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Reducing English Language Anxiety through Sharestart and Cooperative Learning in an EMI course

科技管理導論

Introduction to Technology Management

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1. Research Motive and Purpose

Taiwan's economy and GDP rely very much on export. As English is a Lingua Franca and satisfactory English proficiency is essential, it will be an advantage to be able to communicate in English in an international business environment, for example:

- To communicate with international companies.
- To write reports and emails, and give presentations.
- To build up personal relationships with foreign clients and colleagues.
- To enable business transactions.

There are numerous benefits for students with good command of English. For example.

- Better employment opportunities and higher salaries.
- To enable further studies and research.
- To broaden international horizons and perspectives.

Consequently. the government announced a bilingual education policy in Sep 2021 to enable Taiwan to compete in the global environment. The National Development Council published The Bilingual Nation 2030 report to address the challenges. (National Development Council, et al, 2021)

A. To emphasize productive skills (speaking and writing)

> "…. Their performance in the two receptive skills of reading and listening is far superior to their performance in the two productive skills of writing and speaking….many of them are likely to encounter difficulties in writing English reports or participating in classroom discussions. The top priority for Taiwanese students is thus to substantially improve their ability to speak and write in English…."

B. Extra resources in ESAP and EMI.

> "….university freshmen will not have had any experience of taking EMI courses in specialized subjects, they will need to first receive coaching in English for Specific Academic Purposes (ESAP) before they start to take EMI courses in university. For example, students in engineering departments should take a preparatory ESAP course for their field of study in their first year….

C. Support for teaching staff.

> "….teachers need a friendly and effective training system and sufficient teaching resources (such as teaching assistants)…."

D. Develop methodologies.

> "….universities in Taiwan have been promoting EMI courses for some time, a proven and effective implementation model must still be developed. How can schools greatly improve university students' English speaking and writing….<u>How to enable students to smoothly adapt to all-English learning in their fields of academic specialization?</u> What assistance can be given to teachers to establish or improve all-English teaching skills?...."

Item 4 emphasizes the importance of the transition of instruction language from Chinese to English and second language anxiety will be one of the key issues for a smooth transition.

Sharestart, through a lot of classroom interactions between teachers and students, and students and students, combined with cooperative learning, will enable students to reduce their English language anxiety.

This research aims to address the aforementioned challenges by exploring the effectiveness of Sharestart and cooperative learning strategies in reducing English language anxiety among undergraduate students in an EMI course setting. The purpose is to understand how these educational interventions can influence students' levels of anxiety related to English language use

in academic contexts. By mitigating language anxiety, the research seeks to enhance students' engagement, participation, and overall learning outcomes within the course. Specifically, the study focuses on improving students' professional English-speaking abilities, which are crucial for effective interaction in various professional scenarios, such as exhibitions, presentations, and meetings. Addressing this specific weakness can significantly contribute to the broader goals of Taiwan's bilingual education policy and the Bilingual Nation 2030 initiative.

2. Research Question

The research topic is "Reducing English Language Anxiety through Sharestart and Cooperative Learning in an EMI course". The purpose is to investigate using Sharestart (combined with Satir iceberg model) and cooperative learning to reduce the students' English language anxiety. Once the anxiety is reduced, students can engage better in classroom interactions and activities.

We can then share these results with other parties (through publication, open speeches, and sharing with other teachers, etc) to increase the teaching and learning efficiency in EMI courses.

3. Literature review

English as a Medium of Instruction (EMI) course

In the 3rd phase of the "Forward-looking Infrastructure Development Program", the National Development Council announced a very important policy to build Taiwan into a bilingual nation by 2030 in order to raise national competitiveness (National Development Council, Executive Yuan, 2018). In 2021, the Ministry of Education launched the BEST program to enhance college students' English proficiency by providing EMI professional courses (MOE, 2021). Beacon schools and colleges are established to complete the tasks by 2024 and 2030, and key indicators are targeted at sophomores and first-year graduate students.

