & Lee, 2014).

In both years, a question asking the respondents if they would volunteer to participate in an interview was included in the questionnaire survey form. There were three options: (1) Yes, I would be happy to volunteer, (2) I am undecided, and (3) No, I would rather not. Consequently, only the respondents who chose 'Yes, I would be happy to volunteer' were regarded as prospective interviewees. I requested for their participation in the interviews through a message sent via the university's online noticeboard with the Participant Information Sheet (Appendix D). I contacted one by one, and waited for a prospective interviewee to respond before contacting another prospective interviewee. Due to slow responses from prospective interviewees, it took me longer than expected to make arrangements for interviews. I was successful in interviewing 15 students in total in the first year of the study, and 11 students in total in the second year. The procedure followed to ensure the interviewees' confidentiality is explained in Section 3.7, Ethical Considerations.

In the first year, of the 669 respondents to the questionnaires, 15 students (13 males and two females) took part in the interviews. Similarly, in the second year, of the 506 respondents to the questionnaires, 11 students (10 males and one female) participated in the interviews. The sample size (15 in the first year and 11 in the second year) can be considered appropriate for 'thematic analysis' (Braun & Clarke, 2006), which was used to analyse the qualitative data in this research. Braun, Clarke, Hayfield, and Terry (2019) mentioned that 'there are no magic

formulas for determining sample size' (p. 851), but Clarke and Braun (2016) stated that 'if using interviews, we generally recommend a sample of at least six' (p. 88). Likewise, in the case of interviews, six to 15 can be considered appropriate for a masters or professional doctorate project, based on 'some broad indicative size recommendations' (Terry, Hayfield, Clarke, & Braun, 2017, p. 22).

Furthermore, Onwuegbuzie and Collins (2007), who proposed a framework for developing sampling designs in mixed methods research, denoted that sample sizes in qualitative research should not be too small or too large. For interviews, they proposed '12 participants' (Onwuegbuzie & Collins, 2007, p. 289). Considering this, the sample size of the qualitative phase of this research can be considered appropriate.

In terms of demographics, Table 4 shows information about the participants in the interviews. As the table indicates, students of various classes and departments took part in the interviews.

Table 4									
<i>Demographic Information about the Interviewees</i>									
First year					Second year				
No	Disciplines	Levels	Gender		No	Disciplines	Levels	Gender	First year
1	Eng (Q)	higher	male		16	Eng (M)	higher	male	
2	Eng (L)	higher	male		17	Eng (L)	mid	male	# 2
3	Eng (L)	lower	male		18	Eng (L)	higher	male	# 4
4	Eng (L)	higher	male	*	19	Sci (N)	higher	female	
5	Eng (P)	higher	male		20	Sci (N)	mid	male	
6	Eng (L)	lower	male		21	Eng (R)	higher	male	
7	Eng (L)	higher	male	*	22	Sci (N)	mid	male	# 9
8	Eng (L)	higher	male	*	23	Eng (R)	higher	male	
9	Sci (N)	higher	male		24	Eng (P)	mid	male	
10	Sci (N)	mid	male		25	Eng (M)	lower	male	
11	Eng (L)	mid	male		26	Eng (P)	higher	male	
12	Eng (R)	mid	male						
13	Sci (N)	lower	male						
14	Eng (P)	higher	female						
15	Sci (N)	mid	female						

Note. * Interviewees #4, #7, and #8 in the first year were from the same class.

Male students accounted for approximately 85% of the total population of the Faculty of

Science and Engineering; thus, the interviewees roughly represented the entire population in terms of gender ratio. Each of the seven departments is shown by an alphabetical letter: L, M, N, O, P, Q, or R. These letters are pseudonyms assigned to each department.

In the first year, three participants (Interviewees #4, #7, and #8) were from the same class although each of them did not know that the other two also took part. Interestingly, their opinions were quite different from each other although they were of the same English level and from the same department. On the other hand, Interviewees #2, #4, and #9 participated as Interviewees #17, #18, and #22, respectively, in the second year. Their class levels were changed, and some of their opinions also changed as discussed in Chapter 5.

3. 6. 2 Qualitative Data Collection

For the qualitative phase of my research, I collected data by conducting semi-structured interviews, which are particularly appropriate to gather detailed information about people's thoughts and behaviours (Seidman, 2019). As explained previously, the qualitative phase of my research was intended to explore and gain a better understanding of some aspects emerging from the quantitative survey data. Therefore, the interview protocol was developed mainly on the basis of the findings of the analysis of the quantitative data.

I was unable to pilot test the interview protocol by simulating the actual interview in as real conditions as possible. Therefore, in order to verify its face validity and enhance the reliability of the interview protocol as a data gathering instrument, I collected feedback from three experts: one expert in the topic of my research, and two experienced qualitative researchers. This is a common procedure to provide the researcher with information regarding the clarity of the interview questions and the suitability of the content of these questions with regard to the objectives of the interview (Patton, 2015). I asked the experts to comment on the

protocol in view of my research aim and questions. Based on their feedback, I made some amendments to the interview questions in terms of language and sentence structure, and rephrased a few unclear questions to avoid ambiguity and enhance understanding.

For example, I changed the question 'Do you take English courses even when they are not mandatory?' to 'Would you take English courses even if they were not mandatory? Why/Why not?' Learning English has been mandatory for university students in Japan for decades, and this cannot be changed as it is a national policy. Furthermore, it seemed appropriate to ask them about the reason(s), which would provide me with information related to their motivation for learning English. I also replaced jargons with layman's terms. I changed 'What is the "ideal L2 self" for science/engineering students?' to 'Regarding English, what do you think is the most important for you as a science/an engineering student?' I also changed 'What is the "ought-to L2 self" for science/engineering students?' to 'Regarding English, what do you think other people expect you to achieve?' The final version of the interview protocol (Appendix B) was formed of a total of 15 open-ended questions as follows.

Questions 2 to 8 were meant to obtain further information about the students' foreign language anxiety. Such information was necessary to answer Research Questions 1, 4, and 6. Questions 2, 3, and 4 were about Communication Apprehension, and these questions asked the interviewees whether they preferred Japanese teachers or native English-speaking teachers, whether they preferred to be taught in English or in Japanese, and which variant of English they preferred, respectively. Questions 5, 6, and 7 asked them how they felt about standardised tests, speaking tests, and placement tests, respectively, to collect information about Test Anxiety. Question 8 asked them how they felt about the current system of forming classes. Questions 7 and 8 were intended to collect information related to Fear of Negative Evaluation.

Questions 9 to 14 were intended to probe into the students' motivation to learn English. Question 9 asked the interviewees whether they would choose to enrol in English subjects if doing so were not mandatory, and why. This was intended to collect information about their type of motivation. Questions 10 and 11 were about the ideal L2 self, and asked the interviewees what their goals were in learning English, and what they thought was the most important regarding English, respectively. Questions 12 and 13 were about the ought-to L2 self, and asked them what they thought their parents and their professors expected them to achieve regarding English. Question 14 asked them whether they agreed with the current credit-award system. This question was intended to collect information about External Regulation, which was the least autonomous type of extrinsic motivation. By asking these questions, I determined which of the following types of motivation the students had regarding learning English: intrinsic, extrinsic, integrative, or instrumental motivation. Such information is associated with Research Questions 2, 4, and 6.

Additionally, I asked two questions to seek further information. Question 1 asked the interviewees how they felt about their experience of learning English as part of their degree, and Question 15 asked them whether there was anything else they would like to add regarding their learning experience. The interviews lasted 45-60 minutes and were audio recorded with the permission of the participants.

In this study, the quantitative findings informed the above-mentioned questions at the qualitative stage. As some of the quantitative results were different from my previous assumptions, I wanted to examine those findings in detail in order to gain a better understanding of those results. For example, the science students scored higher on test anxiety than the engineering students for two consecutive years. To find out a possible explanation for such a difference, I asked the interviewees how they felt about standardised

tests (Question 5). As Ogasawara (1998) pointed out, Japanese girls were traditionally considered to 'prefer mechanical memorization to rational understanding' (p. 165). Considering that there were many more female students in the science fields than in the engineering fields, the difference in test anxiety might have derived from standardised tests. In Chapter 5, I will provide a detailed explanation of how the quantitative findings informed the data collection and analysis in the qualitative phase.

3. 6. 3 Qualitative Data Analysis

In this research, thematic analysis (Braun & Clarke, 2006) was used to analyse the qualitative data. This method is often used by researchers to generate themes from qualitative data such as interviews.

Thematic analysis involves six steps: (1) familiarising oneself with the data, (2) generating initial codes, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes, and (6) producing the report (Braun & Clarke, 2006). This six-phase approach is 'a reflexive and recursive, rather than strictly linear, process' (Braun et al., 2019, p. 852). Coding can be done manually as well as electronically by using computer-assisted qualitative data analysis software (CAQDAS) (Clarke & Braun, 2016). Regarding how many themes are appropriate, Braun, Clarke, and Terry (2014) contended that it 'depends on the focus of the analysis and the length of the report, but we offer two to six as a good range to work within' (p. 105).

One of the advantages of thematic analysis is that as it is a flexible method, it can be approached in several ways 'from inductive to deductive, semantic to latent' (Braun, Clarke, & Rance, 2014, p. 186). In an inductive approach, 'the researcher starts the analytic process from the data, working "bottom-up" to identify meaning without importing ideas' (Braun et al.,

2019, p. 853). On the other hand, 'a deductive approach to data coding and analysis is a top-down approach' (Braun & Clarke, 2012, p. 58). In this approach, 'the researcher approaches the data with various ideas, concepts, and theories' (Braun et al., 2019, p. 853).

In this study, the semi-structured interviews were conducted to further explore the aspects emerging from the quantitative data analysis. Therefore, I adopted a deductive approach in generating two types of codes: semantic and latent codes. The former type 'might be fairly *descriptive* and simply summarise the content of the data' whereas the latter type 'can be *interpretive*, and offer some *analytic* interpretation of the content of the data' (Braun, Clarke, & Rance, 2014, p. 189). Semantic codes 'capture explicit meaning; they are identified as the surface level of the data' whereas latent codes 'capture implicit meaning, such as ideas, meanings, concepts, assumptions which are not explicitly stated' (Terry, Hayfield, Clarke, & Braun, 2017, pp. 22–23).

However, this distinction is not clear-cut. To generate initial codes, it is necessary to analyse what is explicitly stated on the surface and conduct the analysis beyond the surface to capture ideas that are not explicitly stated in the data. 'Codes can focus on semantic meaning, latent meaning or both' (Terry, 2016, p. 110). In fact, 'most analyses contain elements of both semantic and latent coding' (Clarke & Braun, 2016, p. 89). As Wheelan (2013) pointed out, 'people shade the truth, particularly when the questions asked are embarrassing or sensitive' (p. 181). Although I had no intention of asking the interviewees embarrassing or sensitive questions, some of them might have preferred not to use direct expressions. Their choice of words and their way of speaking reflected their different personalities. Some spoke distinctly whereas others used a lot of hesitation in their utterances. Therefore, I used both semantic and latent information for coding, not concurrently but separately.

I followed the following six steps described by Braun and Clarke (2012) for the process

of thematic analysis. First, I transcribed the audio-recorded interviews *verbatim* and subsequently checked the transcript with the notes I had jotted down while conducting the interviews. By reading through the transcript, I familiarised myself with the data. Second, coding was performed to find semantic codes first, and manually determine latent codes later. Semantic coding was the procedure adopted for the deductive analysis. For approaches with deductive orientation, researchers analyse the data 'with various ideas, concepts, and theories, or even potential codes based on such' (Braun et al., 2019, p. 853). I performed semantic coding electronically and deductively with potential codes created based on the quantitative results. After the semantic coding, I performed latent coding in order to search for information that might have been otherwise unnoticed.

By utilising a computer-assisted qualitative data analysis software NVivo 12 for Windows, I located phrases or sentences that were linked to any topics relevant to the research questions. For instance, the interviewees often used the words 'understand' and 'credit,' which were easily located electronically, and those words could be used as semantic codes. However, as Braun and Clarke (2013) pointed out, CAQDAS can 'only offer a tool to *assist* with coding and analysis' (p. 220), and it cannot find latent information. Therefore, after I finished searching for semantic codes electronically, I started to find latent information and coded the information manually. I read through the transcript and located expressions that had similar meanings. They were labelled by code. To form latent codes, I had to rephrase the actual expressions of the interviewees. For example, expressions such as 'study hard,' 'have no time,' and 'memorise a lot' were in most cases interpreted as 'workload' in my study. In this way, I coded anything and everything that seemed 'potentially relevant to the research question' (Braun & Clarke, 2012, p. 62).

As I conducted the interviews in Japanese, I transcribed the audio data *verbatim* in

Japanese. I also generated initial codes and searched for themes in Japanese. After reviewing the themes, I translated the transcript and themes into English. I decided to translate them after the analysis because 'it may be less time-consuming for the researcher, as they do not spend time translating all the initial raw interview material that may not be used in the final report' (Esfehiani & Walters, 2018, p. 3166). My research is a longitudinal study, and three students took part in the interviews for two consecutive years. These students showed availability to meet with me after data collection to read and confirm that their interview transcriptions represented their views and opinions. This was intended as a data collection validation procedure.

3.7 Ethical Considerations

I conducted this research after I obtained ethical approval from the Virtual Programme Research Ethics Committee (VPREC). I did not collect any quantitative and qualitative data before my proposal was accepted and ethical approval was given. The formal VPREC Ethical Approval Notice can be found in Appendix C.

As ethics committees generally 'expect to see safeguards like researcher detachment, written consent, and promises of confidentiality built into study design' (Jacobson, Gewurtz, & Haydon, 2007, p. 5), I ensured that I included these elements into my research design. With regard to the recruitment of students as research subjects, 'the ways these issues are handled differ between countries and between universities' (Leentjens & Levenson, 2013, p. 397). Thus, I collected data in the best and safest way in the university where this study was conducted.

Informed consent was sought from all participants before they participated in the questionnaire surveys and the interviews. For prospective participants in the questionnaire surveys, I notified them of the surveys through the university's online noticeboard to ensure

that they understood the aim of the research and the treatment of the participant responses. Additionally, I made sure that their participation was voluntary, and informed them that they were free to withdraw at any time without providing any reason without their rights being affected in any way. Furthermore, I explained to them that the quantitative and qualitative survey results will be used for research purposes alone, and assured them of the anonymity and confidentiality of their data. As I excluded my own students, there was no direct relationship between me, as a researcher, and the participants in this research.

As I taught two 'General English' classes in the first year of the study, I explained to my students in class that they were not invited to participate in the surveys because they were my students. Although they received the same message as the other first-year students through the university's online noticeboard, they were not asked to complete the questionnaire survey form in their 'Oral English' class. I explained to them that I wanted to avoid any unintentional coercion, and that my sample size, despite excluding them, was still adequately large to conduct the study.

Before conducting interviews, I sent a message to prospective interviewees, one by one, through the university's online noticeboard, asking for their participation. I explained the aim of the interviews and the treatment of the interviewee responses. It was possible for me, as an insider researcher, to send a message to a particular student if I had learned their student ID number. The participants in the questionnaire surveys were asked to write the last 4 digits of their student ID number on the survey form if they agreed to take part in the study. Their student ID number consisted of three parts: the year they entered the university, their department, and the last 4 digits. No students could be identified by the last 4 digits alone, because there were students who had the same 4-digit ID number in other departments. However, it was possible for me, as an insider researcher, to discern the participants' student ID numbers, since I

collected the data by department. Asking them to write the last 4 digits of their student ID number was the best and safest way to conduct this research. When I invited prospective interviewees to an interview, some of them did not respond, or did not show up despite making an appointment for the interview. In such cases, I did not contact them anymore, and invited different prospective interviewees to an interview.

I conducted each interview individually, face-to-face, in Japanese in my office. Since the VPREC asked me to ensure that the interviewees would not be seen visiting the venue, I made sure that they were not seen visiting my office by other people. As the other rooms on the same floor were rarely used, my office was the best place for conducting interviews. Furthermore, I personally regarded my office as the best place, because having an office on campus meant that I worked as a full-time faculty member at the university. I believed that this would be reassuring to the interviewees since they could approach the university if they were uncomfortable while participating in the interviews. At that time, sales representatives often visited the campus without permission, asked students to fill in a questionnaire, and tried to sell items to them. The university put a notice outside classrooms warning students not to give their contact information to such sales representatives. Under the circumstances, if I had chosen a neutral place such as a seminar room or a meeting room, the interviewees might have suspected that the person who came to interview them was not a full-time faculty member but a sales representative.

The interview was arranged at the interviewee's convenience. I explained the location of my office when making an appointment, and the interviewee came to my office at the scheduled time. When they came, I read aloud a series of informed consent statements before starting to interview, and asked them whether they wanted to proceed or withdraw. After they informed me that they wanted to proceed, I started to conduct the interview. I recorded each

interview using my digital voice recorder with the consent of the interviewees. I also informed the interviewees that no identifiable information would be included in the recordings.

Confidentiality was guaranteed for all participants. The data were anonymised, and personal information of the participants was kept confidential. In order to retain the confidentiality, each of the seven departments was given an alphabetical letter instead of using their real names. Likewise, all interviewees were assigned numbers. Furthermore, for the participants in the questionnaire surveys, I anonymised their responses in order to hide the respondents' identities during the data analysis process. I ensured that their confidentiality was always preserved.

Data protection was also observed, and I made sure that all the data were stored safely. All the recorded data were transferred from my digital voice recorder to my password-protected computer and password-protected external hard drive. All the quantitative and qualitative data were stored safely in a password-protected external hard drive in a locked cabinet. I ensured that only I, as a researcher, had access to the data.

3.8 Chapter Summary

This chapter elaborates on the methodological rationale for this research, namely, the research design and the methods of data collection and analysis. Ethical guidelines, which were observed throughout the proposal approval process, have also been described.

While the topic of this research has been investigated in a variety of contexts for the past few decades, this research maintains its originality by adopting a mixed methods research approach. Previous studies were questionnaire-based, and built upon quantitative data. In contrast, this research utilised an explanatory sequential (QUAN-qual) design, whereby I collected and analysed qualitative data to further explore the aspects emerging from the

quantitative data analysis that would have been otherwise unexplored.

The context of this study aligns with pragmatism that informs an explanatory sequential mixed methods design, which places more emphasis on quantitative data. I needed to understand the complete picture of the students from the Faculty of Science and Engineering's seven departments before probing more deeply into the issues. The findings of quantitative and qualitative analyses are presented and discussed in detail in the following chapters.

Chapter 4: Quantitative Data Findings

4.1 Introduction

As discussed in the previous chapter, in this study I utilised an explanatory sequential (QUAN-qual) design, whereby I first collected and scrutinised quantitative data, and subsequently conducted qualitative research to further explore and gain a better understanding of aspects emerging from the quantitative data analysis. By presenting the outcomes of the quantitative data analysis, this chapter delves into matters concerning the Japanese undergraduate science and engineering students' foreign language anxiety and motivational orientations, in relation to their English proficiency and self-reported English ability. This research also sought to determine whether there were any significant differences between the two disciplines with respect to foreign language anxiety and motivational orientations to learn English.

4.2 Measurement Procedures

Before presenting the results of the quantitative data analysis, I briefly explain the items along with their abbreviations, which I discussed and critiqued in detail in previous chapters.

4.2.1 Foreign Language Anxiety

In this research, anxiety about learning English was measured by using the Foreign Language Classroom Anxiety Scale (FLCAS) designed by Horwitz et al. (1986). It uses a 5-point Likert scale ranging from 1 (Strongly disagree) to 5 (Strongly agree) and contains 33 items. As I explained in Chapter 2, I used all the 33 items to produce the total anxiety score whereas I chose only 11 items to produce the score for each of the three anxiety factors: six items for Communication Apprehension, two items for Test Anxiety, and three items for Fear

of Negative Evaluation.

1 Communication Apprehension (CA): Items 1, 9, 14, 18, 24, and 27 relate to anxiety about communicating with people (i.e., speaking anxiety).

2 Test Anxiety (TA): Items 8 and 21 address anxiety derived from a fear of failing a test.

3 Fear of Negative Evaluation (NE): Items 2, 19, and 31 involve anxiety about others' evaluations, or expectations of being evaluated negatively by teachers and peers.

Since items 2, 5, 8, 11, 14, 18, 22, 28, and 32 are inverted terms, their scores were reversely computed. I added the score for each item to arrive at an overall score for anxiety. I also totalled the score for each item in each factor to arrive at the score for each of the three anxiety factors. As Horwitz (2013) commented that 'students with averages below 3 are probably not very anxious' (p. 264), I examined whether the participants' averages were below or above 3.0.

4. 2. 2 Motivational Orientations

I measured motivational orientations towards learning English through the Language Learning Orientation Scale (LLOS) developed by Noels et al. (2000). It uses a 7-point Likert scale ranging from 1 (Does not correspond at all) to 7 (Corresponds exactly). This instrument contains seven categories with three items each; therefore, this scale contains 21 items in total. I totalled the score for each item in each category to arrive at the score for each of the seven categories. Additionally, I added the score for each item to arrive at an overall score for motivation. Contrary to anxiety, however, I excluded Amotivation when calculating the overall score for motivation, since Amotivation is the exact opposite of the other six categories. That is, there is no motivation in Amotivation whereas some sort of motivation exists in the other categories; thus, I excluded Amotivation from the overall score for motivation, *not* subtracted

it. Previous empirical studies using the LLOS investigated the score for each category *without* producing an overall score for motivation. In this study, however, to investigate the participants' levels of motivation, I calculated the overall score for motivation by excluding Amotivation.

1 Amotivation (AM): Items 1, 2, and 3 relate to lacking any type of motivation, whether intrinsic or extrinsic.

2 External Regulation (EX): Items 4, 5, and 6 address the least autonomous kind of extrinsic motivation, such as getting a reward or satisfying an external demand.

3 Introjected Regulation (IN): Items 7, 8, and 9 entail a slightly more autonomous type of extrinsic motivation than External Regulation, such as taking pride in oneself or not feeling guilty.

4 Identified Regulation (ID): Items 10, 11, and 12 involve an autonomous sort of extrinsic motivation, such as considering something very important or highly valuable.

5 Intrinsic Motivation (Knowledge) (IK): Items 13, 14, and 15 relate to intrinsic motivation; that is, doing something because of the feelings aroused when knowledge is acquired.

6 Intrinsic Motivation (Accomplishment) (IA): Items 16, 17, and 18 address intrinsic motivation related to accomplishing a goal.

7 Intrinsic Motivation (Stimulation) (IS): Items 19, 20, and 21 entail intrinsic motivation derived from the feelings stimulated by performing a task, such as excitement or fun.

4. 2. 3 English Proficiency and Self-Reported English Ability

It was possible to determine the students' actual English proficiency levels by ascertaining which classes they were in. First-year students were required to take the TOEIC Bridge as a placement test upon entering the university and were placed in pertinent classes

based on their test scores. Second-year students were placed in suitable classes based on their scores of the TOEIC L&R that they took as the end-of-term exam of 'General English 2.' Therefore, in this research, the participants' English 'proficiency' means the results of the TOEIC Bridge or the TOEIC L&R. Both of these tests are multiple-choice tests and measure the test-takers' listening and reading skills. In the past, the results of the entrance examinations were used, but it did not work well because students did not necessarily take the same test. Every year the university provides students with several opportunities to take the entrance examination, and some exams are slightly more difficult than others. As a result, students of various levels were placed in the same class when the results of the entrance examinations were used. Conversely, the current system works well, and students of the same level are generally placed in the same class.