Researchers have slightly different definitions but most of them agree that EMI is being conducted in countries or areas where English is not the first or native language and English is a medium to teach academic subjects (Dearden, 2014, p. 4; Macaro et al., 2018; Rose & McKinley, 2018).

Due to internationalization and English as a Lingua Franca, there is a rapid growth of EMI courses worldwide. The reasons are: (Galloway, 2017)

- Developing English proficiency and those with good English obviously can have an advantage in their careers and further studies.
- English is the major language for academic research or publications and is used in publications with high impact.
- English professional vocabulary is common.
- Universities offering EMI courses can attract foreign students and in turn have higher positions in rankings.
- Authorities' choice to promote English. (Seidlhofer, 2011).

Macaro et al. 2017 with more than 80 empirical studies find out that most deliveries of subject knowledge are done via lecturing but not classroom interaction. A lot of EMI research concentrates on instruction and content learning (Airey 2010; Dafouz and Camacho-Minano 2016; Hellekjær 2010; Lei and Hu 2014) or case studies of teachers' and students' experiences (Airey 2011; Dearden and Macaro 2016; Evans and Morrison 2011; Jensen and Thøgersen 2011; Vu and Burns 2014; Yeh 2014).

Foreign Language Classroom Anxiety Scale (FLCAS)

Foreign Language Classroom Anxiety Scale (FLCAS) is the most widely used instrument for measuring students' foreign language anxiety. The FLCAS includes 33 items, and each item is evaluated using a 5-point Likert scale, with options ranging from strongly agree to agree, neither agree nor disagree, disagree, and strongly disagree. (Appendix 1) The FLCAS is key-reversed,

meaning that strongly agree receives a score of 5, while strongly disagree receives a score of 1, for items with positive wording. For items with negative wording (2, 5, 8, 11, 14, 18, 22, 28, 32), strongly agree receives a score of 1, while strongly disagree receives a score of 5 (Elouise Botes et al, 2021). The study removed the option of "neither agree nor disagree" for their study's objectives to obtain more accurate data, which made the students reconsider their answers before responding. As a result, each item was given a 4-point Likert scale score. The FLCAS is made up of three parts: test anxiety, communication anxiety, and fear of receiving a bad evaluation. The following questions 2, 5, 6, 7, 11, 12, 15, 16, 17, 19, 22, 23, 25, 26, and 30 measure fear of receiving a bad evaluation. Communication anxiety is measured by items 1, 3, 4, 9, 13, 14, 18, 20, 24, 27, 29, 31, 32, and 33 (Elouise Botes et al, 2021). Questions about test anxiety are 8, 21, and 10. By adding the scores of each of the 33 items, the FLCAS calculates a person's overall level of anxiety. The FLCAS's range in this instance was 33–132. The student becomes more anxious as the score rises. We shall use the 4-point system in this project.

The FLCAS has been a crucial instrument for investigating individual differences that may influence second and foreign-language learning outcomes. Extensive research has been conducted on the factorial structure of the scale, providing evidence of validity for a construct of considerable interest to second and foreign language practitioners and researchers (Richard L. Sparks & Leonore Ganschow, 2007). FLCA has the benefit of enabling researchers to recognize and rate statistically distinct types of anxiety. The reliability of the data was evaluated using FLCAS, and the reliability coefficient (Cronbach Alpha) for this instrument was .94, indicating excellent reliability (Richard L. Sparks & Leonore Ganschow, 2007). Many studies have made use of the FLCAS. Among these studies, FLCAS had high internal reliability and test-retest reliability. Over the past three decades, the measure's validity and reliability have been thoroughly examined. As a result, it is now widely acknowledged as a valid indicator of the construct of FL learning anxiety.

Since its initial publication, the construct and its 33-item measure have been mainstays in FL learning research on individual differences (Masoomeh Salehi & Fahimeh Marefat, 2014). Due to its widespread use among students, FLCA has become a popular variable in a wide nomological network of variables and numerous studies. For instance, FLCA has been connected to FL competence, willingness to communicate in the target language, motivation to learn the target language, and interpersonal factors like neuroticism and perfectionism in personality, emotional intelligence, and self-esteem. Studies examining gender differences in FL learning, studies examining adolescent FL learners, studies examining adult FL learners, as well as studies examining a diverse set of target languages, including French, Arabic, and Chinese, have all been conducted as part of research examining FLCA with its companion 33-item FLCAS (Elouise Botes et al, 2021). The 33-item FLCAS and the construct of FLCA have been proven to be useful in a variety of research contexts, and they have cemented their places in the research lexicon of FL learning studies.

Several teachers, researchers, and language field professionals use FLCAS to collect information about students with language anxiety issues because so many things seem to be tapping into students' attitudes and perceptions of language as well as their feelings of anxiety. The FLCAS focuses on students or individuals who fear learning a foreign language in a course and who frequently fear speaking another language in front of other people (Elaine K. Horwitz Et al, 1986). By using FLCAS, a researcher can easily determine the condition of students or individuals regarding their foreign language anxiety problems. With this knowledge, a tutor or researcher will be able to easily solve their foreign anxiety problems, allowing them to be more confident and motivated to learn or speak a foreign language.

陳永煌 (2002)’s research shows that communication fear, test anxiety, fear of receiving a negative evaluation, and other similar fears have a strong negative relationship with English listening, grammar, and vocabulary skills. Foreign language anxiety is most likely to happen in classes with oral practice.

Teachers with a sense of humor who are friendly and patient can help students feel less anxious about learning a foreign language. The way a teacher teaches has a big effect on how nervous students are about learning a foreign language. If they can show how much they care about their students, it may make them more willing to learn a foreign language without making them feel like they have to do so under a lot of pressure.

郭榮鈞 (2016)'s study looked at 201 students who didn't major in English. The results showed that they often used positive thinking, peer-seeking, and avoidance to deal with learning anxiety and lack of motivation. Peer seeking and avoidance were positively correlated to foreign language learning anxiety, while positive thinking and preparation strategies were negatively correlated to anxiety.

Cooperative learning and Student-Teams-Achievement-Divisions (STAD) (Chan, 2022)

Cooperative learning is a way to teach in which small groups of students with different levels of knowledge work together to learn more about a subject through a variety of activities and to complete tasks collectively (Johnson and Johnson, 2009). Each person on the team is responsible for not only learning what is being taught but also helping their teammates do the same. This gives everyone a sense of accomplishment. Students work on the task until everyone in the group can understand it and finish it. Teachers can use this method to get students to learn the material and improve their ability to work together and get along with others. Each student brings a different set of subject experiences and skills to the group. These will help each other's subject strengths and weaknesses. For example, a student who learns English may have a large vocabulary that can help other students learn grammar well. In addition, when better and less-abled students talk to each other, it helps the less-abled students to improve and the better students will feel proud of themselves for helping their classmates. The cooperative learning approach creates an environment that is good for learning. It also gives students more chances to build or change their collective knowledge while reducing competition and individualism. When students work in groups, they have more opportunities to discuss and share ideas. This helps them understand how their peers think and come up with new ideas. Moreover, doing things like brainstorming, making things, and discussing in a group can be less stressful than doing them in front of the whole class. In this kind of setting, students feel more at ease trying out new ideas. Researchers conclude that a cooperative learning environment will make students feel less anxious and give them more chances to practice their abilities.