I asked the participants how they evaluated their English ability as a whole. In this research, their self-reported English 'ability' refers to the four skills: listening, speaking, reading, and writing. There were three options:

- 1 Higher: Above average proficiency for their year group
- 2 Average: More or less same proficiency as most other students in their year group
- 3 Lower: Below average proficiency for their year group

4. 2. 4 Two Additional Variables

There were two additional variables in the second year. One was whether the students had been learning English for a specific purpose for the last 12 months. They were asked to choose one from the three options on the survey form: (1) Yes, I have, (2) No, I have not, or (3) I am uncertain. The other was whether their class level was raised or not: (1) Lowered, (2) The same, or (3) Raised. Some second-year students were placed in a higher level class than

in their first year, some stayed in the same level, and others were placed in a lower level class. As this is a longitudinal study, these two additional variables were also considered when analysing the quantitative data to probe deeply into the students' anxiety and motivation.

4.3 Quantitative Surveys and Data Analysis

This section presents the results of quantitative data analysis: (1) internal consistency reliability, (2) descriptive statistics, (3) Pearson correlation matrix, (4) multiple comparison analysis, and (5) *t*-tests (independent samples *t*-tests and paired samples *t*-tests). After showing the Cronbach's alpha internal consistency reliability of the FLCAS and LLOS, I present the results of the other analyses to answer the research questions posed in this study.

4.3.1 Reliability of the Questionnaires

After administering the questionnaires, I analysed the quantitative data by using the computer software IBM SPSS Statistics (Version 23.0). First, the internal consistency of the questionnaires was examined to confirm their reliability. I calculated the Cronbach's alpha as a measure of the internal consistency for the FLCAS (33 items) as well as the LLOS (21 items): motivation overall (18 items) and Amotivation (three items). As I explained in Section 4.2, I used all the 33 items of the FLCAS to produce the total score of anxiety whereas I excluded Amotivation to calculate the overall score for motivation; there is no motivation in Amotivation whereas some sort of motivation exists in the other six categories of the LLOS.

The internal consistency, gauged via the Cronbach's alpha (α), should not be less than 0.6 and preferably be at least 0.8. In the case of the alpha being 0.8 or above, the instrument has internal consistency and is thus considered reliable. Tables 5 and 6 present the results of the first year and the second year, respectively.

As can be seen in Table 5, in the first year, the data of participants overall show that the FLCAS and LLOS were both reliable for anxiety overall ($\alpha = 0.930$) and for motivation overall ($\alpha = 0.911$) as well as Amotivation ($\alpha = 0.900$). Table 5 also reveals that for both the science students and the engineering students, the FLCAS and LLOS were reliable for anxiety overall ($\alpha = 0.933$ and 0.928 , respectively) and for motivation overall ($\alpha = 0.906$ and 0.912 , respectively) as well as Amotivation ($\alpha = 0.889$ and 0.904 , respectively).

Table 5							
<i>Internal Consistency Reliability for the First Year</i>							
Variable		Anxiety_Total (no. of questions = 33)		Motivation_Total (no. of questions = 18)		Motivation_AM (no. of questions = 3)	
	<i>n</i>	α	<i>N</i>	α	<i>N</i>	α	<i>N</i>
Overall	669	0.930	33	0.911	18	0.900	3
Science	196	0.933	33	0.906	18	0.889	3
Engineering	473	0.928	33	0.912	18	0.904	3
<i>Note.</i> <i>n</i> = number of participants; α = Cronbach's alpha; <i>N</i> = number of questions.							
The value of Cronbach's alpha should be at least 0.6;							
$\alpha \geq 0.8$ denotes internal consistency and thus reliability.							

Likewise, as Table 6 indicates, the data of participants overall in the second year show that the FLCAS and LLOS were both reliable for anxiety overall ($\alpha = 0.926$) and for motivation overall ($\alpha = 0.914$) as well as Amotivation ($\alpha = 0.873$). Additionally, Table 6 reveals that for both the science students and the engineering students, the FLCAS and LLOS were reliable for anxiety overall ($\alpha = 0.932$ and 0.924 , respectively) and for motivation overall ($\alpha = 0.917$ and 0.913 , respectively) as well as Amotivation ($\alpha = 0.920$ and 0.850 , respectively).

Table 6							
<i>Internal Consistency Reliability for the Second Year</i>							
Variable		Anxiety_Total (no. of questions = 33)		Motivation_Total (no. of questions = 18)		Motivation_AM (no. of questions = 3)	
	<i>n</i>	α	<i>N</i>	α	<i>N</i>	α	<i>N</i>
Overall	506	0.926	33	0.914	18	0.873	3
Science	117	0.932	33	0.917	18	0.920	3
Engineering	389	0.924	33	0.913	18	0.850	3
<i>Note.</i> <i>n</i> = number of participants; α = Cronbach's alpha; <i>N</i> = number of questions.							
The value of Cronbach's alpha should be at least 0.6;							
$\alpha \geq 0.8$ denotes internal consistency and thus reliability.							

In summary, for two consecutive years, the FLCAS and LLOS had internal consistency

for the participants overall as well as for the science students and the engineering students, and therefore the two instruments were both considered reliable.

4.3.2 Descriptive Statistics

I produced descriptive statistics with mean scores (M) \pm standard deviation (SD) for each item of the FLCAS and LLOS along with the students' self-reported English ability (self-evaluation). Tables 7 and 8 present the descriptive statistics of participants in the first year and the second year, respectively.

Table 7								
<i>Descriptive Statistics for the First Year</i>								
	Overall ($n = 669$)		Science ($n = 196$)		Engineering ($n = 473$)			
	M	SD	M	SD	M	SD	p	
Anxiety_CA	3.3 \pm 0.8		3.4 \pm 0.9		3.2 \pm 0.8		0.026	<i>a</i>
Anxiety_TA	2.9 \pm 0.9		3.1 \pm 0.9		2.8 \pm 0.9		0.001	<i>a</i>
Anxiety_NE	2.8 \pm 0.8		2.9 \pm 0.9		2.8 \pm 0.8		0.083	<i>a</i>
Anxiety_Total	3.2 \pm 0.6		3.3 \pm 0.7		3.1 \pm 0.6		0.003	<i>a</i>
Motivation_AM	2.5 \pm 1.4		2.8 \pm 1.5		2.4 \pm 1.4		0.000	<i>a</i>
Motivation_EX	4.4 \pm 1.3		4.2 \pm 1.4		4.4 \pm 1.3		0.020	<i>a</i>
Motivation_IN	4.1 \pm 1.4		4.0 \pm 1.4		4.2 \pm 1.4		0.136	<i>a</i>
Motivation_ID	4.5 \pm 1.4		4.3 \pm 1.5		4.6 \pm 1.4		0.077	<i>a</i>
Motivation_IK	3.8 \pm 1.6		3.6 \pm 1.6		3.9 \pm 1.6		0.033	<i>a</i>
Motivation_IA	4.1 \pm 1.5		3.9 \pm 1.5		4.2 \pm 1.5		0.058	<i>a</i>
Motivation_IS	5.1 \pm 1.5		4.9 \pm 1.6		5.2 \pm 1.5		0.033	<i>a</i>
Motivation_Total	4.3 \pm 1.1		4.1 \pm 1.1		4.4 \pm 1.1		0.008	<i>a</i>
Self-evaluation	n	%	n	%	n	%	0.002	<i>b</i>
Higher	47	, 7.0	14	, 7.1	33	, 7.0		
Average	258	, 38.6	55	, 28.1	203	, 42.9		
Lower	364	, 54.4	127	, 64.8	237	, 50.1		
<i>Note.</i> $p = p$ value;								
<i>a</i> indicates values obtained from an independent samples t -test;								
<i>b</i> indicates a Mann-Whitney U test.								

As explained in Chapter 3, there were students who took part in this research only once: either in their first year or second year. Actually, 332 students participated in the surveys twice. However, in this research, I present the data collected from 669 first-year students as the data of the first year, and the data collected from 506 second-year students as the data of the

second year, except when I investigate differences between the first year and the second year to work out an answer to Research Question 6 in Section 4.3.7.

Table 8									
<i>Descriptive Statistics for the Second Year</i>									
	Overall (<i>n</i> = 506)		Science (<i>n</i> = 117)		Engineering (<i>n</i> = 389)				
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>p</i>		
Anxiety_CA	3.4 ± 0.8		3.4 ± 0.9		3.3 ± 0.7		0.853	<i>a</i>	
Anxiety_TA	2.9 ± 0.9		3.0 ± 0.9		2.8 ± 0.9		0.189	<i>a</i>	
Anxiety_NE	2.8 ± 0.8		2.8 ± 0.8		2.8 ± 0.8		0.805	<i>a</i>	
Anxiety_Total	3.2 ± 0.6		3.2 ± 0.7		3.2 ± 0.6		0.491	<i>a</i>	
Motivation_AM	2.7 ± 1.3		3.0 ± 1.5		2.6 ± 1.2		0.003	<i>a</i>	
Motivation_EX	4.3 ± 1.3		4.0 ± 1.3		4.4 ± 1.2		0.003	<i>a</i>	
Motivation_IN	4.0 ± 1.4		3.8 ± 1.4		4.0 ± 1.3		0.154	<i>a</i>	
Motivation_ID	4.4 ± 1.4		4.2 ± 1.5		4.4 ± 1.4		0.126	<i>a</i>	
Motivation_IK	3.7 ± 1.6		3.6 ± 1.5		3.7 ± 1.6		0.535	<i>a</i>	
Motivation_IA	4.0 ± 1.5		4.1 ± 1.4		4.0 ± 1.5		0.751	<i>a</i>	
Motivation_IS	5.0 ± 1.5		4.8 ± 1.5		5.0 ± 1.5		0.114	<i>a</i>	
Motivation_Total	4.2 ± 1.1		4.1 ± 1.1		4.3 ± 1.1		0.094	<i>a</i>	
Self-evaluation	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	0.279	<i>b</i>	
Higher	29	, 5.7	8	, 6.8	21	, 5.4			
Average	223	, 44.1	44	, 37.6	179	, 46.0			
Lower	254	, 50.2	65	, 55.6	189	, 48.6			

Note. *p* = *p* value;
a indicates values obtained from an independent samples *t*-test;
b indicates a Mann-Whitney U test.

Table 14 shows the descriptive statistics of the 322 students who participated in the surveys twice, with mean scores (*M*) ± standard deviation (*SD*) for each item of the FLCAS and LLOS along with their self-reported English ability (self-evaluation) for the first and second years (see Section 4.3.7). The comparison of Table 14 with Tables 7 and 8 above reveals that the results of the 332 students in the first year were highly similar to those of the 669 respondents. Likewise, the results of the 332 students in the second year were highly similar to those of the 506 respondents in the second year. Therefore, the data collected from the 669 first-year students can represent the first-year students, and the data collected from the 506 second-year students can illustrate the second-year students.

In the following sections, I first provide the summary of descriptive statistics to work out

answers to the research questions posed in this study. Subsequently, I present the results of other analyses to investigate those issues from different perspectives. After examining the data of participants overall, I compare the data of the science students with those of the engineering students to find whether there were any trends of note between the two disciplines. I also compare the data of the first year and those of the second year to examine what changes were observed during the two years under investigation.

4. 3. 3 Students' Anxiety and Motivation

This section first summarises the results of descriptive statistics shown in Tables 7 and 8 above, and then presents the results of Pearson correlation matrix to answer the following research questions:

RQ1 What are the nature and levels of foreign language anxiety reported by Japanese undergraduate science and engineering students studying English in a Japanese university?

RQ2 What types of motivation do the Japanese undergraduate science and engineering students have, to learn English as part of their undergraduate curriculum?

With regard to the students' foreign language anxiety, Tables 7 and 8 demonstrate that for two consecutive years, CA scored the highest and TA came in second. Of the three anxiety factors, NE scored the lowest, and its mean scores were below 3.0. Since 'students with averages below 3 are probably not very anxious' (Horwitz, 2013, p. 264), the participants in this research did not have excessive fear or anxiety about being negatively judged by others. Conversely, the mean scores of anxiety overall and CA were above 3.0, and thus the students were generally considered to be anxious, especially about communicating in English. Tables 7 and 8 also reveal that only the science group scored 3.0 or above on TA for two consecutive years, and therefore the science students were more likely to be anxious about tests than the

engineering students.

As for the students' motivational orientations, Tables 7 and 8 demonstrate that for two consecutive years, IS was the highest, ID was the second highest, and EX was also high, whereas AM scored the lowest and IK scored the second lowest of the seven categories of the LLOS. The findings indicate that the students were unlikely to lack motivation to learn English (AM), but that they were also unlikely to be intrinsically motivated to study English in order to learn about the English-speaking countries and their cultures (IK). The outcomes imply that they were likely to have intrinsic motivation related to listening and speaking (IS), and that they were also likely to learn English due to its importance (ID) or for an external reward (EX). Tables 7 and 8 also illustrate that the science group's EX decreased from 4.2 to 4.0 whereas the engineering group scored 4.4 on EX for two consecutive years. Compared with the engineering students, the science students were less likely to be motivated to learn English for an external reward, especially in their second year, and the independent samples *t*-test shows that the difference was statistically significant ($p < .05$).

In addition to descriptive statistics, I calculated the Pearson product-moment correlation coefficient for the total, as well as for each factor of the FLCAS and each category of the LLOS, to measure the linear correlation between two variables. Foreign language anxiety and motivational orientations were so complicated that the Pearson product-moment correlation coefficient had to be calculated in order to perform a thorough investigation.

There is a positive correlation between two variables in the case of r being 0.4 or above, and a strong positive correlation in the case of r being 0.7 or above. Conversely, there is a negative correlation between two variables in the case of r being -0.4 or less, and a strong negative correlation in the case of r being -0.7 or less. Tables 9 and 10 below display the Pearson correlation matrix of the first year and the second year, respectively. Positive or

negative correlations are highlighted in yellow.

Variable		CA	TA	NE	Anxiety Total	AM	EX	IN	ID	IK	IA	IS	Motivation Total
Overall ($n = 669$)													
Anxiety_CA	r	1.000	0.461	0.594	0.883	0.295	-0.048	0.034	-0.189	-0.235	-0.123	-0.177	-0.171
	p		<0.001	<0.001	<0.001	<0.001	0.219	0.374	<0.001	<0.001	0.001	<0.001	<0.001
Anxiety_TA	r	0.461	1.000	0.414	0.652	0.372	0.020	0.053	-0.200	-0.232	-0.199	-0.156	-0.168
	p	<0.001		<0.001	<0.001	<0.001	0.612	0.171	<0.001	<0.001	<0.001	<0.001	<0.001
Anxiety_NE	r	0.594	0.414	1.000	0.711	0.252	0.010	0.140	-0.141	-0.145	-0.082	-0.108	-0.079
	p	<0.001	<0.001		<0.001	<0.001	0.801	<0.001	<0.001	<0.001	0.034	0.005	0.041
Anxiety_Total	r	0.883	0.652	0.711	1.000	0.385	-0.004	0.089	-0.214	-0.266	-0.168	-0.174	-0.173
	p	<0.001	<0.001	<0.001		<0.001	0.924	0.021	<0.001	<0.001	<0.001	<0.001	<0.001
Motivation_AM	r	0.295	0.372	0.252	0.385	1.000	-0.145	-0.164	-0.412	-0.418	-0.412	-0.463	-0.460
	p	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Motivation_EX	r	-0.048	0.020	0.010	-0.004	-0.145	1.000	0.452	0.284	0.250	0.386	0.277	0.576
	p	0.219	0.612	0.801	0.924	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Motivation_IN	r	0.034	0.053	0.140	0.089	-0.164	0.452	1.000	0.519	0.343	0.438	0.422	0.700
	p	0.374	0.171	<0.001	0.021	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
Motivation_ID	r	-0.189	-0.200	-0.141	-0.214	-0.412	0.284	0.519	1.000	0.590	0.532	0.617	0.798
	p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001
Motivation_IK	r	-0.235	-0.232	-0.145	-0.266	-0.418	0.250	0.343	0.590	1.000	0.645	0.551	0.775
	p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001
Motivation_IA	r	-0.123	-0.199	-0.082	-0.168	-0.412	0.386	0.438	0.532	0.645	1.000	0.588	0.813
	p	0.001	<0.001	0.034	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001
Motivation_IS	r	-0.177	-0.156	-0.108	-0.174	-0.463	0.277	0.422	0.617	0.551	0.588	1.000	0.784
	p	<0.001	<0.001	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001
Motivation_Total	r	-0.171	-0.168	-0.079	-0.173	-0.460	0.576	0.700	0.798	0.775	0.813	0.784	1.000
	p	<0.001	<0.001	0.041	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	

Note. r = Pearson's correlation coefficient; p = p value;
 $r \geq 0.4$ indicates a positive correlation between the two variables; $r \geq 0.7$ indicates a strong positive correlation;
 $r \leq -0.4$ indicates a negative correlation; $r \leq -0.7$ indicates a strong negative correlation.

The p value was calculated from the sample correlation coefficient r and the sample size n . As the correlation coefficient r becomes larger, the p value becomes smaller. On the other hand, the p value is small when the sample size n is large. Thus, even a weak correlation can be significant ($p < .05$) when the number of participants, or the sample size, is large. In my study, there were 669 participants in the first year and 506 participants in the second year. As there were more than 500 participants in each year, even a small correlation was statistically significant ($p < .05$) in both years. Looking at Tables 9 and 10, all the correlations were statistically significant ($p < .05$) in the case of r being 0.4 or above or in the case of r being -0.4 or less. In contrast, the p value being less than 0.05 did not necessarily mean the correlation coefficient r being 0.4 or above, or r being -0.4 or less. Therefore, with regard to the Pearson correlation matrix, it is appropriate to discuss the results based on the size of the correlation

coefficient r , instead of the p value.

Table 10												
<i>Pearson Correlation Matrix for the Second Year</i>												
Variable	CA	TA	NE	Anxiety Total	AM	EX	IN	ID	IK	IA	IS	Motivation Total
Overall ($n = 506$)												
Anxiety_CA	r 1.000	0.524	0.572	0.867	0.226	0.024	0.105	-0.117	-0.149	-0.078	-0.134	-0.084
	p	<0.001	<0.001	<0.001	<0.001	0.585	0.018	0.008	<0.001	0.081	0.003	0.058
Anxiety_TA	r 0.524	1.000	0.494	0.692	0.302	0.051	0.047	-0.224	-0.189	-0.188	-0.215	-0.170
	p	<0.001	<0.001	<0.001	<0.001	0.255	0.296	<0.001	<0.001	<0.001	<0.001	<0.001
Anxiety_NE	r 0.572	0.494	1.000	0.723	0.132	0.100	0.137	-0.066	-0.075	-0.004	-0.041	0.005
	p	<0.001	<0.001	<0.001	0.003	0.024	0.002	0.137	0.092	0.934	0.355	0.908
Anxiety_Total	r 0.867	0.692	0.723	1.000	0.307	0.055	0.118	-0.196	-0.202	-0.117	-0.165	-0.123
	p	<0.001	<0.001	<0.001	<0.001	0.216	0.008	<0.001	<0.001	0.008	<0.001	0.006
Motivation_AM	r 0.226	0.302	0.132	0.307	1.000	-0.199	-0.207	-0.493	-0.389	-0.348	-0.414	-0.465
	p	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Motivation_EX	r 0.024	0.051	0.100	0.055	-0.199	1.000	0.458	0.338	0.246	0.342	0.301	0.578
	p	0.585	0.255	0.024	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Motivation_IN	r 0.105	0.047	0.137	0.118	-0.207	0.458	1.000	0.489	0.315	0.433	0.429	0.688
	p	0.018	0.296	0.002	0.008	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Motivation_ID	r -0.117	-0.224	-0.066	-0.196	-0.493	0.338	0.489	1.000	0.587	0.559	0.650	0.817
	p	0.008	<0.001	0.137	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Motivation_IK	r -0.149	-0.189	-0.075	-0.202	-0.389	0.246	0.315	0.587	1.000	0.630	0.530	0.758
	p	<0.001	<0.001	0.092	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Motivation_IA	r -0.078	-0.188	-0.004	-0.117	-0.348	0.342	0.433	0.559	0.630	1.000	0.608	0.810
	p	0.081	<0.001	0.934	0.008	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Motivation_IS	r -0.134	-0.215	-0.041	-0.165	-0.414	0.301	0.429	0.650	0.530	0.608	1.000	0.798
	p	0.003	<0.001	0.355	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Motivation_Total	r -0.084	-0.170	0.005	-0.123	-0.465	0.578	0.688	0.817	0.758	0.810	0.798	1.000
	p	0.058	<0.001	0.908	0.006	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
<i>Note. r = Pearson's correlation coefficient; p = p value;</i>												
<i>$r \geq 0.4$ indicates a positive correlation between the two variables; $r \geq 0.7$ indicates a strong positive correlation;</i>												
<i>$r \leq -0.4$ indicates a negative correlation; $r \leq -0.7$ indicates a strong negative correlation.</i>												

With regard to the students' foreign language anxiety, Tables 9 and 10 indicate positive correlations between anxiety overall and each of the three factors of the FLCAS ($r > 0.4$). Furthermore, strong positive correlations were found between anxiety overall and CA, and also between anxiety overall and NE ($r > 0.7$). The findings signal that the students with high levels of anxiety overall were likely to reach high levels on each of the three anxiety factors, especially CA and NE, and vice versa. The results also indicate positive correlations among the three anxiety factors ($r > 0.4$), which shows that the students who had high levels of CA, TA, or NE were likely to reach high levels on the other two anxiety factors. In this regard, the outcomes of the second year were exactly the same as those of the first year. The profile of the students' foreign language anxiety remained the same for two consecutive years.

As for the students' motivation, Tables 9 and 10 show that motivation overall had some

sort of correlation with each of the seven categories of the LLOS. A negative correlation was observed between motivation overall and AM ($r < -0.4$) for two consecutive years. Regarding the other categories, in the first year, there was a positive correlation between motivation overall and EX ($r > 0.4$), and there were strong positive correlations between motivation overall and the other five categories of the LLOS: IN, ID, IK, IA, and IS ($r > 0.7$). In the second year, motivation overall had positive correlations with EX and IN ($r > 0.4$) whereas strong positive correlations were observed between motivation overall and the other four categories of the LLOS: ID, IK, IA, and IS ($r > 0.7$). Considering that ID, IK, IA, and IS are all regarded as autonomous types, the findings signify that the students who had high levels of motivation overall were highly likely to reach high levels on each of the four autonomous types of motivation for two consecutive years.

Looking at each category, although negative correlations were found between AM and the four autonomous types of motivation ($r < -0.4$) in the first year, only ID and IS had negative correlations with AM ($r < -0.4$) in the second year. The participants in this study scored high on those two types of motivation for two consecutive years, which could be a plausible reason why ID and IS had negative correlations with AM for two consecutive years.

EX, which is regarded as the least autonomous type, had neither positive nor negative correlations with the other types of motivation except for IN for two consecutive years. On the other hand, positive correlations were observed between EX and IN ($r > 0.4$) for two consecutive years. Considering that IN is regarded as the second least autonomous type, the outcomes indicate that less autonomous types of motivation had positive correlations with each other.

4. 3. 4 Relationship between Anxiety and Motivation

In this section, I analyse the results of Pearson correlation matrix shown in Tables 9 and 10 above to answer the following research question:

RQ3 How are the Japanese undergraduate science and engineering students' levels of foreign language anxiety correlated with their types of motivation to learn English?

There is a positive correlation between two variables in the case of r being 0.4 or above, and a negative correlation between two variables in the case of r being -0.4 or less. According to the correlation coefficient r , the students' anxiety and motivation were not necessarily negatively correlated with each other. Tables 9 and 10 show that anxiety overall was negatively correlated with motivation overall and the four autonomous types of motivation, ID, IK, IA, and IS, for two consecutive years. Although the correlation coefficient r was not -0.4 or less, the correlations were statistically significant ($p < .05$). However, that was not the case with the less autonomous types of motivation, EX and IN. Anxiety overall was positively correlated with IN for two consecutive years. The correlation coefficient r was not 0.4 or above but the correlation was statistically significant ($p < .05$). On the other hand, EX had a weak negative correlation with anxiety overall in the first year and a weak positive correlation in the second year. In both years, the correlation was not statistically significant, with the p value being higher than 0.05.

As will be explained in the next section, the science students showed higher levels of anxiety and lower levels of motivation than the engineering students, and such results may appear to suggest that the students' anxiety and motivation were negatively correlated with each other. However, the outcomes of Pearson correlation matrix shown in Tables 9 and 10 statistically demonstrate that having low levels of motivation was not necessarily a significant predictor of high levels of anxiety, and that having low levels of anxiety was not necessarily a significant predictor of high levels of motivation. From the results, however, it can be inferred that the autonomous types of motivation were more likely to be negatively correlated with

anxiety than the less autonomous types.

4.3.5 Differences between Disciplines

In this section, I analyse the results of descriptive statistics shown in Tables 7 and 8 in Section 4.3.2 above to answer the following research question:

RQ4 What differences can be found between science students and engineering students with respect to foreign language anxiety and motivation to learn English?

Comparisons between the two disciplines were made by using an independent samples *t*-test. The outcomes reveal that in the first year, the science students scored higher on anxiety overall (3.3 vs. 3.1) and each of the three anxiety factors (3.4 vs. 3.2, 3.1 vs. 2.8, and 2.9 vs. 2.8, respectively) than the engineering students. Statistically significant differences were detected in anxiety overall, CA, and TA ($p < .05$). On the other hand, the science students scored lower on motivation overall (4.1 vs. 4.4) and each category of the LLOS (4.2 vs. 4.4, 4.0 vs. 4.2, 4.3 vs. 4.6, 3.6 vs. 3.9, 3.9 vs. 4.2, and 4.9 vs. 5.2, respectively) except for AM (2.8 vs. 2.4) than the engineering students. Statistically significant differences were detected in motivation overall, AM, EX, IK, and IS ($p < .05$).

In the second year, too, the science students had higher levels of anxiety and lower levels of motivation than the engineering students, although the tendencies were observed much more distinctly in the first year. In the second year, statistically significant differences were detected only in AM and EX ($p < .05$) between the two disciplines.

The students from both disciplines had roughly the same tendencies regarding anxiety and motivation for two consecutive years. CA was the highest of the three anxiety factors. As for motivation, IS scored the highest and ID came in second, whereas AM scored the lowest and IK was the second lowest. The outcomes indicate that both the science students and the

engineering students had higher levels of speaking anxiety (CA) but also had high levels of intrinsic motivation related to listening and speaking (IS) during the first two years of their undergraduate course. As I explained in Section 4.3.2 above, Tables 7 and 8 also illustrate that the science students scored 3.0 or above on TA whereas the engineering students scored below 3.0 for two consecutive years. The science students were more likely to be uneasy in testing situations than the engineering students.

Furthermore, compared with the engineering students, the science students were more likely to regard their English ability as lower than average for two consecutive years, although the tendencies were observed much more distinctly in the first year. As Tables 7 and 8 show, the science group had a larger proportion of students who considered their English ability to be lower than average: 64.8% vs. 50.1% in the first year and 55.6% vs. 48.6% in the second year. However, the results of the Mann-Whitney U test reveal that there were statistically significant differences between the two disciplines only in the first year ($p < .05$).

4. 3. 6 Self-Evaluation and English Proficiency

In this section, I first present the results of multiple comparison analysis to answer the following research question:

RQ5 How is the Japanese undergraduate science and engineering students' self-reported English ability related to their foreign language anxiety and motivation to learn English?

Subsequently, I compare between the class the students were placed in (based on the multiple-choice test results) and their self-reported English ability. This comparison can provide some insight into how they rated themselves, and the extent to which their self-evaluation could be a valid predictor of their English proficiency.

4. 3. 6. 1 Self-Evaluation

I performed one-way analysis of variance (ANOVA) and Bonferroni multiple comparison tests (Bonferroni, 1936; Dodge, 2008) to compare the three groups of self-reported English ability (higher, average, and lower) for the total score and the subscales of anxiety and motivation.

Table 11										
<i>Multiple Comparison Analysis for the First Year (Self-Evaluation)</i>										
Variable	Self-reported English ability			<i>p</i> for all	<i>p</i> (Bonferroni correction)					
	1. Higher	2. Average	3. Lower		1 vs. 2	1 vs. 3	2 vs. 3			
Overall										
(<i>n</i> = 669)	(<i>n</i> = 47)	(<i>n</i> = 258)	(<i>n</i> = 364)							
Anxiety_CA	2.5 ± 0.9	3.0 ± 0.7	3.5 ± 0.8	0.000	<i>a</i>	0.000	0.000	0.000		<i>b</i>
Anxiety_TA	2.3 ± 1.0	2.6 ± 0.8	3.2 ± 0.9	0.000	<i>a</i>	0.113	0.000	0.000		<i>b</i>
Anxiety_NE	2.3 ± 0.9	2.6 ± 0.7	3.0 ± 0.9	0.000	<i>a</i>	0.031	0.000	0.000		<i>b</i>
Anxiety_Total	2.5 ± 0.8	2.9 ± 0.5	3.4 ± 0.6	0.000	<i>a</i>	0.000	0.000	0.000		<i>b</i>
Motivation_AM	1.8 ± 1.0	2.0 ± 1.0	3.0 ± 1.6	0.000	<i>a</i>	>0.999	0.000	0.000		<i>b</i>
Motivation_EX	4.2 ± 1.6	4.5 ± 1.3	4.3 ± 1.3	0.063	<i>a</i>	0.594	>0.999	0.063		<i>b</i>
Motivation_IN	4.1 ± 1.5	4.2 ± 1.3	4.0 ± 1.4	0.384	<i>a</i>	>0.999	>0.999	0.494		<i>b</i>
Motivation_ID	5.0 ± 1.4	4.8 ± 1.3	4.2 ± 1.5	0.000	<i>a</i>	0.695	0.002	0.000		<i>b</i>
Motivation_IK	4.8 ± 1.7	4.1 ± 1.5	3.4 ± 1.6	0.000	<i>a</i>	0.031	0.000	0.000		<i>b</i>
Motivation_IA	4.8 ± 1.6	4.4 ± 1.3	3.8 ± 1.5	0.000	<i>a</i>	0.309	0.000	0.000		<i>b</i>
Motivation_IS	5.6 ± 1.6	5.4 ± 1.3	4.8 ± 1.6	0.000	<i>a</i>	0.990	0.005	0.000		<i>b</i>
Motivation_Total	4.7 ± 1.2	4.6 ± 0.9	4.1 ± 1.1	0.000	<i>a</i>	0.765	0.001	0.000		<i>b</i>
<i>Note.</i> <i>p</i> = <i>p</i> value; <i>a</i> = one-way ANOVA; <i>b</i> = multiple comparison with Bonferroni.										

Tables 11 and 12 present the outcomes of the multiple comparison analysis of the first year and the second year, respectively, which investigated the simultaneous effects of self-reported English ability on the students' foreign language anxiety and motivational orientations to learn English. The outcomes illustrate that there were statistically significant differences between the three groups of self-reported English ability (*p* value for all: $p < .05$) in both anxiety and motivation for two consecutive years. The mean scores of anxiety overall increased as the self-reported English ability lowered (higher < average < lower: in the first year 2.5, 2.9, and 3.4, respectively, and in the second year 2.4, 3.0, and 3.4, respectively), whereas the

mean scores of motivation overall decreased as the self-reported English ability lowered (higher > average > lower: in the first year 4.7, 4.6, and 4.1, respectively, and in the second year 4.9, 4.4, and 4.0, respectively). From the results, it can be deducted that the students' self-evaluation negatively affected their anxiety and positively influenced their motivation for two consecutive years.

Table 12									
<i>Multiple Comparison Analysis for the Second Year (Self-Evaluation)</i>									
Variable	Self-reported English ability			<i>p</i> for all		<i>p</i> (Bonferroni correction)			
	1. Higher	2. Average	3. Lower			1 vs. 2	1 vs. 3	2 vs. 3	
Overall									
(<i>n</i> = 506)	(<i>n</i> = 29)	(<i>n</i> = 223)	(<i>n</i> = 254)						
Anxiety_CA	2.2 ± 0.9	3.2 ± 0.7	3.6 ± 0.7	0.000	<i>a</i>	0.000	0.000	0.000	<i>b</i>
Anxiety_TA	2.1 ± 1.0	2.6 ± 0.8	3.2 ± 0.8	0.000	<i>a</i>	0.011	0.000	0.000	<i>b</i>
Anxiety_NE	2.3 ± 0.7	2.7 ± 0.7	3.0 ± 0.9	0.000	<i>a</i>	0.028	0.000	0.000	<i>b</i>
Anxiety_Total	2.4 ± 0.7	3.0 ± 0.5	3.4 ± 0.5	0.000	<i>a</i>	0.000	0.000	0.000	<i>b</i>
Motivation_AM	1.9 ± 1.1	2.3 ± 1.0	3.1 ± 1.4	0.000	<i>a</i>	0.132	0.000	0.000	<i>b</i>
Motivation_EX	4.3 ± 1.7	4.4 ± 1.3	4.3 ± 1.2	0.828	<i>a</i>	>0.999	>0.999	>0.999	<i>b</i>
Motivation_IN	4.0 ± 1.6	4.1 ± 1.4	3.9 ± 1.3	0.496	<i>a</i>	>0.999	>0.999	0.701	<i>b</i>
Motivation_ID	5.2 ± 1.1	4.6 ± 1.4	4.1 ± 1.4	0.000	<i>a</i>	0.107	0.000	0.000	<i>b</i>
Motivation_IK	5.0 ± 1.8	3.8 ± 1.5	3.3 ± 1.5	0.000	<i>a</i>	0.001	0.000	0.001	<i>b</i>
Motivation_IA	5.0 ± 1.7	4.2 ± 1.4	3.7 ± 1.5	0.000	<i>a</i>	0.019	0.000	0.001	<i>b</i>
Motivation_IS	5.9 ± 1.4	5.2 ± 1.4	4.7 ± 1.5	0.000	<i>a</i>	0.014	0.000	0.002	<i>b</i>
Motivation_Total	4.9 ± 1.0	4.4 ± 1.1	4.0 ± 1.0	0.000	<i>a</i>	0.036	0.000	0.000	<i>b</i>
<i>Note.</i> <i>p</i> = <i>p</i> value; <i>a</i> = one-way ANOVA; <i>b</i> = multiple comparison with Bonferroni.									

With regard to anxiety overall as well as each of the three anxiety factors, I noticed statistically significant differences for two consecutive years, not only between the three groups (higher, average, and lower) of self-reported English ability (*p* value for all: $p < .05$) but also between two pairs: higher vs. lower and average vs. lower ($p < .05$). The results indicate that the students' self-evaluation was negatively correlated with all of the three anxiety factors, especially in the case of those who viewed their ability as lower than average.

As for motivation, for two consecutive years, all categories except for EX and IN had statistically significant differences between the three groups of self-reported English ability (*p* value for all: $p < .05$) and between two pairs: higher vs. lower and average vs. lower ($p < .05$).

Considering that EX and IN are both regarded as less autonomous, the findings imply that the autonomous types of motivation were positively correlated with the students' self-evaluation, especially in the case of those who viewed their ability as lower than average.

4. 3. 6. 2 English Proficiency

As all of the classes were formed based on the students' latest multiple-choice test results, investigating differences between classes was supposed to provide some information about how they assessed themselves, and the extent to which their self-evaluation could be a valid predictor of their English proficiency.

Although it was easy to compare the three groups of self-reported English ability (higher, average, and lower), it was difficult to compare between classes because each department had different numbers of classes. Some departments had only four or five classes whereas others had six, seven, or eight classes. Therefore, instead of presenting the outcomes in tabular form, this chapter only describes the descriptive statistics of each class, except for the highest level classes and the lowest level classes (see Table 13). I collected data from the seven departments for two consecutive years, and in total, 43 classes in the first year and 41 in the second year participated in the surveys.

In the first year, in 20 out of 43 classes (46.5%), there were no students who viewed their English ability as higher than average. Five out of those 20 classes (25.0%) were the lowest level class of a science department and four engineering departments. Conversely, in the highest level class of two engineering departments, there were no students who saw their ability as lower than average. Likewise, in the second year, in 25 out of 41 classes (61.0%), there were no students who viewed their English ability as higher than average. Six out of those 25 classes (24.0%) were the lowest level class of two science departments and four

engineering departments. Generally, the students tended to underestimate their English ability.

Table 13 shows how the students who were placed in the highest level class or the lowest level class assessed their English ability in the first year and also in the second year.

Table 13						
<i>Highest Level Classes</i>						
First year	Overall (<i>n</i> = 108)		Science (<i>n</i> = 33)		Engineering (<i>n</i> = 75)	
Self-evaluation	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Higher	22	, 20.4	6	, 18.2	16	, 21.3
Average	64	, 59.3	14	, 42.4	50	, 66.7
Lower	22	, 20.4	13	, 39.4	9	, 12.0
Second year	Overall (<i>n</i> = 91)		Science (<i>n</i> = 29)		Engineering (<i>n</i> = 62)	
Self-evaluation	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Higher	18	, 19.8	7	, 24.1	11	, 17.7
Average	54	, 59.3	12	, 41.4	42	, 67.7
Lower	19	, 20.9	10	, 34.5	9	, 14.5
<i>Lowest Level Classes</i>						
First year	Overall (<i>n</i> = 83)		Science (<i>n</i> = 22)		Engineering (<i>n</i> = 61)	
Self-evaluation	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Higher	2	, 2.4	1	, 4.5	1	, 1.6
Average	15	, 18.1	4	, 18.2	11	, 18.0
Lower	66	, 79.5	17	, 77.3	49	, 80.3
Second year	Overall (<i>n</i> = 36)		Science (<i>n</i> = 7)		Engineering (<i>n</i> = 29)	
Self-evaluation	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Higher	2	, 5.6	0	, 0.0	2	, 6.9
Average	7	, 19.4	1	, 14.3	6	, 20.7
Lower	27	, 75.0	6	, 85.7	21	, 72.4

As Table 13 illustrates, the students' self-reported English ability was not necessarily the same as their English proficiency as measured by the TOEIC Bridge or the TOEIC L&R. As those are multiple-choice tests and measure only listening and reading skills, students who achieve a high score on those tests may be poor at speaking or writing. Still, however, the results reveal that the participants in this study tended to underestimate their English ability, especially the science students. For two consecutive years, more than 70% of the students in the lowest level class from both disciplines viewed their English ability as lower than average, whereas less than 25% of the students in the highest level class from both disciplines rated

their English ability as higher than average. Approximately 40% of the science students in the highest level class regarded their English ability as average, and more than 30% of them viewed their ability as lower than average. In contrast, more than 65% of the engineering students in the highest level class regarded their English ability as average, and less than 15% of them viewed it as lower than average. The outcomes indicate that the students' self-evaluation was not a valid predictor of their English proficiency.

On a class level, the results of descriptive statistics demonstrate that the mean scores of anxiety were not correlated with those of motivation for two consecutive years, partly due to a small sample size. In the first year, there were only 10 to 20 participants from 37 out of 43 classes (fewer than nine in two classes and more than 21 in four classes), and in the second year there were 10 to 20 participants from 28 out of 41 classes (fewer than nine in 12 classes and more than 21 in only one class).

In the first year, there were considerable differences between classes for both anxiety and motivation. In one of the engineering departments, the lowest level class had the highest anxiety score across all classes of all departments, whereas its highest level class had the lowest anxiety score across all classes of all departments. Except for that department, however, there was a lack of consistency. In the second year, too, there were considerable differences between classes for both anxiety and motivation, but both the highest and the lowest scores were found in classes from which only one or two students participated in the questionnaire surveys.

Considering that the students' self-evaluation did not match the class they were placed in, there were some limitations in this regard. Apparently, the students did not necessarily rate their English ability based on the class they were placed in. Furthermore, some lower level students might have gotten a good score by chance whereas some higher level students

might have performed poorly on the placement test.

Regardless of level of English proficiency, however, the students showed similar tendencies for two consecutive years. CA was the highest of the three anxiety factors and AM scored the lowest of the seven categories of the LLOS in all classes of all departments. IS scored the highest in all lower level classes of all departments in the first year, but not in the second year. Unlike in the first year, lower level classes showed no distinctive features in the second year. In contrast, IS scored the highest in all higher level classes of all departments in the second year.

From the results, it can be inferred that regardless of level of English proficiency, both the science students and the engineering students were highly unlikely to report a lack of motivation. Interestingly, regardless of English level and discipline, the students were likely to have high levels of speaking anxiety but were also likely to have high levels of intrinsic motivation related to listening and speaking.

4. 3. 7 Changes in Anxiety and Motivation

In this section, I analyse the data of the students who participated in the quantitative surveys both in their first year and in their second year. That should provide some information related to the following research question:

RQ6 What are possible changes in the Japanese undergraduate science and engineering students' foreign language anxiety and their types of motivation to learn English during the first two years of their undergraduate course?

Table 14 shows the descriptive statistics of the 322 students who participated in the surveys twice, with mean scores (M) \pm standard deviation (SD) for each item of the FLCAS and LLOS along with their self-reported English ability (self-evaluation) for the first year and

the second year. The intra-group comparisons were made according to the paired samples *t*-test. As shown in Table 14, the mean score of anxiety overall increased slightly (3.1 to 3.2) whereas the mean score of motivation overall decreased slightly (4.4 to 4.3), but those differences were statistically significant ($p < .05$). On the other hand, the students' tendencies remained roughly the same in both anxiety and motivation. Of the three anxiety factors, CA scored the highest, and it increased (3.3 to 3.4) at a significance level of $p < .05$. As for motivation, IS was the highest but it decreased (5.2 to 5.0) at a significance level of $p < .05$ whereas AM was the lowest but it increased (2.4 to 2.7) at a significance level of $p < .05$.

Table 14							
<i>Comparison between the First Year and the Second Year: Overall</i>							
	First year		Second year				
Overall (n = 332)	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>p</i>		
Anxiety_CA	3.3 ± 0.8		3.4 ± 0.8		0.001	<i>a</i>	
Anxiety_TA	2.9 ± 0.9		2.9 ± 0.9		0.823	<i>a</i>	
Anxiety_NE	2.7 ± 0.8		2.8 ± 0.8		0.027	<i>a</i>	
Anxiety_Total	3.1 ± 0.6		3.2 ± 0.6		0.016	<i>a</i>	
Motivation_AM	2.4 ± 1.4		2.7 ± 1.3		0.000	<i>a</i>	
Motivation_EX	4.4 ± 1.3		4.4 ± 1.3		0.678	<i>a</i>	
Motivation_IN	4.2 ± 1.4		4.0 ± 1.4		0.016	<i>a</i>	
Motivation_ID	4.6 ± 1.5		4.5 ± 1.4		0.064	<i>a</i>	
Motivation_IK	3.9 ± 1.6		3.6 ± 1.6		0.007	<i>a</i>	
Motivation_IA	4.2 ± 1.5		4.0 ± 1.5		0.051	<i>a</i>	
Motivation_IS	5.2 ± 1.5		5.0 ± 1.5		0.046	<i>a</i>	
Motivation_Total	4.4 ± 1.1		4.3 ± 1.1		0.004	<i>a</i>	
Self-evaluation	<i>n</i>	%	<i>n</i>	%	0.371	<i>b</i>	
Higher	21	, 6.3	18	, 5.4			
Average	147	, 44.3	145	, 43.7			
Lower	164	, 49.4	169	, 50.9			
<i>Note. p = p value;</i>							
<i>a</i> indicates values obtained from a paired samples <i>t</i> -test;							
<i>b</i> indicates a Wilcoxon signed-rank test.							

As for self-evaluation, the data were analysed by using a Wilcoxon signed-rank test to compare the three groups (higher, average, and lower), and there were no statistically significant differences between them. For two consecutive years, approximately half of the students (49.4% to 50.9%) viewed their English ability as lower than average, around 44% of

them (44.3% to 43.7%) regarded it as average, and only a small percentage of them (6.3% to 5.4%) considered it higher than average. Looking at each of the two disciplines, however, the science students tended to remain the same whereas the engineering students were more likely to change.

Table 15							
<i>Comparison between the First Year and the Second Year: Science Students</i>							
	First year		Second year				
Science (n = 82)	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>p</i>		
Anxiety_CA	3.4 ± 0.9		3.5 ± 0.8		0.441		<i>a</i>
Anxiety_TA	3.1 ± 0.9		3.0 ± 0.9		0.664		<i>a</i>
Anxiety_NE	2.9 ± 1.0		2.9 ± 0.9		0.860		<i>a</i>
Anxiety_Total	3.3 ± 0.7		3.3 ± 0.6		0.868		<i>a</i>
Motivation_AM	2.7 ± 1.6		3.1 ± 1.6		0.035		<i>a</i>
Motivation_EX	4.0 ± 1.5		4.1 ± 1.3		0.244		<i>a</i>
Motivation_IN	3.9 ± 1.5		3.9 ± 1.5		0.979		<i>a</i>
Motivation_ID	4.4 ± 1.6		4.2 ± 1.6		0.254		<i>a</i>
Motivation_IK	3.5 ± 1.7		3.5 ± 1.5		0.964		<i>a</i>
Motivation_IA	4.0 ± 1.7		4.0 ± 1.5		0.674		<i>a</i>
Motivation_IS	4.9 ± 1.8		4.8 ± 1.6		0.427		<i>a</i>
Motivation_Total	4.1 ± 1.2		4.1 ± 1.2		0.878		<i>a</i>
Self-evaluation	<i>n</i>	%	<i>n</i>	%	0.827		<i>b</i>
Higher	5	, 6.1	4	, 4.9			
Average	28	, 34.1	29	, 35.4			
Lower	49	, 59.8	49	, 59.8			
<i>Note. p = p value;</i>							
<i>a</i> indicates values obtained from a paired samples <i>t</i> -test;							
<i>b</i> indicates a Wilcoxon signed-rank test.							

Table 15 shows the descriptive statistics of the 82 science students, and Table 16 presents the data of the 250 engineering students. They participated in the surveys both in their first and second years. According to the results of paired samples *t*-test, in the case of the 82 science students, the mean score of AM increased (2.7 to 3.1) at a significance level of $p < .05$, but small and statistically insignificant changes were observed in both anxiety and motivation except for AM. In contrast, the results of the 250 engineering students were similar to those of the 332 participants shown in Table 14, except for two types of motivation: IA and IS. In the case of the 332 participants, no statistically significant change was observed in IA

whereas the mean score of IS decreased (5.2 to 5.0) at a significance level of $p < .05$. In contrast, in the case of the 250 engineering students, the mean score of IA decreased (4.3 to 4.0) at a significance level of $p < .05$ but no statistically significant change was observed in IS.