As a result, Ornprapat, S and Saovapa, W (2010) showed that cooperative learning is a good way to learn a language because it makes students less anxious and thus improves their language skills. Their anxiety is probably reduced because this learning environment gives them chances to get help, encouragement, and praise from their peers. In this kind of environment, students may feel more at ease trying out new ideas. To help students meet their learning goals, teachers need to find strategies or methods that do not make the classroom more stressful. Furthermore, the participants' language skills may improve because they do not have to discuss, create, and think in front of the whole class. Instead, they can have done these things within their group. Members of a group who have a good sense of dependence on each other can learn more in a supportive environment. Students can improve their language skills because they feel more at ease in this kind of classroom. Teachers of English as a Foreign Language (EFL) need to be more aware of their students' worries about learning and create a calm, supportive learning environment, along with a cooperative learning method. (Ornprapat, S. Saovapa, W., 2010)

Since then, many cooperative learning methodologies are developed, for example:

- TPS (Think, pair, share)
- Rally table
- Jigsaw and reverse jigsaw
- Reciprocal teaching
- STAD (Student-Teams-Achievement-Divisions)

- TGT (Team Game Tournament)
- Inside-outside circle

STAD will be used as the cooperative learning technique in this research. STAD consists of different phases, in general (Slavin 1995):

- Lectures
- Evaluation
- Divided into groups
- Group study and processing
- Recognition

In this research, the heterogeneous division will be carried out by using an S-type sorting mechanism. Students will be placed in groups according to the sorting list according to the British Council, EnglishScore test scores. Groups, with similar total test scores, will work together for assigned classroom activities and bonus marks will be awarded according to their performance.

There is an improvement in students' learning attitudes and evaluation results by utilizing STAD but the higher-performing groups show better results (Chang et al, 2019). Another study by Chang (2010) involving students majoring in English showed that group performance and motivation levels are positively correlated. Highly motivated groups have better performance than the low-motivated ones.

In 張柏超 (2016) study, the Student Teams Achievement Divisions Method (STAD) was used in science courses. The results showed that the STAD method does help students feel less anxious about learning. When students' anxiety is reduced, it can raise their motivation and improve their confidence in learning. During the cooperative learning process, it is a challenge in keeping classroom order. If the order does not maintain properly, students will talk, play, etc, and do other things that have nothing to do with the course. This will, in turn, affect the discussion and learning of the whole group.

Sharestart and Satir Communication

The Sharestart teaching method, which has been pushed by Mr. Fai-Cheng Chang (張輝誠老師) since 2013, is used in the course. This method helps students learn, read, think, discuss, analyze, summarize, and express themselves. The teacher uses their expertise to control the best concentration period for the students, creates question-and-answer oriented handouts with comprehensive information, and frequently changes learning styles. The "cooperative and competitive" learning model between groups gives the classroom back to the students and turns the teacher into a facilitator, guide, and classroom designer. This gives the students the right to learn again. Taiwan's spoon-fed education and single-way lecture teaching have changed because of Sharestart (https://www.sharestart.org/).

The "Iceberg Theory" by Satir is a theory that is often talked about and used to look into a person's past and family relationships. Using the analogy of a big iceberg floating on the water's surface, the behaviors or responses that can be seen by others are only a small part of the surface. The bigger mountain underneath the surface is the "inside," which has been hidden and ignored for a long time. By digging deeper into the iceberg, we can see our desires, expectations, points of view, and feelings and get in touch with whom we really are. When we talk to other people, sometimes we don't even know what's going on in our own heads (郭進成, 馬琇芬, 2020). So, the Satir communication model will help us figure out what students really want, expect, think, and feel, so we can help them feel less anxious by responding in the right way.

卓淑芬 (2018)'s study on Sharestart teaching on mathematics learning attitude for second-grade vocational high school students shows that there are significant differences in learning attitude and

effect on learning achievement. Students also expressed that they liked the mathematics class because of the Sharestart teaching method. Similar findings are also confirmed in the research by 鐘嘉綾 (2017).