Table 16							
<i>Comparison between the First Year and the Second Year: Engineering Students</i>							
	First year		Second year				
Engineering ($n = 250$)	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>p</i>		
Anxiety_CA	3.2 ± 0.8		3.4 ± 0.8		0.001	<i>a</i>	
Anxiety_TA	2.8 ± 0.9		2.8 ± 1.0		0.975	<i>a</i>	
Anxiety_NE	2.7 ± 0.8		2.8 ± 0.8		0.008	<i>a</i>	
Anxiety_Total	3.1 ± 0.6		3.2 ± 0.6		0.006	<i>a</i>	
Motivation_AM	2.2 ± 1.3		2.5 ± 1.2		0.000	<i>a</i>	
Motivation_EX	4.6 ± 1.3		4.5 ± 1.2		0.298	<i>a</i>	
Motivation_IN	4.3 ± 1.4		4.0 ± 1.3		0.005	<i>a</i>	
Motivation_ID	4.7 ± 1.4		4.5 ± 1.3		0.146	<i>a</i>	
Motivation_IK	4.0 ± 1.6		3.7 ± 1.6		0.002	<i>a</i>	
Motivation_IA	4.3 ± 1.5		4.0 ± 1.5		0.011	<i>a</i>	
Motivation_IS	5.3 ± 1.4		5.1 ± 1.5		0.060	<i>a</i>	
Motivation_Total	4.5 ± 1.0		4.3 ± 1.0		0.001	<i>a</i>	
Self-evaluation	<i>n</i>	%	<i>n</i>	%	0.362	<i>b</i>	
Higher	16	, 6.4	14	, 5.6			
Average	119	, 47.6	116	, 46.4			
Lower	115	, 46.0	120	, 48.0			
<i>Note.</i> $p = p$ value;							
<i>a</i> indicates values obtained from a paired samples <i>t</i> -test;							
<i>b</i> indicates a Wilcoxon signed-rank test.							

Considering that there were 82 students in the science group (24.7%) and 250 students in the engineering group (75.3%), these results may not be persuasive. Due to the difference in sample size, the outcomes may not be convincing enough. Still, however, Tables 14, 15, and 16 clearly illustrate the features of the participants in this research. The science students showed high levels of test anxiety and tended to remain the same during the two years under investigation, whereas the engineering students became more anxious and less motivated in their second year. However, regardless of discipline, the students had high levels of speaking anxiety, which got even higher in their second year. On the other hand, regardless of discipline, the students' motivation decreased in their second year although they still had high levels of

intrinsic motivation related to listening and speaking. As the findings appear to be contradictory, it is necessary to probe into this issue in the qualitative phase of this study.

To further investigate possible changes in the students' anxiety and motivation, I conducted one-way ANOVA and Bonferroni multiple comparison tests to examine two additional variables in the second year. One of the variables is 'purpose.' There was an additional question on the questionnaire survey form used in the second year, asking the participants whether they had been learning English for a specific purpose for the last 12 months. The other variable was 'level.' I examined the effects of the students' class level being changed. Table 17 shows the results of descriptive statistics in these two variables.

Table 17									
<i>Descriptive Statistics for the Second Year: Purpose and Level</i>									
	Overall (<i>n</i> = 506)		Science (<i>n</i> = 117)		Engineering (<i>n</i> = 389)		<i>p</i>		
Purpose	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	0.324		<i>c</i>
Yes	156	, 30.8	34	, 29.1	122	, 31.4			
No	239	, 47.2	62	, 53.0	177	, 45.5			
Uncertain	111	, 21.9	21	, 17.9	90	, 23.1			
Level	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	0.755		<i>b</i>
Lowered	187	, 37.0	40	, 34.2	147	, 37.8			
Same	138	, 27.3	41	, 35.0	97	, 24.9			
Raised	181	, 35.8	36	, 30.8	145	, 37.3			
<i>Note.</i> <i>p</i> = <i>p</i> value;									
<i>b</i> indicates a Mann-Whitney U test; <i>c</i> indicates a Fisher's exact test.									

To investigate simultaneous effects of having a specific purpose, I performed one-way ANOVA and Bonferroni multiple comparison tests to compare the three groups (having a specific purpose, having no specific purpose, and uncertain) for the total score and the subscales of anxiety and motivation.

As shown in Table 18, having a specific purpose had statistically significant positive relation to their motivation scores (*p* value for all: $p < .05$). Furthermore, in all categories of the LLOS, I noticed statistically significant differences between one pair: yes (having a specific purpose) vs. no (having no specific purpose) ($p < .05$). As expected, the group of participants

who had no specific purpose had the highest score on AM of the three groups, whereas the group of participants who had a specific purpose had the highest score on all types of extrinsic or intrinsic motivation. However, it appears that having a specific purpose did not affect their motivational orientations; IS scored the highest of all the motivation types whether the students had a purpose or not.

Table 18									
Multiple Comparison Analysis for the Second Year (Purpose)									
Variable	Having a specific purpose			<i>p</i> for all	<i>p</i> (Bonferroni correction)				
	1. Yes	2. No	3. Uncertain		1 vs. 2	1 vs. 3	2 vs. 3		
Overall									
(<i>n</i> = 506)	(<i>n</i> = 156)	(<i>n</i> = 239)	(<i>n</i> = 111)						
Anxiety_CA	3.3 ± 0.8	3.4 ± 0.8	3.4 ± 0.8	0.439	<i>a</i>	0.621	>0.999	>0.999	<i>b</i>
Anxiety_TA	2.7 ± 0.9	2.9 ± 0.9	3.0 ± 0.9	0.024	<i>a</i>	0.063	0.057	>0.999	<i>b</i>
Anxiety_NE	2.8 ± 0.9	2.8 ± 0.8	2.9 ± 0.8	0.476	<i>a</i>	>0.999	0.678	>0.999	<i>b</i>
Anxiety_Total	3.1 ± 0.6	3.2 ± 0.6	3.3 ± 0.6	0.021	<i>a</i>	0.059	0.051	>0.999	<i>b</i>
Motivation_AM	2.2 ± 1.1	3.0 ± 1.4	2.7 ± 1.2	0.000	<i>a</i>	0.000	0.000	0.394	<i>b</i>
Motivation_EX	4.6 ± 1.3	4.1 ± 1.2	4.4 ± 1.1	0.000	<i>a</i>	0.000	0.342	0.143	<i>b</i>
Motivation_IN	4.3 ± 1.4	3.8 ± 1.4	3.9 ± 1.2	0.001	<i>a</i>	0.001	0.086	0.863	<i>b</i>
Motivation_ID	4.9 ± 1.4	4.1 ± 1.4	4.3 ± 1.3	0.000	<i>a</i>	0.000	0.005	0.376	<i>b</i>
Motivation_IK	4.1 ± 1.6	3.3 ± 1.5	3.7 ± 1.5	0.000	<i>a</i>	0.000	0.115	0.020	<i>b</i>
Motivation_IA	4.6 ± 1.4	3.7 ± 1.5	4.0 ± 1.3	0.000	<i>a</i>	0.000	0.001	0.291	<i>b</i>
Motivation_IS	5.6 ± 1.3	4.6 ± 1.5	4.8 ± 1.5	0.000	<i>a</i>	0.000	0.000	0.783	<i>b</i>
Motivation_Total	4.7 ± 1.0	3.9 ± 1.0	4.2 ± 0.9	0.000	<i>a</i>	0.000	0.000	0.066	<i>b</i>
<i>Note.</i> <i>p</i> = <i>p</i> value; <i>a</i> = one-way ANOVA; <i>b</i> = multiple comparison with Bonferroni.									

In contrast, although having a specific purpose had statistically significant relation to their anxiety overall and TA (*p* value for all: *p* < .05), it had no statistically significant relation to their CA and NE. Furthermore, no statistically significant differences were detected between any of the three pairs: yes vs. no, yes vs. uncertain, and no vs. uncertain. It also appears that having a specific purpose had no influence on their types of anxiety; CA scored the highest whether the students had a purpose or not.

To investigate the other variable, 'level,' I performed one-way ANOVA and Bonferroni multiple comparison tests to compare the three groups (lowered, the same, and raised) for the total score and the subscales of anxiety and motivation. By which class they were placed in, I

learned whether their class level was raised or not. Table 19 presents the outcomes of the multiple comparison analysis, which investigated the simultaneous effects of their class level being changed on the students' anxiety and motivation.

Table 19									
Multiple Comparison Analysis for the Second Year (Level)									
Variable	Level			<i>p</i> for all	<i>p</i> (Bonferroni correction)				
	1. Lowered	2. Same	3. Raised		1 vs. 2	1 vs. 3	2 vs. 3		
Overall									
(<i>n</i> = 506)	(<i>n</i> = 187)	(<i>n</i> = 138)	(<i>n</i> = 181)						
Anxiety_CA	3.2 ± 0.8	3.3 ± 0.8	3.5 ± 0.7	0.000	<i>a</i> 0.125	0.000	0.074	<i>b</i>	
Anxiety_TA	2.8 ± 0.8	2.9 ± 0.9	3.0 ± 1.0	0.036	<i>a</i> 0.809	0.029	0.616	<i>b</i>	
Anxiety_NE	2.8 ± 0.8	2.7 ± 0.8	2.9 ± 0.8	0.077	<i>a</i> >0.999	0.185	0.143	<i>b</i>	
Anxiety_Total	3.1 ± 0.6	3.2 ± 0.6	3.3 ± 0.6	0.001	<i>a</i> 0.792	0.000	0.047	<i>b</i>	
Motivation_AM	2.6 ± 1.3	2.9 ± 1.5	2.6 ± 1.2	0.183	<i>a</i> 0.419	>0.999	0.281	<i>b</i>	
Motivation_EX	4.3 ± 1.3	4.5 ± 1.3	4.3 ± 1.2	0.272	<i>a</i> 0.516	>0.999	0.421	<i>b</i>	
Motivation_IN	4.0 ± 1.4	3.9 ± 1.4	4.0 ± 1.3	0.823	<i>a</i> >0.999	>0.999	>0.999	<i>b</i>	
Motivation_ID	4.4 ± 1.4	4.3 ± 1.5	4.4 ± 1.4	0.684	<i>a</i> >0.999	>0.999	>0.999	<i>b</i>	
Motivation_IK	3.6 ± 1.6	3.8 ± 1.6	3.6 ± 1.5	0.522	<i>a</i> 0.879	>0.999	>0.999	<i>b</i>	
Motivation_IA	3.9 ± 1.4	4.1 ± 1.6	4.1 ± 1.5	0.457	<i>a</i> 0.901	0.769	>0.999	<i>b</i>	
Motivation_IS	5.0 ± 1.5	4.9 ± 1.5	5.0 ± 1.5	0.977	<i>a</i> >0.999	>0.999	>0.999	<i>b</i>	
Motivation_Total	4.2 ± 1.0	4.3 ± 1.1	4.2 ± 1.1	0.817	<i>a</i> >0.999	>0.999	>0.999	<i>b</i>	
Note. <i>p</i> = <i>p</i> value; <i>a</i> = one-way ANOVA; <i>b</i> = multiple comparison with Bonferroni.									

The results indicate that the students' anxiety was negatively affected by their class level being raised. The mean score of anxiety overall got higher if the class level was raised (lowered < same < raised: 3.1, 3.2, and 3.3, respectively). Furthermore, the group of students whose class level was raised scored the highest on all of the three anxiety factors. Whether their class level was raised or not had statistically significant relation to their levels of anxiety, especially CA and TA (*p* value for all: *p* < .05). Statistically significant differences were detected in anxiety overall between two pairs: lowered vs. raised and same vs. raised (*p* < .05). I also noticed statistically significant differences in CA and TA between one pair: lowered vs. raised (*p* < .05). The outcomes clearly demonstrate that their class level being raised increased the students' anxiety levels, especially with regard to communication apprehension and test anxiety.

In contrast, neither positive nor negative effects were observed on the students' motivation levels. With regard to motivation overall, the group of students whose class level was raised had the same score as the group of students whose class level was lowered ($M = 4.2$) whereas the group of students who stayed in the same level scored the highest ($M = 4.3$). Furthermore, no statistically significant differences were detected in any types of motivation and between any pairs. It also appears that their class level being changed had no influence on the students' types of motivation; IS scored the highest of all the motivation types.

4.4 Chapter Summary

This chapter presented the results of quantitative data analysis. I conducted quantitative research for two consecutive years using the FLCAS and LLOS, both of which have been widely used for decades. I scrutinised the quantitative data using the computer software IBM SPSS Statistics (Version 23.0). It was worthwhile to use several different methods of analysis to answer the research questions posed in this study, since they enabled me to examine the quantitative data from various perspectives.

When examining differences between classes, I noticed there was a lack of consistency, partly due to the small sample size. In referring to cases where an explanation cannot be given due to a lack of consistency, Agresti (2013) pointed out that 'the sample size n influences the results' (p. 237). Weak effects cannot be detected if the sample size is small although strong effects are likely to be detected regardless of sample size.

It should also be noted that the students tended to underestimate their English ability, and thus the students' self-assessment was not a valid predictor of their English proficiency. In the lowest level classes, more than 70% of the students (79.5% in the first year and 75.0% in the second year) rated their English ability as lower than average. However, even in the

highest level classes, nearly 60% of the students (59.3% in the first and second years) rated their English ability as average. Approximately 20% of the highest level students (20.4% in the first year and 19.8% in the second year) viewed their ability as higher than average, and nearly the same percentage of them (20.4% in the first year and 20.9% in the second year) regarded their ability as lower than average. From the results, it can be inferred that there were some limitations to the students' self-assessment data. However, I still roughly grasped the whole picture of foreign language anxiety and motivational orientations of the participants in this research.

The outcomes of the surveys were roughly the same for two consecutive years. The findings indicate that the participants in this study were most likely to have high levels of communication apprehension, less likely to have test anxiety, and least likely to have a fear of negative evaluation, regardless of discipline and level of English proficiency. Their anxiety levels were negatively influenced by their self-reported English ability; their mean score of anxiety overall increased as their self-reported ability got lower. On the other hand, the findings denote that the participants in this research were most likely to have intrinsic motivation related to listening and speaking, regardless of discipline and level of English proficiency. They were also likely to be motivated to learn English by regarding English as something personally important to them or for an external reward. Their motivation levels were positively influenced by their self-reported English ability; the mean score of motivation overall increased as the self-reported ability got higher.

For two consecutive years, the science students had higher levels of anxiety and lower levels of motivation than the engineering students, which may suggest that there was some negative correlation between anxiety and motivation. However, the outcomes of Pearson correlation matrix illustrate that the students' anxiety and motivation were not necessarily

negatively correlated with each other. From the results, it can be deduced that some other variables influenced the students' anxiety or motivation. It appears that having a specific purpose and their class level being raised can be a significant predictor of high levels of motivation and anxiety, respectively. Having a specific purpose increased the students' motivation levels and reduced their levels of test anxiety, but it did not have a significant influence on their speaking anxiety and fear of negative evaluation. In contrast, the students' class level being raised increased their anxiety levels but did not affect their motivation.

Compared with the engineering students, the science students tended to have high levels of test anxiety and underestimate their English ability. On the other hand, the engineering students were more likely to change in both anxiety and motivation during the first two years of their undergraduate course. However, regardless of discipline, the participants in this study had high levels of speaking anxiety, which got even higher in their second year. Contradictorily, the students from both disciplines had high levels of intrinsic motivation related to listening and speaking for two consecutive years. The contradictory results were examined in the qualitative phase of this study.

This chapter presented the results of quantitative data analysis. The next chapter deals with qualitative data analysis. For the ease of presentation, the results of the analysis of two sets of data are presented separately. However, the objectives pursued with the adoption of a mixed methods approach to the present study require an integrated view of both analyses. This integrated view underlies the discussion of results in Chapter 6.

Chapter 5: Qualitative Data Findings

5.1 Introduction

I utilised an explanatory sequential mixed methods (QUAN-qual) design. After collecting and scrutinising quantitative data, I conducted semi-structured interviews in order to gain a better understanding of some aspects emerging from the quantitative analysis.

The results of the quantitative part of this study appear to be contradictory in two respects. First, Communication Apprehension (CA) scored the highest of the three factors of the FLCAS and Test Anxiety (TA) came in second, whereas Intrinsic Motivation (Stimulation) (IS), Identified Regulation (ID), and External Regulation (EX) scored higher than the other categories of the LLOS. The results appear to be contradictory in that the students had high levels of speaking anxiety (CA) despite their high levels of intrinsic motivation related to listening and speaking (IS). Second, the results demonstrate that the science students had higher levels of anxiety and lower levels of motivation than the engineering students, and therefore it appears that there were negative correlations between their anxiety and motivation. However, the outcomes of Pearson correlation matrix statistically illustrate that the students' anxiety and motivation were not necessarily negatively correlated with each other. The findings indicate that their motivation was not necessarily a significant predictor of their anxiety, and that some other variables might have affected their anxiety or motivation in one way or another.

The aim of the qualitative dimension of this research was to explore in greater detail the factors associated with the students' language-related anxiety and motivation to learn English as part of their course requirements, with a special emphasis on some of the findings of the quantitative analysis that were unexpected and intriguing. Therefore, in order to gain a better understanding of the apparently contradictory results of the quantitative findings of this study, those quantitative findings were addressed in the qualitative phase of the study.

First, regardless of discipline, communication apprehension increased in the second year whereas test anxiety did not. Although I expected communication apprehension was the highest of the three anxiety factors, I had not assumed the levels increased in the second year. To find the reason(s), I prepared three questions in relation to oral communication: whether they preferred a Japanese teacher or a native English-speaking teacher (Q2), whether they preferred to be taught in English or in Japanese (Q3), and whether they had any preference as to which country or area their English teacher came from (Q4). 'Oral English 3/4' was less popular with 'Academic Reading' with the second-year students, and fewer students were enrolled in 'Writing' classes if the Japanese teacher taught in English (see Tables 1 and 2, Chapter 1, pp. 5-6). Furthermore, Japanese students learn American English, and thus they are less accustomed to British or Australian accents.

Second, the science students scored high on test anxiety ($M = 3.0$ or above) for two consecutive years whereas the engineering students did not. Another trend of note is that the science students were more likely to have low self-esteem. As I had not assumed that such differences were found between the two disciplines, I created four questions in relation to tests and evaluation: how they felt about the standardised tests (Q5), whether they agreed with a speaking test (Q6), how they felt when taking the placement test (Q7), and how they felt if they were placed in a higher (or lower) level class based on the test results (Q8).

Third, regardless of discipline, intrinsic motivation related to listening and speaking scored higher than extrinsic motivation for an external reward for two consecutive years. The results were apparently contradictory, considering that communication apprehension was the highest of the three anxiety factors and increased in the second year. Furthermore, as discussed in Chapter 2, previous studies suggested that Japanese students' EFL motivation tended to be instrumental, and I had also assumed that the participants in my study would

score the highest on extrinsic motivation for an external reward. In this regard, the results of the quantitative phase of my study were unexpected and intriguing, and I wanted to clarify the reason(s). I created six questions in relation to motivation, and three of them were about their ideal L2 self: why they would (or would not) take English (Q9), what their goals were (Q10), and what was the most important for them with regard to English (Q11). Two questions were about their ought-to L2 self: what their parents expected them to achieve (Q12) and what the professors from their department expected regarding English (Q13). I also created a question aimed at eliciting their extrinsic motivation for an external reward: whether they agreed with the current system of awarding two credits to those who successfully achieve 600 or higher on the TOEIC L&R (Q14).

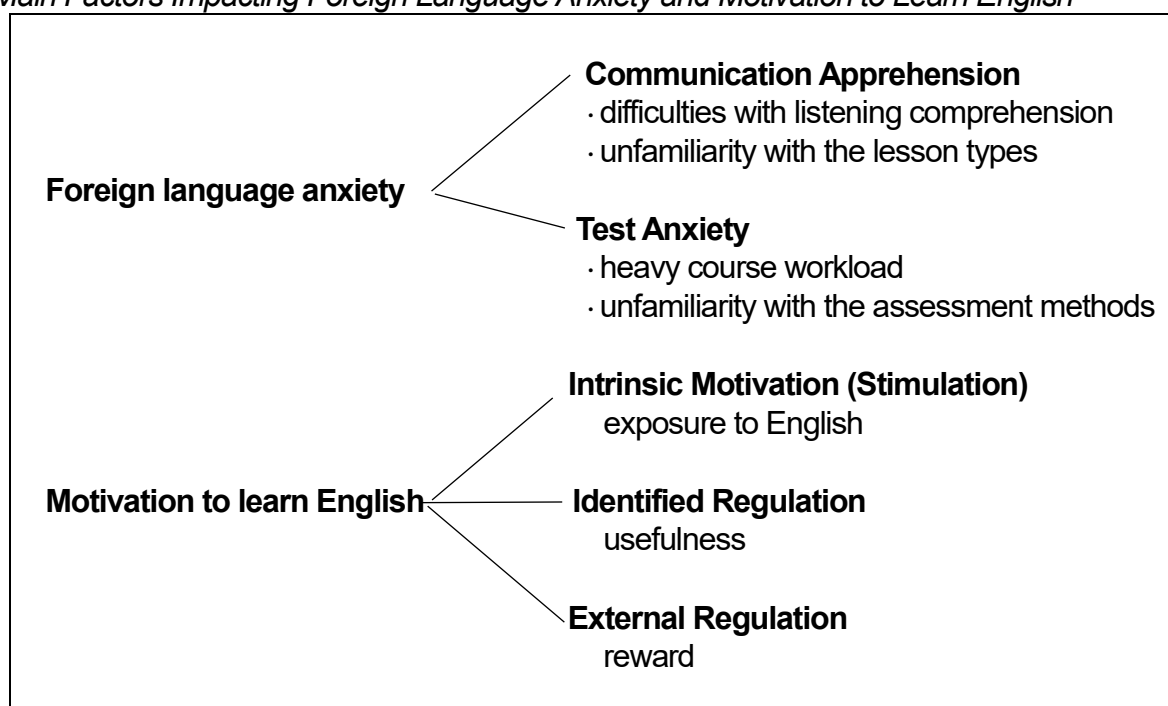
In addition to all those questions, I asked two broad questions: how they felt about their experience of learning English as part of their degree (Q1) and whether there was anything else they would like to add (Q15). Those two questions were intended to let the students freely express their feelings and opinions.

As explained in Chapter 3, I adopted a deductive approach to the qualitative data analysis guided by a previously defined analytical framework. As represented in Figure 2, the analytical framework comprised five main themes related to the two topics under investigation. Communication Apprehension and Test Anxiety, which appear directly related to foreign language anxiety, were pointed out by the students as being caused by three main factors: difficulties with listening comprehension, unfamiliarity with the lesson types or assessment methods, and heavy course workload. On the other hand, the students' motivation to learn English was shaped essentially by three main factors: Intrinsic Motivation (Stimulation) derived from an interest of exposure to English; Identified Regulation in association with the sense of usefulness of learning the language; and External Regulation associated with the feeling of

reward. I explore those five themes in Sections 5.2 and 5.3.

Figure 2

Main Factors Impacting Foreign Language Anxiety and Motivation to Learn English



As this is a longitudinal study, I conducted interviews for two consecutive years: 15 students in the first year (#1 to #15) and 11 in the second year (#16 to #26). In this chapter, for ethical reasons, direct quotes from the interviews are referenced with a code showing the interviewee's code number and year. For instance, 'Interviewee #1/Y1' means that this interviewee's number is 1 and the interview was conducted in the first year.

Three students took part in the qualitative phase of this study for two consecutive years. Interviewee #2/Y1, Interviewee #4/Y1, and Interviewee #9/Y1 participated in the interviews in the second year as Interviewee #17/Y2, Interviewee #18/Y2, and Interviewee #22/Y2, respectively. In Section 5.4.2, I give some attention to those three students, examining their stories and trends over time.

5.2 Foreign Language Anxiety

There are two main factors that are related to and explain the students' levels of foreign

language anxiety: (1) Communication Apprehension caused by difficulties with listening comprehension and unfamiliarity with the lesson types, and (2) Text Anxiety caused by heavy course workload and unfamiliarity with the assessment methods. The analysis of the interviewees' testimonials suggests that failure to properly understand spoken English, being unfamiliar with the lesson type or test format, and spending many hours preparing for the exam were likely to increase their anxiety levels.

5. 2. 1 Communication Apprehension

As explained in Chapter 1, one of the problems in the Faculty of Science and Engineering was that almost all the second-year students were enrolled in 'Oral English 3' in the spring semester but less than half of them continued to take 'Oral English 4' in the autumn semester. In contrast, most of the second-year students were enrolled in 'Academic English 1' in the spring semester and more than 80% of them continued to take 'Academic English 2' in the autumn semester (see Table 1, Chapter 1, p. 5). It is compulsory for them to take either 'Oral English 3' or 'Oral English 4' but not necessarily both. However, 'Academic Reading 1' and 'Academic Reading 2' are both elective, and thus students do not have to take either of them.

As an institutional policy, native English-speaking teachers teach 'Oral English' and Japanese teachers teach 'Academic Reading.' 'Writing' is also taught by Japanese teachers but there were three classes whose teacher taught in English (see Table 2, Chapter 1, p. 6). The teacher also asked his students to speak English in class. Considering that those three classes had fewer students than the other 'Writing' classes, the students might have disliked speaking English. Generally, students are often engaged in listening activities in Japanese teachers' classes but they are *not* required to speak English by Japanese teachers. It is native

English-speaking teachers who ask their students to speak English in class. Actually, the results of the quantitative data analysis show that Communication Apprehension scored the highest of the three anxiety factors for two consecutive years. Furthermore, its mean scores were above 3.0 for two consecutive years and slightly increased in the second year ($M = 3.3$ to $M = 3.4$) (see Table 14, Chapter 4, p. 93). As Horwitz (2013) mentioned that students 'who average near 4 and above are probably fairly anxious' (p. 264), the participants in this study were *not* fairly anxious during the two years under investigation. However, Horwitz (2013) also stated that students 'with averages around 3 should be considered slightly anxious' (p. 264), and therefore the participants in this study were considered to be slightly anxious about communicating in English for two consecutive years. The explanation for this issue was provided by the interviewees in association with the difficulties with listening comprehension and the use of English by the teachers in the 'Oral English 3/4' classes.

Difficulties with Listening Comprehension as a Cause of Anxiety

Difficulties with listening comprehension seems to be closely associated with the students' foreign language anxiety, especially Communication Apprehension. I asked the interviewees whether they preferred taking English lessons in English or in Japanese. Their testimonials indicate that for two consecutive years, they were relatively less likely to have high levels of Communication Apprehension as long as they were able to understand, or comprehend, the content in English. The interviewees in the first year unanimously expressed a preference for 'Oral English' teachers to use English in class as much as possible except when they had a hard time understanding difficult words or concepts.

'I want native English-speaking teachers to give us lessons in English. When we encounter a new English word in class, I personally want them to give us its definition in

English, instead of explaining it to us in Japanese.' (Interviewee #9/Y1)

'I want native English-speaking teachers to avoid using Japanese as much as possible. However, there are some cases where it is difficult to understand everything in English. In such a case, I want them to use Japanese to make for smooth communication.' (Interviewee #8/Y1)

Furthermore, about half of the interviewees in the first year claimed to prefer Japanese teachers to use English in class given that the Japanese teachers' English was easier to understand than native English-speaking teachers' English.

'My "Oral English" teacher speaks so fast that I cannot understand what he says. I think I would not be too nervous about Japanese teachers' English, and I don't mind their Japanese accents. In fact, Japanese teachers' English is easier to understand than native English-speaking teachers' English.' (Interviewee #12/Y1)

This claim was corroborated by another interviewee who, in referring to his experience of studying abroad, stated: *'I think it is good to study in Russia using English, because non-native speakers' English is easier to understand'* (Interviewee #5/Y1).

Conversely, however, the interviewees in the second year generally shared a preference for 'Oral English' teachers to use Japanese, especially when giving instructions in class. Most of the interviewees confessed that they had experienced some trouble in class simply because they were not able to understand instructions given in English, as illustrated by the following quotes:

'I want native English-speaking teachers to use Japanese when they give us instructions. Once my "Oral English" teacher explained a lot in English so quickly that I was not able to understand what to do. I was not doing what I was told to do, when the teacher came to me and asked me why I was not doing what I was told to do. I felt embarrassed. I did not mean to be rude. I simply did not understand what to do.' (Interviewee #20/Y2)

'My current "Oral English" teacher teaches us in English and sometimes in Japanese, which prevents trouble from occurring. And it's fun. I want native English-speaking teachers to use both English and Japanese when they tell us what to do. Giving instructions in English does not make any sense if students don't understand what to do.' (Interviewee #22/Y2)

Interestingly, most of the interviewees in the second year expressed that they wanted their 'Oral English' teachers to use Japanese in class sometimes, although all the interviewees in the first year preferred lessons conducted in English. One plausible reason for this change might be that the second-year interviewees were able to compare two teachers because they took 'Oral English' in their first and second years, although the first-year interviewees knew only one native English-speaking teacher.

'My current "Oral English" teacher speaks only English, and sometimes I have difficulties understanding what he says. That scares me. But my previous "Oral English" teacher sometimes spoke Japanese, and it helped me understand the content.' (Interviewee #17/Y2).

However, there seemed to be more to it than that. There are differences between 'Oral English 1/2' and 'Oral English 3/4' and the analysis of the interviewees' testimonials suggests that those differences might have raised the students' anxiety levels.

Unfamiliarity with the Lesson Types as a Cause of Anxiety

'Oral English 3/4' for second-year students focus on speaking and presentation skills, whereas 'Oral English 1/2' for first-year students deal with the four language skills (listening, speaking, reading, and writing). Therefore, the content of 'Oral English 3/4' could be more difficult, and more importantly, the lesson types were less familiar to the students. It is not common that students take presentation classes in secondary school in Japan, and thus the participants in this study were not accustomed to the activities involved in their 'Oral English 3/4' class.

'I want my teacher to use Japanese in class, because I want to completely understand what I am told to do. Even if my teacher is not a native speaker of Japanese, I want the teacher to speak Japanese when giving instructions just to make sure that we all

understand what to do in class.' (Interviewee #19/Y2).

Less explanation is needed for first-year students because in their 'Oral English 1/2' class, they are engaged in activities they are used to: answering multiple-choice questions, solving quizzes or puzzles, having conversations within a small group, and so on. In contrast, second-year students have to pay extra attention to their teacher's instructions in 'Oral English 3/4' class. They are not accustomed to learning presentation skills even in their own language.

All those comments suggest that failure to properly understand English spoken by their teacher in class would be likely to increase the students' anxiety levels. If they cannot completely understand the instructions, they are likely to be too anxious to speak out in class.

5. 2. 2 Test Anxiety

The analysis of the quantitative data shows that although Test Anxiety scored lower than Communication Apprehension, its mean scores were not low enough to be ignored: 3.0 or above for the science students and 2.8 for the engineering students for two consecutive years. According to Horwitz (2013), students 'with averages around 3 should be considered slightly anxious' (p. 264) and therefore the participants in this study were considered to be slightly anxious about sitting English tests for two consecutive years. The explanation for this issue was provided by the interviewees in association with heavy course workload and unfamiliarity with the test format.

Heavy Course Workload as a Cause of Anxiety

Heavy course workload emerged from the interviewees' testimonials as a cause of foreign language anxiety, especially related to the preparation for the end-of-term exams that they felt were a burden adding to the already heavy course workload. The interviewees gave

more favourable opinions about standardised tests than textbook-based exams. In the case of 'General English 1' and 'TOEIC 1,' the end-of-term exam is a standardised test whose format is the same as the TOEIC L&R. It is a 50-minute test with 65 questions that a group of full-time teachers create every year, and students sit the test on a weekday. In the case of 'General English 2' and 'TOEIC 2,' the end-of-term exam is the TOEIC L&R, which is a 120-minute test with 200 questions. Students come to school on Saturday only to sit the test.

On one hand, they did not seem to believe that a standardised test would badly affect their final grade, nor did they believe they would fail the course simply because the end-of-term exam was a standardised test. On the other hand, in the first year, with 'General English' classes being held twice a week, a textbook-based exam would require twice as much preparation time and effort as a standardised test. The first-year interviewees claimed that they had to memorise their textbook before taking a textbook-based exam whereas they did not have to spend many hours preparing for a standardised test. This tendency was more distinct in the first year. In the second year, with 'TOEIC' classes being held only once a week, a textbook-based exam would not require so much preparation time and effort.

'If I have sufficient knowledge of English grammar, I can achieve a good score on a standardised test. To be honest, I am genuinely grateful for it because I don't want to prepare for English tests.' (Interviewee #10/Y1)

'I prefer standardised tests. In fact, standardised tests would be helpful because I don't have to prepare for the end-of-term exam.' (Interviewee #7/Y1)

'If the end-of-term exam of "General English" were not a standardised test, I would have to spend twice as many hours in preparing for it.' (Interviewee #11/Y1)

The perceived advantage of spending time and energy in studying their specialised subjects, instead of English, was clearly expressed by both the first- and second-year interviewees in the following terms:

'In the Faculty of Science and Engineering, specialised subjects are difficult. A lot of unfamiliar technical terms, and such.' (Interviewee #6/Y1)

'If the end-of-term exam is not a standardised test, we have to sit the test on a weekday, but if it is the TOEIC L&R, we are required to sit the test on Saturday. That's a good point, because I can concentrate on my specialised subjects on weekdays. As for specialised subjects, we have to sit the end-of-term exams on weekdays.' (Interviewee #22/Y2)

All those comments suggest that an end-of-term exam based on their textbook would end up increasing the students' anxiety levels partly due to the heavy course workload.

Unfamiliarity with the Assessment Methods as a Cause of Anxiety

Unfamiliarity with the methods of assessment was pointed out by the interviewees as another factor impacting their foreign language anxiety. As mentioned above, the interviewees in the first year generally gave favourable opinions about using a standardised test as the end-of-term exam of 'General English.' The primary reason was heavy course workload, but another common reason was that they were familiar with the test format. The standardised test of 'General English 1' is in the same multiple-choice format as the TOEIC L&R the students were used to taking in 'General English' classes, and the standardised test of 'General English 2' is the TOEIC L&R. Therefore, it is understandable that they showed a preference for the standardised tests as the end-of-term exams of 'General English 1/2' instead of other types of tests they were unfamiliar with.

'I don't think taking a standardised test would make me feel more anxious. It is true that the textbook mainly deals with daily topics, but it also provides some TOEIC practices.' (Interviewee #14/Y1)

This phenomenon can be confirmed by the interviewees' responses in the second year. Just like 'General English' is compulsory for first-year students, 'TOEIC' is compulsory for second-year students and they have to take a standardised test as the end-of-term exam. The

standardised test of 'TOEIC 1' is in the same multiple-choice format as the TOEIC L&R, and the standardised test of 'TOEIC 2' is the TOEIC L&R. The interviewees in the second year agreed with the idea of using a standardised test as the end-of-term exam of 'TOEIC.' They unanimously stated that the standardised tests, which they were familiar with, reflected what they learned in class.

'I agree with the standardised test. The lessons are in preparation for the TOEIC L&R, and therefore it would not make any sense if the end-of-term exam were a textbook-based test.' (Interviewee #19/Y2)

This is in line with the interviewees' negative feelings towards speaking tests in the first year. It was not that they had had some bad experience about speaking tests, but that they were simply not familiar with them. As one interviewee explained, *'I cannot say anything about speaking tests because I have never taken such tests before'* (Interviewee #10/Y1). This was corroborated by another interviewee who claimed, *'I have never taken a speaking test before'* (Interviewee #11/Y1). Considering that none of the interviewees in the first year had ever taken a speaking test before taking part in the interviews, naturally the idea of taking a speaking test would make them feel more anxious than taking a written test simply because they were not familiar with the former one. As one interviewee confessed, *'I prefer paper-and-pencil tests because I am used to them'* (Interviewee #15/Y1). This comment suggested that unfamiliarity with the forms of assessment could cause the students' anxiety to heighten.

Conversely, the interviewees in the second year generally expressed favourable opinions about speaking tests. 'Oral English 1/2' for first-year students deal with the four language skills but 'Oral English 3/4' for second-year students focus on speaking and presentation skills. The interviewees agreed with the idea of using speaking tests as the end-of-term exams of 'Oral English 3/4' because speaking tests matched the content of the class:

'When our teacher gave us paper-and-pencil quizzes, I felt a bit strange. As we mainly practised speaking and making presentations in our "Oral English 3" class, a speaking test would be best suited as the end-of-term exam.' (Interviewee #21/Y2)

The mismatch between the focus and practices in class and the test type was best expressed by one interviewee in the following terms:

'Speaking tests would be more difficult to prepare for, because our teacher doesn't teach us how to give a good presentation and just lets us speak in class. If a speaking test were used as the end-of-term exam, we would have to study very hard by ourselves outside the classroom.' (Interviewee #19/Y2)

However, it is worth noticing that unfamiliarity by itself is not always related to the students' anxiety levels, as illustrated by the following quote:

'I completely disagree with speaking tests, because I am so nervous that I often stammer while speaking. I don't mind reading out a passage, but I just hate delivering a speech without looking at a manuscript.' (Interviewee #16/Y2)

For this interviewee, the main reason why he opposed using speaking tests was that he was too shy to be good at speaking.

5.3 Motivational Orientations

The results of the quantitative research show that Intrinsic Motivation (Stimulation) was the highest of the seven categories of the LLOS. Identified Regulation and External Regulation were also high, whereas Amotivation was the lowest and Intrinsic Motivation (Knowledge) was the second lowest. In a sense, the results were rather unexpected. Considering that previous studies suggested that Japanese students' motivation to learn English was likely to be instrumental (Irie, 2003; Norris-Holt, 2001; Yashima, 2000), it was expected that External Regulation, which is the least autonomous type of extrinsic motivation, would be the highest of the seven categories.

The mean scores of anxiety overall increased ($M = 3.1$ to $M = 3.2$) whereas those of motivation overall decreased ($M = 4.4$ to $M = 4.3$) in the second year (see Table 14, Chapter 4, p. 93). These issues were also explored in the interviews in my study. As explained in Chapter 2, Dörnyei's (2005, 2009) L2 Motivational Self System consists of three components. One is the ideal L2 self, which represents individuals' imagined ideal future self about a second or foreign language learning. Another is the ought-to L2 self, which represents the attributes that individuals believe they ought to have in order to meet expectations from others about a second or foreign language learning. In relation to this, Papi (2010) demonstrated that students' anxiety levels increased if they were motivated through the ought-to L2 self whereas their levels of anxiety decreased if they were motivated through the ideal L2 self.

The results of the qualitative phase in this research suggest that being exposed to English, finding English useful, and receiving some reward were factors likely to motivate the students to learn English. Exposure to English is related to Intrinsic Motivation (Stimulation), usefulness is connected with Identified Regulation, and reward is associated with External Regulation of the LLOS.

5. 3. 1 Exposure to English as Intrinsic Motivation (Stimulation)

According to the interviewees' testimonials, exposure to English appears to be connected with the students' motivation to learn English. When asked whether they preferred taking English lessons in English or in Japanese, the interviewees in the first year unanimously expressed a preference for 'Oral English' teachers to use English in class as much as possible, and about half of them also claimed to prefer Japanese teachers to use English. Those interviewees commented that if they were taught in English, they would be exposed to English and thus could improve their listening skills.

'I agree with the idea of English teachers giving us lessons in English. That would give us many more opportunities to be exposed to English.' (Interviewee #2/Y1)

'I would appreciate it if both native English-speaking teachers and Japanese teachers could give us lessons in English, because I think that would help us improve our English skills.' (Interviewee #3/Y1)

'I think we should improve communication skills in English. If a Japanese teacher, too, speaks to us in English in class and we respond in English, it is a good practice for communication.' (Interviewee #8/Y1)

This type of motivation can be regarded as Intrinsic Motivation (Stimulation) of the LLOS, which occurs when an activity or behaviour is performed to experience some sort of stimulation, such as for 'the "high" I feel when hearing foreign languages spoken' and for 'the "high" feeling that I experience while speaking in the second language' (Noels et al., 2000, p. 85).

This was in line with their ideal L2 self. To uncover in detail their motivational orientations to learn English, I asked the interviewees the following question: *'Regarding English, what do you think is the most important for you as a science (or an engineering) student?'* Their responses to this question denote that they were likely to be motivated to speak and listen to spoken English. For two consecutive years, a majority of interviewees expressed that speaking English fluently was by far their most important goal, and that they wanted to improve their oral communication skills so that they would be able to have a daily conversation with native English speakers. As revealed in the following quotes, the desire to improve their communication skills functioned as a stimulus to learn English:

'I think writing skills might be more important for people in the engineering field, but I personally want to be able to speak English fluently. If I speak English fluently, I will probably end up achieving a high score on the TOEIC L&R.' (Interviewee #14/Y1)

'I want the ability to have conversations in English. I want to be able to talk with native speakers in English in my daily life.' (Interviewee #20/Y2)

However, it appears that exposure to English could be a motivator on condition that the

students were able to understand the content in English. One interviewee in the second year expressed his anxiety like this:

'If teachers, whether they are native English-speaking teachers or Japanese teachers, give me lessons in English only, I cannot understand the content.' (Interviewee #25/Y2)

Being exposed to English would increase their anxiety levels if they were not able to properly understand what they heard. As discussed in Section 5.2.1, most of the interviewees in the second year explained their trouble understanding instructions given in English, and expressed that they wanted their 'Oral English' teachers to use Japanese when giving instructions. Therefore, the interviewees' testimonials suggest that there is some overlap with regard to oral communication. Exposure to English could be both an anxiety factor and a motivational factor for the students depending on whether they had difficulties with listening comprehension or not.

5. 3. 2 Usefulness of English as Identified Regulation

Identified Regulation has been described as a type of extrinsic motivation that involves a goal or regulation for something personally important (Noels et al., 2000). Usefulness appeared in the interviewees' discourses as a factor closely related to their motivation, especially Identified Regulation of the LLOS. This is confirmed by the claims made by the interviewees in stating that they would register for English subjects even if that were not a compulsory part of their study programme. The key reason was that they considered English useful—much more useful than any other foreign language. For two consecutive years, the interviewees pointed out that English is by far the most useful and important language, especially for science or engineering students. English is a lingua franca and therefore can be used all over the world.

'I would definitely take English if it were not mandatory. I have been learning English since I was 12, and English is necessary. I plan to work in China after graduating from the university, and I have to study Chinese to pursue my career. But having a good command of English is much more important for me.' (Interviewee #3/Y1)

'I would take English subjects if they were electives. English is spoken by people all over the world, and I have no motivation to learn useless languages. I don't think other foreign languages are as useful as English.' (Interviewee #18/Y2)

At a glance, this disposition of the interviewees appears to be contradictory to the fact that the students tended not to register for English subjects in the autumn semester, especially in their third year. As revealed in the above quotes, however, most of the interviewees compared English with other foreign languages. There was one interviewee in the second year who compared English with his specialised subjects, and he made the following comment:

'I would not take English if it were not mandatory, because I want to study my specialised subjects. I am busy working on my assignments, and I want to study what I am interested in.' (Interviewee #20/Y2)

It has been a common practice for decades that university students in Japan are required to complete general education courses such as physical education and foreign language courses like English or German in addition to their specialised subjects. It is also a national policy. Currently, students are required to get a minimum of 14 credits in foreign language courses to graduate from the Faculty of Science and Engineering. It was likely that most of the interviewees thought that if they did not take English, they would have to register for other foreign languages to get 14 credits in foreign language courses.

5. 3. 3 Reward as External Regulation

Receiving an external reward is related to the students' motivation to learn English, especially External Regulation of the LLOS. This type of extrinsic motivation is defined as

behaviours that are determined by external sources such as ‘tangible benefits or costs’ (Noels et al., 2000, p. 62). In the Faculty of Science and Engineering, currently, students who score 600 or higher on the TOEIC L&R are given two credits and receive 100 as a final grade for ‘TOEIC 1’ and ‘TOEIC 2.’ This can be regarded as tangible benefits. Studying English to achieve 600 or higher on the TOEIC L&R may appear to be related to Intrinsic Motivation (Accomplishment) of the LLOS, which is ‘the sensations related to attempting to master a task or achieve a goal’ (Noels et al., 2000, p. 61). However, the interviewees’ testimonials reveal that they would be motivated by this credit award system (tangible benefits), not by the sensations of achieving a high score. Thus, it should be regarded as External Regulation.

I asked the interviewees how they felt about receiving two credits by achieving 600 or higher on the TOEIC L&R. All the interviewees in both the first year and the second year gave favourable opinions about this credit award system. One interviewee in the second year clearly stated, *‘Without this system, higher level students would not study English as hard as they do now’* (Interviewee #16/Y2). The following quotes by two other interviewees in the second year are illustrative of the agreement shared among the students with the idea of giving some reward to those who make efforts:

‘I totally agree with the system, because I have a friend who successfully achieved 600, and I know he studied English very hard just to score 600 on the TOEIC L&R to receive two credits.’ (Interviewee #20/Y2)

‘I agree. A friend of mine had been studying English very hard for one year and a half just to score 600 on the TOEIC L&R, and he finally achieved it. I think he deserves two credits.’ (Interviewee #22/Y2).

The students also seemed to regard this reward as appropriate. Two interviewees in the first year (Interviewees #1/Y1 and #12/Y1) and one in the second year (Interviewee #26/Y2) pointed out that 600 is the minimum score they can write on a curriculum vitae. Furthermore,

two interviewees in the first year reported like this:

'A score of 600 might be a sort of index, because I have found a lot of TOEIC books aiming for 600.' (Interviewee #9/Y1)

'We can pass almost any test with a 60% correct answer rate, and achieving 600 means a 60% correct answer rate. So, I think 600 is appropriate.' (Interviewee #10/Y1)

On the other hand, one interviewee in the second year confessed, *'A score of 600 is suitable because it's within reach of us'* (Interviewee #16/Y2). Those comments indicate that the students were likely to be extrinsically motivated as long as the reward can be regarded as appropriate; that is, adequately evaluated by society and not too difficult to achieve.

This was in line with their ought-to L2 self. In order to understand better their motivational orientations to learn English, I asked the interviewees the following question: *'Regarding English, what do you think other people expect you to achieve?'* For two consecutive years, their responses denote that the students generally considered achieving a high score on the TOEIC L&R was what they were expected to do. As revealed in the following quotes, however, their ought-to L2 self entails tangible benefits such as securing a good job:

'My parents and teachers want me to secure a good job in Japan. Achieving a high score on the TOEIC L&R would help me to find a job.' (Interviewee #6/Y1)

'They just want me to secure a good job by achieving a high score on the TOEIC L&R. They don't mind if I cannot speak English fluently.' (Interviewee #11/Y1)

On the other hand, one interviewee in the second year made the following comment:

'I have to achieve 700 or higher on the TOEIC L&R to go on to the postgraduate school I want to be admitted to.' (Interviewee #24/Y2)

The above quote reveals that this interviewee's aim was not to achieve the score in itself but to get an external reward—being admitted to the postgraduate school he wanted to go to.

5. 4 Changes during the Two Years

The students' levels of anxiety overall increased ($M = 3.1$ to $M = 3.2$) whereas their levels of motivation overall decreased ($M = 4.4$ to $M = 4.3$) in the second year (see Table 14, Chapter 4, p. 93). This phenomenon was addressed in this section.