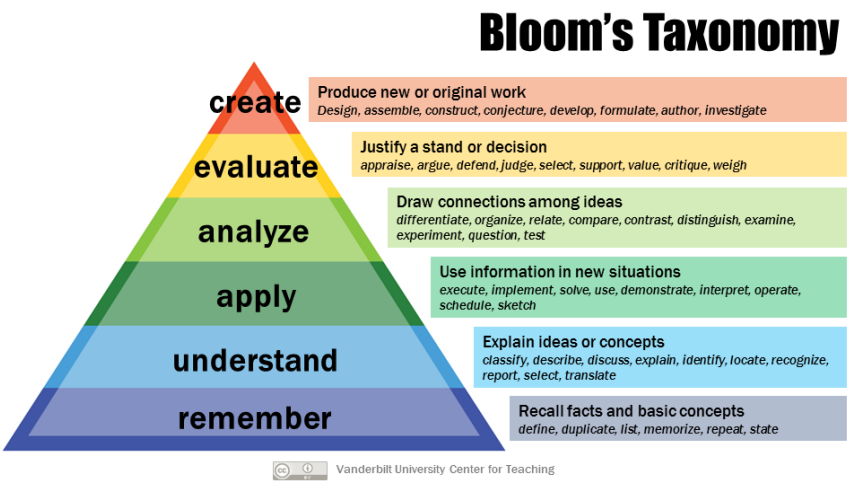
Bloom's Taxonomy

Bloom arranged the categories of instructional goals in the Cognitive Domain into six levels, each of which is a prerequisite for mastery of the next more complex category. (Bloom, 1956)

1. Knowledge
2. Comprehension
3. Application
4. Analysis
5. Synthesis
6. Evaluation

A group of cognitive psychologists, curriculum theorists, and instructional researchers, as well as testing and evaluation experts, subsequently published a revised version of Bloom's Taxonomy in 2001, entitled "Taxonomy of Teaching, Learning, and Assessment". This title shifted attention away from the somewhat static concept of "educational goals" and toward a more dynamic taxonomic concept. The authors of the revised taxonomy emphasize this dynamism by using verbs and verbal nouns to mark their categories and subcategories (rather than the nouns of the original taxonomy). These "action words" describe the cognitive processes by which learners encounter and process knowledge: (Anderson, 2001)

1. Remember
2. Understand
3. Apply
4. Analyze
5. Evaluate
6. Create



The syllabus is designed based on Bloom's taxonomy.

4. Teaching Planning

The course, Introduction to Technology Management for sophomores (an EMI course), is to introduce the concepts of technology management. It evaluates the national competitive environment, technology planning and forecasting, managing innovation, the creation of an innovative organization, new products and international marketing, research and development management, tools for reducing R&D lead-time, and quality policy of new technology. The course is conducted in the 2nd semester. Students will be able to understand the importance of both the speed and the scope of change in technological development and the consequential paradigm shift in the industrial and business enterprise system. The course is also designed to address climate change and adaptation issues in technology management. Sharestart and cooperative learning will be employed as teaching pedagogies.

The assessment methods are:

- Participation 15%
- Group Discussion 20%
- Mid-term exam 25%
- Individual presentation 15%
- Project 25% Appendix 2 (Table 1) shows group project assessment rubrics.

- Bonus marks. This is to encourage each student in the group to be active in classroom activities such as case studies and group discussions.

Appendix 2 (Table 2)shows the course syllabus. There will be a pre-test in week 0 and a post-test (project) in week 18 to compare the results. The course consists of classroom lectures in weeks 1–3, 7-8, 10 and 13-15. Weeks 4-6 are for individual oral presentations. Weeks 11-12 is for group discussion Weeks 16-18 project report Appendix 2 (Table 3) shows the Introduction to Technology Management course.