5. 4. 1 Changes in the Mean Scores

It was difficult to find a good reason in the qualitative data why the students' scores of anxiety increased in the second year. A plausible reason might be that as explained in Section 5.2.1, 'Oral English 3/4' for second-year students focus on speaking and presentation skills. Most of the interviewees in the second year expressed that they felt uncomfortable with presentations.

On the other hand, from the interview data, it can be inferred that the students' scores of motivation decreased in the second year due to their academic priority. All the first-year interviewees mentioned something as their ought-to L2 self when I asked them the following question: *'Regarding English, what do you think other people expect you to achieve?'* For a majority of the interviewees in the first year, the ought-to L2 self was achieving a high score on the TOEIC L&R or improving their speaking skills. In the second year, however, four interviewees commented that nothing was expected of them about English.

'I am expected to acquire expertise. This is the most important goal. English is also important, but they seem to think it's not as important as my specialised subjects.' (Interviewee #21/Y2)

'Having a good command of English is beneficial, but nothing in particular is expected of me about English.' (Interviewee #23/Y2)

'They don't expect anything from me as far as English is concerned.' (Interviewee #24/Y2)

'Regarding English, nothing in particular is expected of us. Mathematics and science are much more important than English. We are highly evaluated if we are good at maths and science.' (Interviewee #25/Y2)

Those four students had no ought-to L2 self, and thus they gave low priority to English. Due to the low academic priority, their motivation scores naturally decreased as the course progressed.

5. 4. 2 Changes of the Three Students

There were three students who participated in the interviews twice: in their first and second years. Their answers were not necessarily the same. As shown in Table 20, I noticed several changes in their opinions.

Table 20						
<i>Changes in the Three Interviewees' Opinions</i>						
	Student A		Student B		Student C	
	#2	#17	#4	#18	#9	#22
	first year	second year	first year	second year	first year	second year
Class levels	higher	mid	higher	higher	higher	mid
Disciplines	engineering		engineering		science	
Standardised tests	I agree.	I agree.	I disagree.	I agree.	I disagree.	I agree.
Teaching in Japanese or in English	All teachers of English should teach in English.	I want my 'Oral English' teacher to use Japanese sometimes.	Teachers should use their native language.	Teachers should use their native language.	All teachers of English should teach in English.	I want my 'Oral English' teacher to use Japanese sometimes.
Ideal L2 self	I want to be able to have a daily conversation with native English speakers.	I want to be able to have a daily conversation with native English speakers.	I want to be able to read academic papers and books in English.	I want to be able to have a daily conversation and also read academic papers in English.	I want to be able to give lectures in English.	I want to read academic papers and also have a daily conversation in English.
<i>Note.</i> Interviewee #2 in the first year took part in the interview as Interviewee #17 in the second year, Interviewee #4 in the first year took part as Interviewee #18 in the second year, and Interviewee #9 in the first year took part as Interviewee #22 in the second year.						

By examining their stories, I noticed interesting trends. First, two of them disagreed with the standardised tests in the first year but all of them agreed in the second year. In the first

year, Student A expressed his preference for the standardised tests because he did not have to memorise the textbook, whereas Students B and C explained that they would perform better on the textbook-based exam because all they had to do was to memorise what they had learned in class. In the second year, all of them preferred the standardised tests. Students A and B explained that they did not have to prepare for the standardised tests and Student C expressed that he could spend more time in studying his specialised subjects.

Second, although one student had the same opinion for two consecutive years and stated that teachers should use their own language when teaching English, the other two students changed their thinking about which language their teachers should use in class; in the first year they wanted their teachers to use English when teaching English, but in the second year they wanted their 'Oral English' teachers to use Japanese sometimes. Student B explained that Japanese teachers of English played different roles from native English-speaking teachers. He mentioned that Japanese teachers were good at teaching grammar whereas native English-speaking teachers were more suitable for teaching conversation classes. In contrast, although Students A and C preferred to be taught in English in the first year, both of them explained that they sometimes did not understand the instructions given in English and therefore wanted their 'Oral English' teacher to use Japanese sometimes.

Third, the ideal L2 self for two students was something academic: reading academic papers and books in English or giving lectures in English. Although they still considered it their ideal L2 self in their second year, all the three students expressed that they wanted to be able to have a daily conversation informally with native English speakers. They all mentioned that they found it enjoyable to have a conversation in English, and Student C also expressed his preference for speaking and writing because listening and reading were boring. He found it enjoyable to express himself by speaking or writing.

Several other interviewees told me similar stories in the first or second year. In addition to all those responses, Student B referred to role differences between Japanese teachers and native English-speaking teachers. This is not included in the main factors impacting anxiety or motivation and thus was not discussed in Sections 5.2 and 5.3, but actually several other interviewees in both the first year and the second year had the same opinion. In the qualitative phase of this research, I used thematic analysis (Braun & Clarke, 2006) and I adopted a deductive approach in generating semantic and latent codes. The concept of role differences was not considered when I performed coding, but I will discuss it in the next chapter.

5.5 Chapter Summary

The analysis of the qualitative data suggests that three main factors contribute to explain the students' levels of foreign language anxiety: difficulties with listening comprehension, unfamiliarity with the lesson types or assessment methods, and heavy course workload. The interviewees in this study viewed difficulties with listening comprehension as the main cause of Communication Apprehension, but the difficulties in this case refer to their difficulties in understanding the teachers' instructions. Their testimonials suggest that they found it difficult to understand the instructions given in English due to their unfamiliarity with the lesson type, and that they could not speak in class if they did not catch the instructions. From a different perspective, the findings appear to imply that just having a conversation with their teacher or peers in English would not necessarily increase the students' levels of anxiety about communication; they would feel anxious due to failure to properly understand spoken English. On the other hand, heavy course workload and unfamiliarity with the assessment methods emerged from the interviewees' testimonials as the two main causes of Test Anxiety. This could explain the students' preference for the standardised tests as the end-of-term exams.

On the other hand, three themes emerged from the qualitative data analysis that appear to be associated with the students' motivational orientations: exposure to English, usefulness of English, and reward. Considering that exposure to English is related to Intrinsic Motivation (Stimulation), usefulness of English is connected with Identified Regulation, and reward is associated with External Regulation, it makes sense that those three categories scored higher than the other categories of the LLOS. A plausible reason why Intrinsic Motivation (Stimulation) scored higher than the other types of motivation might be that the students' ideal L2 self, which represents individuals' imagined ideal future self about a second or foreign language learning, was closely connected with this category. For two consecutive years, speaking English fluently in their daily lives was the ideal L2 self for a majority of the interviewees, and this is exactly the type of motivation that can be categorised into Intrinsic Motivation (Stimulation) (Noels et al., 2000). However, exposure to English could be a motivator on condition that they were able to understand what they heard.

In Chapters 4 and 5, I presented the findings of the quantitative and qualitative data analyses separately. As this research utilised an explanatory sequential design, in the next chapter I will take an integrated approach in order to discuss and interpret the quantitative and qualitative findings in a combined fashion.

Chapter 6: Discussion of Results

6.1 Introduction

This chapter is concerned with the discussion of the findings of my research. This is a longitudinal, mixed methods study that followed an explanatory sequential mixed methods (QUAN-qual) design through the collection of both quantitative and qualitative data for two consecutive years. After administering the questionnaires, semi-structured interviews were conducted to further explore and gain a better understanding of the aspects emerging from the quantitative data analysis, which would otherwise remain unexplored. This chapter is organised into two main parts: in the first part I sum up the findings of my study by providing clear-cut answers to my research questions; in the second part I move on to discussing the findings in articulation with relevant literature and in regard of their significance to the objectives of my research. In mixed methods research, as the quantitative data show an overall picture of the issues, the qualitative outcomes are used 'to refine, extend or explain the general picture' (Subedi, 2016, p. 572). In the particular case of my study, the discussion chapter takes an integrated approach in order to discuss and interpret the quantitative and qualitative findings in a combined fashion.

6.2 Answers to the Research Questions

This study posed six research questions (RQ) to investigate Japanese undergraduate science and engineering students' foreign language anxiety and motivational orientations, in relation to their English proficiency and self-reported English ability. This section presents the answers to each of the research questions based on the findings presented in the previous chapters.

RQ1 What are the nature and levels of foreign language anxiety reported by Japanese

undergraduate science and engineering students studying English in a Japanese university?

The students showed the same tendencies for two consecutive years, notwithstanding discipline or proficiency level. Their anxiety levels were highest about speaking English and also high about tests, but not so high about being judged negatively by others. In the qualitative phase of this study, difficulties with listening comprehension (especially the difficulty in understanding the teacher's instructions) as well as unfamiliarity with the lesson types were pointed out as a cause of communication apprehension, whereas their levels of anxiety about tests were raised by heavy course workload as well as unfamiliarity with the assessment methods. Although their tendencies remained the same, their levels of communication apprehension increased in the second year regardless of discipline. According to the interview data, this increase appears to have resulted from the difference in lesson type. 'Oral English 3/4' for second-year students focus on presentation skills, which Japanese students generally do not learn before entering university. That resulted in difficulties in understanding their teacher's instructions, which raised their anxiety levels.

RQ2 What types of motivation do the Japanese undergraduate science and engineering students have, to learn English as part of their undergraduate curriculum?

For two consecutive years, the participants had intrinsic motivation related to listening and speaking. In fact, they would be inspired by having many opportunities to be exposed to English. They were also motivated to learn English by finding it useful or by receiving some reward. On the other hand, they were not intrinsically motivated to learn about the literature and cultures of English-speaking countries. Although they did not lack motivation to learn English, their levels of motivation decreased in the second year. In the qualitative phase, for two consecutive years, the interviewees expressed that speaking English fluently was by far the most important goal. They also referred to English as a lingua franca and showed a strong

willingness to achieve 600 or higher out of 990 as a mark on the TOEIC L&R (Test of English for International Communication Listening & Reading Test). However, it appears that English was a low academic priority for the second-year students, resulting in their low motivation.

RQ3 How are the Japanese undergraduate science and engineering students' levels of foreign language anxiety correlated with their types of motivation to learn English?

The results of Pearson correlation matrix have indicated that the students' levels of foreign language anxiety were not necessarily negatively correlated with their motivation. Statistically, the students' motivation was not necessarily a significant predictor of their anxiety levels. The findings suggest that some other variables might have affected their anxiety.

On the other hand, I observed positive correlations among anxiety factors. The results of Pearson correlation matrix show that there were positive correlations between anxiety overall and each of the three anxiety factors (Communication Apprehension, Test Anxiety, and Fear of Negative Evaluation) for two consecutive years. There were also positive correlations among the three factors. Therefore, having high levels of anxiety overall implied that the students reached high levels on each of the three anxiety factors, and they were unlikely to have only one type of anxiety. Those who were anxious about tests, for example, had high levels of communication apprehension and a fear of negative evaluation.

Similarly, I noticed strong positive correlations for two consecutive years between motivation overall and the four types of motivation: three types of intrinsic motivation and a type of extrinsic motivation driven by considering English personally important. As those four types are all regarded as autonomous types of motivation, it is highly likely that the students who had high levels of motivation overall reached high levels on each of the autonomous types of motivation. I also observed positive correlations among the four autonomous types, and thus it is likely that the students who had one of the autonomous types of motivation had the

other autonomous types of motivation.

In summary, highly anxious students were likely to have high levels of anxiety about communication, tests, and negative evaluation. Likewise, highly motivated students were highly likely to have the four autonomous types of motivation. Furthermore, the results of Pearson correlation matrix illustrate that although the students' anxiety and motivation were not necessarily negatively correlated with each other, the autonomous types of motivation were more likely to have negative correlations with their anxiety levels than the less autonomous types for two consecutive years (see Tables 9 and 10, Chapter 4, pp. 81–82). In the qualitative phase, the second-year interviewees explained that they had trouble understanding their 'Oral English' teacher's instructions, but speaking English fluently was still the most important goal for them. Their testimonials could partly explain the results of the quantitative part of this study. Exposure to English could be a motivator for them, but it could also be a cause of anxiety. The students could be intrinsically motivated by being exposed to English, provided that they did not have difficulty in understanding spoken English. Otherwise, their levels of communication apprehension would increase.

RQ4 What differences can be found between science students and engineering students with respect to foreign language anxiety and motivation to learn English?

For two consecutive years, the science students had higher levels of anxiety and lower levels of motivation than the engineering students, but their anxiety and motivation tended to remain the same (see Table 15, Chapter 4, p. 94). In contrast, the engineering students showed more significant changes in both anxiety and motivation as the study programme unfolded. Their levels of anxiety overall increased whereas their levels of motivation overall decreased in the second year, and the differences were statistically significant ($p < .05$) (see Table 16, Chapter 4, p. 95).

Regardless of discipline, the students' communication apprehension scored the highest of the three anxiety factors, but the science students also had higher levels of test anxiety than their engineering counterparts for two consecutive years. Their test anxiety scored high ($M = 3.1$ in the first year and $M = 3.0$ in the second year), whereas the engineering students' test anxiety did not ($M = 2.8$ for two consecutive years). The findings denote that the students in the science fields were slightly anxious about English tests whereas those in the engineering fields did not have much anxiety about sitting tests.

However, these findings must be read with caution. Those differences might have resulted from the difference in the number of participants. A bigger number of engineering students participated in the quantitative surveys: 196 science students (29.3%) and 473 engineering students (70.7%) in the first year, and 117 science students (23.1%) and 389 engineering students (76.9%) in the second year. Furthermore, there was no evidence in the interview data that clearly indicates why those differences emerged.

RQ5 How is the Japanese undergraduate science and engineering students' self-reported English ability related to their foreign language anxiety and motivation to learn English?

The students' self-reported English ability was closely related to their levels of anxiety and motivation overall. In the quantitative phase, I compared the three groups of self-reported English ability (higher, average, and lower) for the total score and the subscales of anxiety and motivation. For two consecutive years, the tendency was for the anxiety levels to increase as their self-reported English ability decreased, whereas the motivation levels increased as their self-reported English ability increased. Furthermore, there were statistically significant differences between the three groups of self-reported English ability (p value for all: $p < .05$) in the three anxiety factors and the four autonomous types of motivation. In contrast, with regard

to the less autonomous types of motivation, there was no consistency and there were no statistically significant differences between the three groups of self-reported English ability. The results clearly indicate that the students who highly evaluated their own English ability tended to feel less anxious about learning English and were more likely to have autonomous types of motivation.

RQ6 What are possible changes in the Japanese undergraduate science and engineering students' foreign language anxiety and their types of motivation to learn English during the first two years of their undergraduate course?

Overall, the students' tendencies regarding foreign language anxiety and motivational orientations to learn English did not change significantly, but their levels of each factor or category slightly fluctuated for the two years under scrutiny. According to Table 14 (Chapter 4, p. 93), their levels of anxiety overall increased whereas their levels of motivation overall decreased in the second year. Furthermore, their levels of communication apprehension and fear of negative evaluation increased in the second year whereas their levels of test anxiety remained the same. On the other hand, the students' motivation levels decreased except for the type of extrinsic motivation for an external reward. This type of motivation, which is regarded as the least autonomous, remained the same. Thus, the students became less motivated but were still driven by external rewards in their second year.

In the qualitative phase, the interviewees' testimonials suggested that their levels of test anxiety did not increase in the second year because of the lesson content. Some of the first-year interviewees pointed out that their textbook mainly dealt with daily topics and did not focus on the TOEIC L&R, and that was the key reason why they disagreed with the standardised tests. In contrast, the second-year interviewees unanimously mentioned that the standardised tests reflected what they learned in class. It makes sense, considering that the subjects for

first-year students are 'General English 1/2' whereas second-year students take 'TOEIC 1/2.' Furthermore, just like the first-year interviewees, the second-year interviewees unanimously gave favourable opinions about the credit award system, which may explain why they were still motivated to receive external rewards in their second year.

6.3 Discussion

In this section, the findings of my research are discussed in articulation with previous studies and also with my previous assumptions described in Chapter 1.

6.3.1 Anxiety and Motivation about Oral Communication

As explained in the previous sections, one of the unanticipated results is the participants' high levels of intrinsic motivation related to listening and speaking despite their high levels of communication apprehension. The quantitative phase of this study revealed that their communication apprehension scored higher than any other factor of foreign language anxiety for two consecutive years, and that their levels of communication apprehension increased in the second year regardless of discipline. This was confirmed by the results of the qualitative phase. Three motivation-related sub-themes appeared from the interview data, and one of them, exposure to English, could be a cause of their communication apprehension. This is not what I expected, and this is also one of the main differences between previous studies and my study.

As Yashima et al. (2009) pointed out, in Japanese classroom culture, it is common that students are unwilling to volunteer answers in class. They examined the interplay of anxiety, intrinsic motivation, and gender in Japanese first-year EFL students from faculties of law, economics, commerce, and arts, and their findings indicated that a lack of confidence in

speaking English in class was negatively correlated with intrinsic motivation. Therefore, as explained in Chapter 1, I previously assumed that the participants in my study, too, would have high levels of anxiety about oral communication, and that communication apprehension would negatively affect their intrinsic motivation related to listening and speaking. Contrary to my expectations, however, the quantitative phase of this study revealed that they were intrinsically motivated to speak and listen to English although their levels of communication apprehension were high. This difference between my previous assumption and the quantitative results of my study may be explained in part by the interviewees' testimonials, which referred to some specific circumstances of their learning context.

My organisation has a facility called 'English Village,' which is a one-story building especially designed to offer students many opportunities to talk with native English speakers. It is open from 10 am to 6 pm on weekdays, and students can spend time with the staff there freely, playing games, cooking, or just talking with them in English. When it was established in November 2006, it was featured on TV and newspapers. Even now, only a few universities in Japan have a facility like this. It is mandatory for all first-year students to visit 'English Village' at least twice a month, but this system generally has a good reputation among students partly because their English proficiency is not assessed there. They just go there, speak English, have fun, and have their notebook stamped as a proof of attendance. This system might have been one of the reasons why the participants in my study had different views from those in other studies. In fact, some of the interviewees referred to 'English Village' when I asked them *'Is there anything else you would like to add?'* before ending the interviews. They explained how fun it was to spend time talking with native English-speaking staff there. Even the second-year interviewees described how they enjoyed visiting the facility and talking informally with the native English-speaking staff. Their testimonials imply that the participants in my study

might be more used to speaking English informally than students in other Japanese universities, which could partly explain why intrinsic motivation related to listening and speaking scored higher than any other type of motivation.

6. 3. 2 Test Anxiety and Differences between Disciplines

Traditionally, test anxiety has been a controversial item. Horwitz, Horwitz, and Cope (1986) dealt with anxiety related to foreign language learning separately from other types of anxiety, and they categorised three factors—communication apprehension, test anxiety, and fear of negative evaluation—into foreign language anxiety. In contrast, some studies dealt with test anxiety independently or separately from the other two factors of foreign language anxiety (Önem, 2010; Sarason, 1972; Schunk, Meece, & Pintrich, 2014; Zeidner & Matthews, 2005). MacIntyre and Gardner (1989) supported Horwitz et al.'s (1986) contention that foreign language anxiety is separable from general anxiety, by showing the strong relationship of the participants' foreign language anxiety and proficiency as well as the poor relationship of their general anxiety and language proficiency. However, MacIntyre and Gardner (1989) also suggested that test anxiety did not play an important role as a factor of foreign language anxiety. Likewise, Yashima et al. (2009) concluded that 'test anxiety is not language learning specific' (p. 55), and this distinction emerged as a topic of discussion in the literature mentioned above. However, that distinction falls beyond the scope of my research and therefore there is no evidence in my data to substantiate an acceptable discussion in this chapter.

Regarding the tendencies of anxiety, the quantitative phase of my study produced similar results as Ahmetović, Bećirović, and Dubravac (2020), who examined EFL students aged 10 to 17 in Bosnia and Herzegovina. The outcomes illustrate that communication apprehension was the most anxiety-provoking factor for the students, test anxiety was the second, and fear

of negative evaluation was the least anxiety-provoking. However, in the particular case of my study, the science students scored higher in test anxiety ($M = 3.0$ or higher) than the engineering students ($M = 2.8$) for two consecutive years. On the other hand, the science students' test anxiety decreased in the second year whereas the engineering students' test anxiety remained the same.

The results of my research may be explained in part by the interviewees' testimonials, which referred to some specific circumstances of their learning context and background. In my organisation, first- and second-year students are required to sit a standardised test as an end-of-term exam of 'General English 1/2' and 'TOEIC 1/2,' respectively. Such an exam is not a textbook-based test, and thus they may not necessarily get a high score even if they memorise what they learned in class. Previous empirical studies did not examine whether there was a relationship between students' test anxiety and standardised tests, and I assumed that standardised tests might increase the students' anxiety levels. Contrary to what I had expected, however, it appears that the standardised tests had a good influence on their anxiety. In the particular case of my study, the standardised tests seem to have contributed to reducing their anxiety levels.

For the participants in my study, a standardised test would not make them anxious, partly because it was a multiple-choice listening and reading test that they were familiar with, and partly because they did not have to prepare for it. Conversely, a textbook-based test would increase their anxiety levels, partly because they had to spend many hours memorising a lot, and partly because tests differed among teachers and thus the students were not able to anticipate the test type and degree of difficulty. Three second-year interviewees pointed out that there were differences between teachers in 'Academic English,' whose end-of-term exam is a textbook-based test. This is best implied by the following second-year interviewee's

comment suggesting how a standardised test is less anxiety-provoking than a textbook-based test, in that the students can expect the test type and degree of difficulty and everyone takes the same test:

'We sometimes complain about differences between teachers. Every teacher uses their own textbook, creates their own end-of-term exam, and evaluates us in their own way.' (Interviewee #23/Y2)

As discussed in Chapter 5, unfamiliarity with the test format as well as the mismatch between the focus of the instruction and the focus of the exam; that is, the mismatch between the skills developed in class and the skills tested in the exam were pointed out by the interviewees as reasons for anxiety.

'Speaking tests would be more difficult to prepare for, because our teacher doesn't teach us how to give a good presentation and just lets us speak in class. If a speaking test were used as the end-of-term exam, we would have to study very hard by ourselves outside the classroom.' (Interviewee #19/Y2)

Preparing for unfamiliar, or unpredicted, types of tests means having to practise the skills that have not been trained and developed in class. This implies a heavier course workload which, in turn, may increase the students' anxiety levels.

From the discussion so far, it appears that familiarity plays a major role in the students' levels of test anxiety. The interviewees' testimonials show that sitting a test itself would not increase their anxiety levels if they were familiar with the test types and assessment methods. Some of the interviewees clearly stated that they would take English subjects if they were not compulsory because English was a familiar language. However, it was difficult to find a good reason in the qualitative data why the science students scored higher in test anxiety than the engineering students, and why the science students' test anxiety decreased in the second year whereas the engineering students' test anxiety remained the same.

The difference is possibly due to the difference in the number of participants: 196 science students (146 male and 50 female) and 473 engineering students (437 male and 36 female) in the first year, whereas 117 science students (90 male and 27 female) and 389 engineering students (354 male and 35 female) in the second year. This means that engineering students comprised 70.7% of the sample of this study in the first year and 76.9% in the second year. The results would have been more persuasive if the same number of students had participated in the surveys from the two disciplines.

The difference is also possibly due to the gender ratio in the participants, considering that there were many more female students in the science departments. As for the science students, the population comprised 74.5% male and 25.5% female in the first year whereas 76.9% male and 23.1% female in the second year. With regard to the engineering students, the population comprised 92.4% male and 7.6% female in the first year whereas 91.0% male and 9.0% female in the second year. Although Ahmetović et al. (2020) found 'communication apprehension was the greatest concern of both genders' (p. 282), the gender ratio might have affected the results of my study. Possibly it is not that the science students had higher levels of test anxiety than the engineering students, but that the female students were more anxious about tests than the male students.

However, questions still remain with regard to the students' anxiety and motivation. As Tables 7 and 8 (Chapter 4, pp. 77–78) illustrate, the science students had lower levels of motivation than the engineering students for two consecutive years, especially in the first year. This does not corroborate previous studies such as Ahmetović et al. (2020) and Yashima et al. (2009), who found that female students were more motivated than male students. Therefore, in my study, if the differences in anxiety between the two disciplines had resulted from the gender ratio, the science students would have had higher levels of motivation. As the

quantitative phase of my study produced different results, it is likely that the differences between the disciplines did not derive from the differences in gender ratio between the two groups.

Hence, a more plausible reason may be that the science students might have been more worried about getting a credit, or passing the course, than the engineering students. The following comments given by two science students suggest that their main concern was getting credits:

'For me, what is important is to get a credit. I would be enrolled in Chinese instead of English if English were not compulsory, because I think Chinese courses are easier to pass. If I think German is easier to pass, then I would take German.' (Interviewee #19/Y2)

'If I get a credit and I am satisfied with the final grade, I do not complain about the test type.' (Interviewee #20/Y2)

This could explain why the science students scored higher in test anxiety, because the interviewees from the engineering departments did not express their anxiety about getting a credit, or passing a course, as clearly as those two science students.

Another more plausible reason may be that the science students were more likely to have low self-esteem than the engineering students. As Tables 7 and 8 (Chapter 4, pp. 77–78) show, the science group had a larger proportion of students who viewed their English ability as lower than average: 64.8% (science) vs. 50.1% (engineering) in the first year and 55.6% (science) vs. 48.6% (engineering) in the second year. However, the results of the Mann-Whitney U test reveal that there were statistically significant differences between the two disciplines only in the first year ($p < .05$) and not in the second year. Compared with the engineering group (50.1% to 48.6%), the science group showed a larger decrease in the percentage of students who considered their English ability to be lower than average (64.8% to 55.6%). The outcomes may partly help to explain why the science students' test anxiety

decreased in the second year whereas the engineering students' test anxiety remained the same.

6. 3. 3 Types and Levels of Motivation

As for motivational orientations, some previous studies denoted that Japanese university students in general were likely to notice the instrumental value of English and therefore their EFL motivation tended to be instrumental (Irie, 2003; Johnson, 2013; Yashima, 2000). The participants in my study also appeared to notice the instrumental value of English, since the quantitative data illustrate that they found English useful and important and the results were confirmed by the interview data. However, the instrumental value of English would not be the only motivator for them, as the quantitative data also show that the students felt enjoyment in speaking and listening to English. Actually, their intrinsic motivation related to listening and speaking scored higher than their extrinsic motivation, although the other types of intrinsic motivation were lower. This was also confirmed in the qualitative phase of this study.

There are three types of intrinsic motivation in the LLOS: learning about the literature and cultures of English-speaking countries (IK), accomplishing a goal (IA), and feeling enjoyment in speaking and listening to English (IS) (Noels et al., 2000). Although previous studies did not clearly distinguish different types of intrinsic motivation (Liu & Huang, 2011; Yashima et al., 2009; Zhang, Zhang, Song, & Gong, 2016), the results of my study clearly indicate that intrinsic motivation related to listening and speaking was quite different from the other types of intrinsic motivation. The quantitative data clearly show that for two consecutive years, the students were least likely to study English to learn about the literature and cultures of English-speaking countries. The findings are in line with most of the interviewees' claims that they did not care where their native English-speaking teachers came from, and that they

were unable to distinguish between American and British English regarding accents and spellings. As one of the interviewees stated, *'English-speaking countries and Singapore are the same, because when I went to Singapore everyone spoke English fluently as if they were American'* (Interviewee #20/Y2). In this respect, the results of my study corroborate Irie's (2003) contention that although Japanese university students were interested in communicating with native English speakers, they did not have the traditional type of integrative motivation; instead, they showed a generally favourable attitude towards speakers of the target language community. The interviewees' testimonials in my study imply that the students did not connect English with English-speaking countries, and that they were unlikely to study English to learn about the literature and cultures of English-speaking countries.

Autonomous learners are 'by definition motivated learners' (Ushioda, 1996, p. 2), and intrinsic motivation related to listening and speaking is regarded as an autonomous type of motivation (Noels et al., 2000). Considering that the participants in my study showed enjoyment in speaking and listening to English for two consecutive years, they were supposed to be autonomous learners and thus motivated learners. However, the quantitative data show that their levels of motivation slightly decreased in the second year. In this regard, the results of my study do not appear to corroborate Ushioda (1996) and Noels et al. (2000). However, intrinsic motivation related to listening and speaking (IS) is only one of the three types of intrinsic motivation of the LLOS, and the participants in my study did not have the other two types of intrinsic motivation: motivation to learn about the literature and cultures of English-speaking countries (IK) and motivation to accomplish a goal (IA). That is, the participants in this study were only partly intrinsically motivated to learn English.

Furthermore, extrinsic motivation can also be autonomous. Deci and Ryan (1987) denoted that intrinsic-extrinsic dichotomies can lead to misunderstandings, and that a person

‘could willingly and freely pursue some extrinsic end (in which case it would be autonomous)’ (pp. 1033–1034). In this sense, the intrinsic-extrinsic distinction should not be used to explain how autonomous the students were, because those who were extrinsically motivated to achieve 600 or higher on the TOEIC L&R might have been autonomous learners. In fact, one second-year interviewee (Interviewee #24/Y2) had a clear goal to achieve a high score on the TOEIC L&R, and explained that he wanted to achieve 700 or higher to be admitted to the postgraduate school. Such a student is extrinsically motivated but can be regarded as an autonomous learner. For this reason, it appears that the students’ types of motivation did not affect their levels of motivation.

With regard to achieving a high score on an English proficiency test, Taguchi, Magid, and Papi (2009) examined Japanese, Chinese, and Iranian students’ motivation to learn English, and mentioned that ‘good English ability represented with high scores on English proficiency tests is just one of the favourable conditions for finding a job’ (p. 86). From this comment, it can be inferred that science and engineering students’ top priority is to gain and develop deep knowledge of their disciplines/specialities, and that achieving a high score on the TOEIC L&R is only one of the advantages for them.

In my organisation, students who achieve 600 or higher on the TOEIC L&R are given two credits. This can be regarded as tangible benefits, and therefore some students study English very hard to score 600 or higher on the TOEIC L&R. Such students are not intrinsically motivated to accomplishing a goal but extrinsically motivated to get an external reward. One interviewee clearly expressed, *‘Without this system, higher level students would not study English as hard as they do now’* (Interviewee #16/Y2).

All the second-year participants in this study sat the TOEIC L&R at the end of their first year, and some of them, or their friends, successfully achieved 600 or higher, which might

have affected their levels of extrinsic motivation to learn English. As Johnson (2013) pointed out, setting a clear goal is important but 'such goals need to be structured in a manner in which they are perceived to be achievable' (pp. 202–203). As the two interviewees' (Interviewees #20/Y2 and #22/Y2) comments (quoted in Chapter 5, p. 119) indicate, the second-year participants realised that achieving 600 or higher on the TOEIC L&R was achievable. Table 14 (Chapter 4, p. 93) shows that only the extrinsic type of motivation for an external reward remained the same ($M = 4.4$) and the other extrinsic and intrinsic types of motivation all decreased in the second year.

6. 3. 4 Relationship of English Proficiency with Anxiety and Motivation

The quantitative findings of my research indicate that there was no statistically significant correlation between the students' proficiency levels of English and their levels of anxiety or motivation.

As discussed in Chapter 2, foreign language anxiety and motivation are affective variables that predict language achievement, but anxiety can be divided into two categories: (1) debilitating anxiety and (2) facilitating anxiety (Alpert & Haber, 1960; Scovel, 1978; Zheng, 2008). Previous studies generally suggested that anxiety is a cause or result of students' poor performance (Ansari, 2015; Horwitz, 2017; MacIntyre, 2017; Teimouri et al., 2019; Tianjian, 2010). Conversely, however, some studies focused on the facilitating side of anxiety and demonstrated that students with higher anxiety levels performed better (Marcos-Llinás & Garau, 2009; Park & French, 2013). It appears that the results of my research do not corroborate any of these previous studies with regard to the relationship between the students' foreign language anxiety and their levels of English proficiency. In my study, the students' anxiety levels were neither positively nor negatively correlated with their levels of English.

I investigated possible differences between levels of English proficiency by examining differences between classes. In my organisation, all English classes are formed based on students' levels of English proficiency using the TOEIC Bridge and TOEIC L&R as a placement test for first- and second-year students, respectively. The results of the quantitative phase of my study demonstrate that higher level classes did not necessarily score lower in anxiety or higher in motivation, and that lower level classes did not necessarily score higher in anxiety or lower in motivation.

On the other hand, the quantitative results illustrate that as the students' self-reported English ability increased, their anxiety levels decreased and their motivation levels increased. In this regard, the results of my research appear to confirm the contention of previous studies that foreign language anxiety is not to be seen as merely an effect or result of poor performance in English, and that a close link can exist between students' self-perceptions and their levels of anxiety (Liu & Jackson, 2008; Tóth, 2007). In my research, which is a longitudinal study, the students whose class level was raised in their second year had higher levels of anxiety than the students whose class level was lowered or remained the same. One plausible reason for this might be that as some of the interviewees pointed out, they suspected that they would have difficulties keeping up with the class if they were placed in a higher level class.

Tóth (2017) investigated the relationship between higher level students' anxiety levels and oral communication experiences, and the results supported the view that language anxiety is not specific to lower level students. Higher level students are likely to have high expectations, and disparities between those expectations and their actual L2 self can be a cause of anxiety. In my study, the students' anxiety levels were neither positively nor negatively correlated with their levels of English proficiency, and there were inconsistencies in this regard. It might be that both higher and lower level students can have high anxiety levels but for

different reasons.

With regard to motivation, as discussed in Chapter 2, Teimouri (2017) suggested that students' motivational orientations determine whether their anxiety is debilitating or facilitative. Anxiety has a debilitating effect on students whose motivation is promotion focused, whereas it has a facilitative effect on those whose motivation is prevention focused. In the case of the participants in my study, however, it appears that their motivational orientations were not to be seen as merely a cause or result of their poor or good performance in English.

The results of the quantitative phase of this research demonstrate that in the first year, intrinsic motivation related to listening and speaking scored the highest in all lower proficiency level classes of all departments whereas higher level classes showed no such distinctive features. In a sense, the results corroborate Kiyota (2009), who divided participants into three groups based on their English proficiency levels, and found that the highest level group had intrinsic or near intrinsic motivation whereas the other lower level groups did not. In his study, the lower level groups' motivation levels were very low. Kiyota (2009) investigated first-year students learning English at a university in Japan, but the participants in his study were so-called 'remedial students,' whose English proficiency was not good enough. Thus, the highest proficiency level group in Kiyota (2009) was probably of a similar level to the students in lower level classes in my study. Considering that, it appears that both his study and my study indicated that first-year lower level university students were likely to be intrinsically motivated.

However, in my study, in the second year, there were no distinct features in lower level classes whereas intrinsic motivation related to listening and speaking scored the highest in all higher level classes of all departments, which was completely opposite to the results of the first year. Those outcomes may indicate that the students' type of motivation was not correlated with their English proficiency levels.

I used the FLCAS to measure the students' anxiety, and as discussed in Chapter 2, the instrument has several drawbacks. As Luo (2018) pointed out, the FLCAS mainly deals with anxiety about speaking with few or no items about reading and writing. In this regard, I might not have accurately measured their anxiety overall. Even so, there is a lack of consistency with regard to the students' proficiency levels of English, and thus it is likely that some other variables affected their anxiety and motivation.

It should be noted that the results of my research may have derived from the small number of participants from each class, since fewer than 20 students participated from most of the classes for two consecutive years. Agresti (2013) mentioned 'the sample size n influences the results' (p. 237). Strong effects can be detected even if a sample size is small, but a large number of participants are required to detect weak effects.

6.4 Chapter Summary

This chapter has taken an integrated approach in order to discuss and interpret the quantitative and qualitative findings in a combined fashion. I provided concrete and clear-cut answers to each of the research questions posed in this study. Then I discussed differences and similarities between my research and previous studies in relevant fields. In the case where my findings were different from other studies, I scrutinized the details and examined why those differences had emerged. Conversely, in the case where the main findings of my research were in line with previous studies, I figured out what my study added to the findings of previous studies.

The differences and similarities in what concerns students' foreign language anxiety and motivation between previous studies and my research are to be regarded in view of the differences and similarities in participants' background and learning contexts. The participants

in my study were Japanese undergraduate science and engineering students who viewed English differently from students with other academic backgrounds. Furthermore, there are a variety of learning contexts not only in Japan but also in the world. My organisation has a facility called 'English Village,' which might have contributed to differences in communication apprehension between other studies and my research. The limitations as well as the implications of this research will be discussed in the next chapter.

Chapter 7: Conclusion

7.1 Introduction

The focus of my thesis is on Japanese undergraduate science and engineering students' foreign language anxiety and motivation. My study is a longitudinal mixed methods study, and I collected quantitative and qualitative data from students from the Faculty of Science and Engineering's seven departments for two consecutive years. An explanatory sequential mixed methods (QUAN-qual) design (Creswell & Creswell, 2018) was utilised. I collected and analysed quantitative data first, and then carried out qualitative research to further explore the aspects emerging from the quantitative data analysis that would go otherwise unexplored. This chapter begins with a brief summary of the main findings of my research, and then discusses the implications of the findings. This will be followed by my reflections on the strengths and limitations of the study. Finally, I will present some suggestions for future research and reflect on my doctoral journey.

7.2 Summary of the Main Findings

The main findings of my study can be summed up as follows:

- The students' tendencies regarding foreign language anxiety remained the same for two consecutive years, regardless of discipline. The students' anxiety was, most of all, connected with communicating orally, which could be caused by difficulties with listening comprehension (especially the difficulty in understanding their teacher's instructions in presentation classes). For this reason, it can be said that their communication apprehension could be caused by unfamiliarity with the lesson types, because they were not used to giving presentations in class. Their anxiety was also related to tests, which could be due to unfamiliarity with the assessment methods or heavy course workload. The standardised tests

could reduce their levels of test anxiety due to their familiarity with the assessment methods and less heavy course workload.

- As for the students' tendencies regarding motivational orientations to learn English, for two consecutive years, they revealed to be intrinsically motivated to speak and listen to English. Although communication apprehension was the most anxiety-provoking factor, the students' testimonials suggested that exposure to English could be a good motivator for them if they were able to understand what they heard. They were also motivated by finding English useful or by receiving an external reward. Conversely, they were not motivated to study English to learn about the literature and cultures of English-speaking countries. The students confessed they were not able to distinguish between American and British English in terms of accents and spelling.

- Statistically, the students' levels of anxiety were not necessarily negatively correlated with their motivation. The findings indicate that motivation was not necessarily a significant predictor of anxiety, and that some other variables would affect the students' anxiety or motivation.

- The students who had been learning English with a specific purpose for the past year reported higher scores of motivation in their second year, but having a specific purpose did not affect their foreign language anxiety.

- The students whose class level was raised in their second year showed higher levels of anxiety, but their class level being raised or lowered did not affect their motivation. According to the students' testimonials, they were worried that being placed in a higher level class would cause them to make an extra effort to pass the course, which ended up increasing their anxiety levels.

- Although the science students and the engineering students had the same tendencies

with regard to anxiety and motivation, small differences were observed between the two disciplines. The science students had higher levels of anxiety and lower levels of motivation than the engineering students for two consecutive years. Furthermore, the science students were more likely to underestimate their English ability, and they scored 3.0 or above on test anxiety whereas the engineering students scored 2.8 for two consecutive years.

- The students' self-reported English ability was negatively correlated with their levels of foreign language anxiety and positively correlated with their levels of motivation for two consecutive years.

- With regard to the 332 students who participated in the surveys twice, their anxiety overall increased ($M = 3.1$ to $M = 3.2$) whereas their motivation overall decreased ($M = 4.4$ to $M = 4.3$) in the second year (see Table 14, Chapter 4, p. 93). Although slightly, those differences were statistically significant ($p < .05$). Their levels of communication apprehension would have been influenced by the lesson type (presentation class) whereas their levels of motivation overall could have been affected by expectations from other people. The students' testimonials suggested that they felt they were expected to give priority to their specialised subjects, instead of English, in their undergraduate years.

7.3 Implications for Practice

This section first discusses how the findings of this research may be important for Japanese science or engineering students' practice of learning English as a foreign language, and which action or practice is recommended at an institutional level. It also gives some suggestions to students of similar background or Japanese students of other fields of study.

In Chapter 1, I pointed out that one of the problems in my organisation was that second-year students were not likely to register for 'Oral English' in the autumn semester. The

quantitative phase of this study demonstrated that the students' communication apprehension scored the highest of the three anxiety factors, and that the levels increased in their second year. In the qualitative phase, the second-year interviewees' testimonials revealed that they had difficulties understanding instructions given orally in English. They wanted their teachers to give them instructions not only in English but also in Japanese, because 'Oral English 3/4' for second-year students focus on speaking and presentation skills and Japanese students are not used to making presentations. The second-year interviewees in my study stated that they often did not know what to do in 'Oral English' class. This suggests that there is a need for students to be more encouraged to develop presentation skills at secondary school in order to be better prepared to make use of such skills at higher education level both in English as a foreign language class and in other subjects.

In the particular case of my study, therefore, the students' high levels of communication apprehension did not necessarily indicate that they had high levels of anxiety about orally communicating in English. The quantitative phase of this study clearly demonstrated that their levels of motivation related to listening and speaking scored higher than any other type of motivation for two consecutive years regardless of discipline. In the qualitative phase, most of the interviewees expressed that speaking English fluently was by far their most important goal, and some of them even described how they enjoyed spending time talking with native English speakers in 'English Village.' The outcomes clearly illustrate that having many opportunities to communicate in English in itself can be a good motivator.

It has been a wide-spread idea that ideal English teachers are native English-speaking teachers. Phillipson (1992) called this idea 'native speaker fallacy' (p. 195). However, we cannot decide that native English-speaking teachers are better than non-native English-speaking teachers. As Murahata (2001) pointed out, using students' first language effectively

in class has often been advocated in previous studies because it could have a positive impact on the students. This is supported by the findings of my study. For two consecutive years, the interviewees' testimonials revealed that they did not mind their English teacher's accents. Some of them even stated that non-native speakers' English was easier to understand and therefore they did not mind Japanese teachers' Japanese accents. Some of the interviewees preferred American accents simply because they had learned American English for many years and thus found it easier to understand, but most of the interviewees expressed that they were not able to distinguish American and British accents.

On the other hand, most of the interviewees in the second year expressed that their 'Oral English' teacher using Japanese would facilitate their understanding. Thus, it may not be important for science or engineering students whether their teachers are native English-speaking teachers or not. It may be more important whether their teachers can help them understand the content in one way or another. Using the students' first language properly may be an effective strategy if there is only one teacher in the classroom, but team teaching may also be helpful for students. For two consecutive years, the interviewees in my study unanimously expressed that they appreciated the current English curriculum partly because they were taught by both Japanese teachers and native English-speaking teachers. In my organisation, currently Japanese teachers and native English-speaking teachers teach different English subjects, but team teaching is also possible and should be encouraged at an institutional level.

Another problem in my organisation was that third-year students were not likely to register for any English subjects in the autumn semester. The quantitative phase of my study illustrated that the students' levels of motivation overall decreased in their second year. In the qualitative phase, some of the second-year interviewees expressed that they felt nothing was

expected of them regarding English. These tendencies are not restricted to science or engineering students. The teachers who teach medical students explained to me that medical students have similar tendencies for the same reasons. Although English is important for their academic or professional career, they do not want to spend many hours studying English. They are simply busy conducting experiments and preparing for the National Medical Practitioners Qualifying Examination.

Just like medical students, science and engineering students appear to consider their specialised subjects as their top priority. Still, we can make efforts to enhance the opportunities for them to be exposed to English and facilitate their English learning. As discussed earlier in Chapter 1, 'ESP' was more popular among the third-year students than 'Writing.' This suggests that, although the specialised subjects were their top priority, the students were interested in English related to their fields of study. Therefore, in terms of curriculum development, a stronger emphasis on ESP content may prove beneficial in boosting their interest and motivation to learn English as part of their undergraduate curriculum.

7.4 Strengths and Limitations of the Study

This section describes several strengths of this study, and also several limitations by reviewing my research.

7.4.1 Strengths

Several strengths of this research should be considered. As I conducted my study at the institution where I am currently working, this is 'insider research.' As an insider researcher, it was relatively easy for me to access official data and obtain the head official's permission to conduct surveys within the organisation. I also understood the local culture and shared the

same language with the participants. Thus, familiarity with the context was an asset that I brought to my research, and it facilitated the research process and also helped me probe deeply into the issues under investigation.

The strengths of this research include it being a longitudinal study adopting a mixed methods research approach. Previous studies on similar topics were, in most cases, conducted cross-sectionally. As Dörnyei (2007) pointed out, longitudinal research is 'rather underutilized' (p. 79) in this field. However, anxiety and motivation are not static; instead, they can evolve over time by going through some fluctuation (MacIntyre, 2017; Schoaib & Dörnyei, 2005; Ushioda, 2001). Thus, conducting a longitudinal study allowed me to investigate the participants over an extended period of time and better capture the dynamic nature of the phenomena under investigation.

Furthermore, previous studies on similar topics were mostly questionnaire-based and quantitative in nature. The explanatory sequential mixed methods (QUAN-qual) design used in my study proved helpful in: (1) providing a multidimensional picture of the participants' views and the context of the study, (2) allowing the exploration of some issues emerging from the analysis of the quantitative data that would go otherwise unexplored, and (3) allowing me to minimise possible biases brought about by my position as an insider researcher.

7.4.2 Limitations

This research is not without its limitations. One of them was the sample size in the second year of this longitudinal study, where from two departments, fewer than 20 students participated in the questionnaire surveys. Although the response rate in the other five departments was more than 50%, the response rate in those two departments was less than 20% in the second year.

In the quantitative phase of this study, although the number of participants overall was large enough to produce persuasive results, the sample size of each department or proficiency level class was, in some cases, not large enough. In fact, when looking at the mean scores of each class, there was a lack of consistency for both anxiety and motivation. This lack of consistency may have resulted from the small number of participants from each class for two consecutive years. Despite the small number of participants, however, Amotivation scored the lowest across all higher proficiency level classes of all departments for two consecutive years, which indicated that the students with higher level of English proficiency were unlikely to lack motivation to learn English. Those outcomes can be explained by Agresti's (2013) comment that 'detection of weak effects requires large n ' (p. 237). It was notably obvious that higher level students did not lack motivation to learn English, but other effects were not strong enough to be detected due to the small number of participants.

Sample size can also be a common limitation in qualitative research. In my study, no students volunteered to participate in the interviews from Departments M and O in the first year and from Departments O and Q in the second year (see Table 4, Chapter 3, p. 59). Since I interviewed 15 students in the first year and 11 in the second year, the sample size of the qualitative phase of my study was within the sample size suggested in Onwuegbuzie and Collins (2007), where 12 was proposed as the number of interviewees in the qualitative phase of a mixed methods study. However, I did not obtain qualitative data from Department O for two consecutive years.

Longitudinal mixed methods studies can be challenging, particularly in what concerns the integration of 'longitudinal mixed methods databases' (Plano-Clark, Anderson, Wertz, Zhou, Schumacher, & Miaskowski, 2014, p. 297). This was the first time I conducted a longitudinal mixed methods study with the use of interviews as a method of qualitative data

collection. Therefore, my lack of experience of conducting research, especially qualitative research, can be seen as another limitation of the present study.

7.5 Suggestions for Future Research

The present study is a longitudinal study conducted with first- and second-year science and engineering students, who were learning English as compulsory subjects. The main findings of this research corroborate some previous studies but not others. Anxiety and motivation are both popular topics, and many studies have been conducted in a variety of contexts. However, previous studies on anxiety ‘tended to adopt a cross-sectional approach, with very few longitudinal studies having been published’ (MacIntyre, 2017, p. 26). When cross-sectional studies were conducted at universities, students of various specialities (fields of study) were examined but participants were mostly first-year students (Liu & Huang, 2011; Tóth, 2007; Yashima et al., 2009) or second-year students (Wei, 2007). Johnson (2013) conducted a longitudinal qualitative study about EFL motivation, but just like my study, he examined students during the first two years of their undergraduate course. It would be interesting to investigate third- or fourth-year students’ anxiety and motivation. In my organisation, for example, third-year students are required to study English. They have to register for one of the four subjects—‘Writing 1,’ ‘Writing 2,’ ‘ESP 1,’ or ‘ESP 2’—but not necessarily two or more. It would be interesting to conduct a similar study with third- and fourth-year science and engineering students in order to examine the extent to which the status of English subjects as part of their study programme might impact their levels of language-related anxiety and motivation to learn English. Alternatively, a qualitative study could be undertaken to examine what motivates third- and fourth-year students to register for two or more English subjects although they are required to take only one.

Furthermore, in my organisation, for instance, some 'ESP' classes are taught by professors in the science or engineering fields whereas others are taught by English teachers. I hear that professors in the science or engineering fields teach their expertise in their 'ESP' class instead of teaching the language. Although the interviewees in this research were not entitled to register for 'ESP,' some of them explained to me what they thought about that. Their opinions were divided, and some expressed that they would prefer to learn their expertise in their 'ESP' class whereas others commented that they wanted to learn English in their English class. The former type of interviewees wanted to take every opportunity to develop expertise in their field of study whereas the latter type considered that learning expertise in English class would be too challenging. That would introduce a further dimension and perspective about science or engineering students' anxiety and motivation to learn English at university.

Another interesting topic for future research is the coping strategies adopted by students to deal with foreign language anxiety. Considering that most students successfully complete their undergraduate course in four years, they can manage their anxiety about learning English and earn enough credits to graduate. A qualitative survey could be undertaken to further explore this issue.

7.6 Reflexivity

In this section, reflecting on my research, I first review the influence of positioning myself as a practitioner and researcher. Then I present what this research meant to me, and the gains and learning from the main findings of the study.

I work as a professor of language education at a private university in Japan. My main duties include teaching English as a foreign language to Japanese undergraduate students from the Faculty of Science and Engineering, coordinate their learning processes, as well as

reviewing and revising their English curriculum. As I conducted my research at the institution where I am currently working, my study is insider research. Being an insider researcher has several advantages, and those advantages are likely to facilitate the research process (Unluer, 2012). On the other hand, insider researchers must pay extra attention not to project their own views onto the participants in their study and data analysis, especially with qualitative research (Greene, 2014).

Greene (2014) suggested several techniques to overcome the disadvantages of insider research, and two of them were adopted in my research to guard against bias. Greene (2014) referred to 'prolonged engagement' as a technique to assist in conducting insider research, and as an example of it, referred to testing for the researcher's distortions. As explained earlier in Chapter 1, I made several assumptions about my study context before conducting the surveys. By comparing the outcomes of the study with my previous assumptions, I examined if any distortions resulted from my assumptions. As I found several differences, I sought clarification on why such disparities occurred.

Greene (2014) referred to a mixed methods research approach as another technique to assist in conducting insider research. As explained in Chapter 3, I adopted a mixed methods research approach on the grounds of its suitability for my study. This approach can be considered appropriate not only for my research aim but also for insider research.

Conducting this research meant a great deal to me, and represented an important source of learning. Attia and Edge (2017) reported some ethical challenges such as audio recording. I experienced similar challenges when I applied for ethical approval. I obtained ethical approval from Virtual Programme Research Ethics Committee (VPREC) of the University of Liverpool before collecting data in Japan, but it was tough for me to persuade the ethical committee members that administering the paper-and-pencil questionnaires in class

was not ethically problematic in my organisation. In those days, online questionnaires were not as common as they are now, and class evaluation questionnaires were also administered in class. However, this experience gave me valuable experience of and insight into ethical issues in the UK, and also helped me consider ethical concerns for the participants.

The main findings of this research, especially the qualitative ones, gave me a lot to learn about how the science and engineering students felt about studying English at this university. In the quantitative phase, the data provided me with a clear picture of the participants' experiences in terms of language-related anxiety and motivation as learners of English as a foreign language. The qualitative phase, in turn, provided me with opportunities to gain a deeper understanding of those experiences and draw possible implications about the current English curriculum and learning context. In conclusion, conducting this research was a great developmental experience for me as a practitioner and researcher.

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Appendix A: Questionnaire Survey Form

This survey is conducted to understand how students from the Faculty of Science and Engineering feel about learning English at this university. Your answers will be kept strictly confidential, and the data will be treated anonymously. Therefore, please rate each item honestly. If you choose *not* to participate in the survey, please submit this form without completing it. That will *not* affect you in any way. Thank you for reading this message.

Part 1: The Foreign Language Classroom Anxiety Scale (FLCAS)

Please indicate on a 5-point Likert scale from 1 (Strongly disagree) to 5 (Strongly agree) the extent to which each item applies to you:

1	2	3	4	5
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

- 1 I never feel quite sure of myself when I am speaking in my foreign language class.
1 2 3 4 5
- 2 I don't worry about making mistakes in language class.
1 2 3 4 5
- 3 I tremble when I know that I'm going to be called on in language class.
1 2 3 4 5
- 4 It frightens me when I don't understand what the teacher is saying in the foreign language.
1 2 3 4 5
- 5 It wouldn't bother me at all to take more foreign language classes.
1 2 3 4 5
- 6 During language class, I find myself thinking about things that have nothing to do with the course.
1 2 3 4 5
- 7 I keep thinking that the other students are better at languages than I am.
1 2 3 4 5
- 8 I am usually at ease during tests in my language class.
1 2 3 4 5
- 9 I start to panic when I have to speak without preparation in language class.
1 2 3 4 5
- 10 I worry about the consequences of failing my foreign language class.
1 2 3 4 5
- 11 I don't understand why some people get so upset over foreign language classes.
1 2 3 4 5
- 12 In language class, I can get so nervous I forget things I know.
1 2 3 4 5
- 13 It embarrasses me to volunteer answers in my language class.
1 2 3 4 5
- 14 I would not be nervous speaking the foreign language with native speakers.
1 2 3 4 5
- 15 I get upset when I don't understand what the teacher is correcting.
1 2 3 4 5

- 16 Even if I am well prepared for language class, I feel anxious about it.
1 2 3 4 5
- 17 I often feel like not going to my language class.
1 2 3 4 5
- 18 I feel confident when I speak in foreign language class.
1 2 3 4 5
- 19 I am afraid that my language teacher is ready to correct every mistake I make.
1 2 3 4 5
- 20 I can feel my heart pounding when I'm going to be called on in language class.
1 2 3 4 5
- 21 The more I study for a language test, the more confused I get.
1 2 3 4 5
- 22 I don't feel pressure to prepare very well for language class.
1 2 3 4 5
- 23 I always feel that the other students speak the foreign language better than I do.
1 2 3 4 5
- 24 I feel very self-conscious about speaking the foreign language in front of other students.
1 2 3 4 5
- 25 Language class moves so quickly I worry about getting left behind.
1 2 3 4 5
- 26 I feel more tense and nervous in my language class than in my other classes.
1 2 3 4 5
- 27 I get nervous and confused when I am speaking in my language class.
1 2 3 4 5
- 28 When I'm on my way to language class, I feel very sure and relaxed.
1 2 3 4 5
- 29 I get nervous when I don't understand every word the language teacher says.
1 2 3 4 5
- 30 I feel overwhelmed by the number of rules you have to learn to speak a foreign language.
1 2 3 4 5
- 31 I am afraid that the other students will laugh at me when I speak the foreign language.
1 2 3 4 5
- 32 I would probably feel comfortable around native speakers of the foreign language.
1 2 3 4 5
- 33 I get nervous when the language teacher asks questions which I haven't prepared in advance.
1 2 3 4 5

Part 2: The Language Learning Orientations Scale (LLOS)

Please indicate on a 7-point Likert scale from 1 (Does not correspond at all) to 7 (Corresponds exactly) the extent to which each item applies to you:

1	2	3	4	5	6	7
Does not						Corresponds
correspond at all						exactly

- 1 I cannot come to see why I study a second language, and frankly, I don't give a damn.
1 2 3 4 5 6 7

- 2 Honestly, I don't know, I truly have the impression of wasting my time in studying a second language.
1 2 3 4 5 6 7
- 3 I don't know; I can't come to understand what I am doing studying a second language.
1 2 3 4 5 6 7
- 4 Because I have the impression that it is expected of me.
1 2 3 4 5 6 7
- 5 In order to get a more prestigious job later on.
1 2 3 4 5 6 7
- 6 In order to have a better salary later on.
1 2 3 4 5 6 7
- 7 To show myself that I am a good citizen because I can speak a second language.
1 2 3 4 5 6 7
- 8 Because I would feel ashamed if I couldn't speak to my friends from the second language community in their native tongue.
1 2 3 4 5 6 7
- 9 Because I would feel guilty if I didn't know a second language.
1 2 3 4 5 6 7
- 10 Because I choose to be the kind of person who can speak more than one language.
1 2 3 4 5 6 7
- 11 Because I think it is good for my personal development.
1 2 3 4 5 6 7
- 12 Because I choose to be the kind of person who can speak a second language.
1 2 3 4 5 6 7
- 13 For the pleasure that I experience in knowing more about the literature of the second language group.
1 2 3 4 5 6 7
- 14 For the satisfied feeling I get in finding out new things.
1 2 3 4 5 6 7
- 15 Because I enjoy the feeling of acquiring knowledge about the second language community and their way of life.
1 2 3 4 5 6 7
- 16 For the pleasure I experience when surpassing myself in my second language studies.
1 2 3 4 5 6 7
- 17 For the enjoyment I experience when I grasp a difficult construct in the second language.
1 2 3 4 5 6 7
- 18 For the satisfaction I feel when I am in the process of accomplishing difficult exercises in the second language.
1 2 3 4 5 6 7
- 19 For the 'high' I feel when hearing foreign languages spoken.
1 2 3 4 5 6 7
- 20 For the 'high' feeling that I experience while speaking in the second language.
1 2 3 4 5 6 7
- 21 For the pleasure I get from hearing the second language spoken by native second language speakers.
1 2 3 4 5 6 7

Part 3: Other Questions

- 1 How do *you* evaluate your own English ability?
 - 1 Higher
 - 2 Average
 - 3 Lower

- 2 You are also invited to an interview if you are willing to give further information regarding learning English at the university. Your participation is totally voluntary. Would you volunteer to take part in an interview?
 - 1 Yes, I would be happy to volunteer.
 - 2 I am undecided.
 - 3 No, I would rather not.

- 3 Please let me know your gender if you don't mind.
 - 1 Male
 - 2 Female

- 4 Have you been learning English for a specific purpose (e.g. TOEIC) for the last 12 months?
** This question was asked only in the second year.*
 - 1 Yes, I have.
 - 2 No, I have not.
 - 3 I am uncertain.

Please write the last 4 digits of your student ID number if you agree to take part so that I can contact you later when necessary.

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Thank you for your cooperation!

If you should want to withdraw *now*, please tick the box. Then, your data will be excluded.

☐

Appendix B: Interview Questions

- 1 How do you feel about your experience of learning English as part of your degree?
- 2 Whom do you prefer as your teacher of English, a Japanese teacher or a native English-speaking teacher? Why?
- 3 Which do you prefer, being taught in English or in Japanese? Why?
- 4 Do you have any preference as to which country or area your English teacher comes from? Which variant of English do you prefer, American English or British English? Why?
- 5 The end-of-term exam of 'General English' ('TOEIC' in the second year) is a standardised test. How do you feel about that? Why?
- 6 If you were asked to take a speaking test as an end-of-term exam of 'Oral English,' how would you feel? Why so?
- 7 How did you feel when you were taking the placement test in April? Were you as nervous as you were when taking an entrance exam?
** This question was asked only in the first year.*

You took the TOEIC L&R as the end-of-term exam of 'General English 2' and were placed in a suitable class based on the test results. How do you feel about that?

** This question was asked only in the second year.*

- 8 Currently, all English classes are formed according to students' levels of English proficiency. Class A is the lowest level, Class B is the second lowest, and so on. Are you, or your friends, happy or unhappy if placed in a higher level class? Why?
- 9 Would you take English courses even if they were not mandatory? Why/Why not?
- 10 What are your goals in taking English courses? Compared with other foreign languages such as German and French, what is the goal of learning English at university?
- 11 Regarding English, what do you think is the most important for you as a science/an engineering student?
- 12 Regarding English, what do you think other people expect you to achieve? For example, your parents, do you think they expect you to speak English fluently or do they expect you to achieve a high score on the TOEIC L&R?
- 13 And what about the professors from your department? What do you think they expect you to achieve?
- 14 What about the current credit award system? Currently, students who achieve a score of

600 or higher on the TOEIC L&R are given 2 credits. Without registering for the courses called 'TOEIC 1' and 'TOEIC 2,' they receive 100 as a final grade for the courses. How do you feel about that?

15 Is there anything else you would like to add?

Thank you very much for participating in the interview.

Appendix C: VPREC Ethical Approval Notice

Dear Kei Mihara			
I am pleased to inform you that the EdD. Virtual Programme Research Ethics Committee (VPREC) has approved your application for ethical approval for your study. Details and conditions of the approval can be found below.			
Sub-Committee:	EdD. Virtual Programme Research Ethics Committee (VPREC)		
Review type:	Expedited		
PI:			
School:		HLC	
Title:	A study on motivating factors and anxiety for engineering students		
First Reviewer:	Dr. Morag Gray		
Second Reviewer:	Dr. Greg Hickman		
Other members of the Committee	Dr. Lucilla Crosta, Dr. Kalman Winston, Dr. Marco Ferreira,		
Date of Approval:	19 th April 2018		
The application was APPROVED subject to the following conditions:			
Conditions			
1	Mandatory	M: All serious adverse events must be reported to the VPREC within 24 hours of their occurrence, via the EdD Thesis Primary Supervisor.	

This approval applies for the duration of the research. If it is proposed to extend the duration of the study as specified in the application form, the Sub-Committee should be notified. If it is proposed to make an amendment to the research, you should notify the Sub-Committee by following the Notice of Amendment procedure outlined at <http://www.liv.ac.uk/media/livacuk/researchethics/notice%20of%20amendment.doc>.

Where your research includes elements that are not conducted in the UK, approval to proceed is further conditional upon a thorough risk assessment of the site and local permission to carry out the research, including, where such a body exists, local research ethics committee approval. No documentation of local permission is required (a) if the researcher will simply be asking organizations to distribute research invitations on the researcher's behalf, or (b) if the researcher is using only public means to identify/contact participants. When medical, educational, or business records are analysed or used to identify potential research participants, the site needs to explicitly approve access to data for research purposes (even if the researcher normally has access to that data to perform his or her job).

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Please note that the approval to proceed depends also on research proposal approval.

Kind regards,

Lucilla Crosta

Chair, EdD. VPREC

Appendix D: Participant Information Sheet

1. Title of Study: A study on motivating factors and anxiety for engineering students

This study will examine students' anxiety and their motivational orientations regarding English learning. By administering questionnaires and conducting interviews, this study will try to identify anxiety-related problems with motivation. I (the researcher) am conducting this study as part of my EdD Professional Doctorate, and I will have a supervisor while conducting this research. The results will be used to improve teaching methods, and might be used to review and revise the current English curriculum.

2. Version Number and Date

Version Number: 2

Date: 19 April 2018

3. Invitation Paragraph

You are being invited to participate in a research study. Before you decide whether to participate or not, it is important for you to understand why this research is being done and what it will involve. Please take time to read the following information carefully and feel free to ask me (the researcher) any questions if you want more information or if there is anything you do not understand. Please also feel free to discuss this with your friends, family, and other teachers if you wish. I would like to stress that you do not have to accept this invitation and should only agree to take part if you want to. In addition, you can withdraw from this study at any time without providing a reason. Thank you for reading this.

4. What is the purpose of the study?

The purpose of this study is to examine students' anxiety and motivation about learning English. Previous studies suggested that students' mental status affects their language learning, and thus I would like to investigate how students feel about learning English at the university. Questionnaires will be administered to all students, and then interviews will be conducted to a few volunteer students from each department, who are willing to express their frank opinions regarding this issue. The findings of this research will be used to improve teaching methods, and might be used to review and revise the current English curriculum.

5. Why have I been chosen to take part?

You have been chosen to take part in this study because you are currently a student at this university. Due to globalisation, Japanese university students have to study English. Whether they choose to go on to a postgraduate school or to get a full-time job upon graduation, it is doubtless that they will need English in their future career. More and more Japanese employees are asked to work internationally, and therefore it is necessary for university students to learn English. Data collected from students, including you, should be helpful to assist future students in learning English at this university.

6. Do I have to take part?

Participation in this study is voluntary and you are free to withdraw from participation at any time without providing any reason and without any penalty. You are asked to write the last 4 digits of your student ID number on the questionnaire survey form if you agree to take part,

but the data will be anonymised and of course be treated anonymously. If you are willing to give me further information regarding this issue, you are invited to take part in an interview later on. If you volunteer to be an interviewee, your interview will be conducted confidentially and your personal information (such as your email address) will be deleted. The interview will be recorded, but the data will be anonymised and of course be treated anonymously. I will make sure that participants cannot be identified in any way, and their privacy will be protected.

You do *not* have to take part in this study. If you choose not to take part, you can return a questionnaire survey form without completing it. If for some reason, you should want to withdraw after completing the questionnaire survey form, you can notify me (the researcher) by ticking the box on the bottom of the form. Then, I will exclude it from the data. And, you will not be chosen as an interviewee unless you volunteer to take part in an interview.

7. What will happen if I take part?

7. 1 *What the methods are*

Surveys will be conducted twice: (1) when students are in their first year and (2) when they are in their second year. Therefore, you are invited to participate in the research twice, although you can choose not to take part if you do not want to.

The first part of the questionnaire (33 items) asks students how they feel about learning English, and the second part (21 items) asks them why they learn English. After that, volunteer students are invited to participate in an interview. Information about each department will also be anonymised. Each department will be described as Department A, Department B, and the like. Although interviews will be recorded using my digital voice recorder, the data will be anonymised and thus participants' identities will be protected. My computer, which I use when analysing the data, is safely protected with a password. An external hard drive, which will store the data, will be safely kept in a locked drawer for five years.

7. 2 *Who the researcher is*

I (the researcher) am a professor of language education at the university. It means that I am currently one of the teachers who teach English to undergraduate students. I have nothing to do with administration, and I do not have any sort of authority or power over students except for my own students. Similarly, I have no authority or power over other teachers (colleagues of mine). Therefore, I have no coercive authority to make you (students) feel that you (students) have to comply.

7. 3 *Who will be conducting surveys*

I (the researcher) will be conducting surveys. I will ask 'Oral English' teachers to let me administer the questionnaires in their class. It will take approximately 15-20 minutes to give an explanation and administer the questionnaires. I will visit each of the classrooms myself and collect the questionnaire survey forms.

When administering the questionnaires, I will inform students that I need volunteer students who are willing to take part in an interview. I will ask students to visit my office if they volunteer to take part. When volunteer students visit my office, I will explain what sort of information is needed for the research before starting to interview them. If I do not get enough volunteer interviewees, I will send a message through the online noticeboard to recruit volunteers.

7. 4 What the duration / frequency of the questionnaire / interview is

Probably it will take students approximately 10 to 15 minutes to complete the questionnaire survey form. The questionnaires will be administered twice: (1) in June 2018 when they are in their first year and (2) in June 2019 when they are in their second year. Each time, interviews will be conducted in the autumn semester, and each interview will probably take 30 minutes.

7. 5 What the participant's responsibilities are

While completing the form, participants are required to rate each item honestly. They have to be careful, since the first part is a 5-point Likert scale survey whereas the second part is a 7-point Likert scale survey. Participants are also asked to write how they rate their own English level—lower, average, or higher—on the form. When taking part in an interview, interviewees are asked to express their frank opinions. They are required to speak in a direct manner so that I (the researcher) can easily understand what they want to say.

8. Expenses and/or payments

The questionnaires will be administered in class, and interviews will be conducted at school when participants come to school. They will not be asked to come to school only to take part in the research. Therefore, they do not have to pay extra to participate in this research. For this reason, participants will not receive any money for taking part. However, interviewees are given soft drinks if they want.

9. Are there any risks in taking part?

It is not anticipated that students will experience any risks or harm from participation in this study. If you should experience any discomfort as a result of your participation, however, please feel free to inform me (the researcher) immediately.

10. Are there any benefits in taking part?

No monetary incentives are used to facilitate survey recruitment. In other words, no money or rewards will be given to participants. However, although there are no direct benefits to those taking part, their participation will help the researcher provide better English education to future students.

11. What if I am unhappy or if there is a problem?

If you are unhappy, or if there is a problem, you can choose not to participate in the study and you can withdraw from it at any time without giving any reason. If you want to complain, please feel free to contact me (the researcher). If you still feel unhappy or have a complaint which you feel you cannot report to the researcher, then you should contact the researcher's thesis supervisor at eric.anderson@online.liverpool.ac.uk or LOREC at liverpoolethics@ohcampus.com. When contacting the supervisor or the Research Governance Officer, you are asked to provide details of the name or description of the study (so that it can be identified), the researcher involved, and the details of the complaint you want to make.

12. Will my participation be kept confidential?

Your participation in the research will be kept confidential at all times. I will make sure that you will not be able to be identified in any way. I will ask 'Oral English' teachers to let me administer

the questionnaires in their class, but 'Oral English' teachers have nothing to do with this research. Interviews will be conducted at school, probably at my office, but students can choose when and where. In any case, interviews will be conducted confidentially and the data will be anonymised. All the data will be stored securely on an external hard drive for five years. It will be used for this specific project. I (the researcher) am the only person who will have access to the data, although my supervisor will have access to it when it is absolutely necessary. After five years, the data will be destroyed.

13. What will happen to the results of the study?

I (the researcher) may give a presentation at the Faculty Development (FD) about the findings of this study. The results may also be published a few years after the presentation. Participants will not be identifiable from the results in any way, as the data is anonymised.

14. What will happen if I want to stop taking part?

You can withdraw at any time without explanation. Results up to the period of withdrawal will not be used. If you stop answering the questionnaire, your questionnaire survey form will be collected and disposed of. If you want to withdraw after completing the form, you can notify me by ticking the box on the bottom of the form. Then, I will exclude it from the data. If you want to withdraw from an interview, I will stop interviewing you and delete the recorded data. Then I will recruit a volunteer student who will replace you.

15. Who can I contact if I have further questions?

You can contact Kei Mihara by phone, email, or letter.

Email address: kei.mihara@online.liverpool.ac.uk

Office: November Hall 203 (Extension: 3107)