5. Research Methodology

Research methods and tools

The class of Introduction of Technology Management for sophomores will participate in the study (except those with English mother tongue). The study will include both quantitative and qualitative data collection and analyses. The quantitative data will be collected through the English proficiency test (EnglishScore) and FLCAS, and a paired sample T-test will be applied to the scores to examine the improvement in English proficiency and English language anxiety. The qualitative data will be gathered through open-ended survey responses, interviews with purposive-sampled students, and the 3-minute reflection.

Pre-test and post-test

A pre-test and post-test are designed to compare
1. if there is any change in the participants' English proficiency by the British Council EnglishScore test.
2. if there is any change in the participants' English language anxiety level by the use of the Foreign Language Classroom Anxiety Scale (FLCAS). The Cronbach Alpha of FLCAS is 0.94.

Open-end survey responses - Students' self-evaluation

Students will take a descriptive self-evaluation open-end survey at the end of the course to provide qualitative data for comparison. Sample questions are:
Q1: Do you feel uncomfortable when you attend class?
Q2: What do you think about the discussions and activities in class for this course?

Interviews

Purposive-sampled students will be interviewed to focus on the comparison before and after the course. The interviews will be video-recorded and then transcribed. Sample questions are:
Q1: Do you like the class? Which part do you like? Why?
Q2: Are there any changes in your performance and anxiety level at the beginning and the end of the course? Why the course can change your performance and foreign language anxiety level?

Checkpoint: 3-minute Reflection

Students are required to fill in a "3-minute reflection" regarding the lesson every time. This will form the checkpoints for course improvement and students' records of their learning progress for further analysis. The sample questions (eg. at the end of week 3) are as follows:
Q1: Please list the five forces of Porter's five forces model.
Q2: How do you assess the competitiveness of an industry or company?

Data collection

The quantitative data will be collected through pre-test and post-test scores of the British Council EnglishScore test and FLCAS undertaken in week 0 and week 18 respectively. In order to provide an in-depth discussion about what really happens in the classroom, qualitative data will also be collected in the study through

a. open-ended survey responses
b. interviews with purposive-sampled students (video-recorded) at the end of the course.
c. 3-minute reflection.

The qualitative data can provide participants' opinions and a more detailed picture of the anxiety level. The details will then be transcribed for further analysis.

Quantitative data analysis

After the completion of the pre-test and post-test, the data will be analyzed by statistical software, Minitab, using the paired sample T-test to determine the means of the two measurements taken from the same individual. The purpose is to determine whether there is statistical evidence that the mean difference between paired observations is significantly different from zero.

For RQ1, the researcher will establish if there is enough evidence for:

> "The reduction of second language anxiety for students with different levels of English proficiency through Sharestart and cooperative learning."

The hypotheses are:
H0: $\mu 1 - \mu 2 = 0$ ("the difference between the paired population means is equal to 0")
H1: $\mu 1 - \mu 2 \neq 0$ ("the difference between the paired population means is not 0")

where
$\mu 1$ is the population mean of pre-test scores, and
$\mu 2$ is the population mean of post-test scores.

Qualitative data analyses

In the qualitative data analyses (open-end survey responses, interviews and 3-minute reflection), the researcher will code the responses and investigate if the results can confirm the findings in the above hypotheses of the quantitative data analysis.

For RQ2, we shall count the number of voluntary interactions between the students and the instructor in class.

5. Implementation Procedure. Appendix 4 (Figure 1)

Phase 1: Pre-test

1. The pre-test before the beginning of the course consists of 2 parts to assess students' English proficiency and second language anxiety.
2. In the pre-test, the British Council EnglishScore test and FLCAS will be used.
3. Once the pre-test is done, students are sorted and grouped according to their EnglishScore scores. There will be about 5 members in each heterogeneous group and the grouping is based on Student-Teams-Achievement Divisions (STAD) using an S strategy. The team leader of each group has the best score and he/she will act as a teacher within the group. The average score of each group should be similar.

Phase 2: Introduction

1. The instructor informs the students of the course structure, the desired classroom participation behaviors, and the importance of participation in the classroom activities, (case studies, small group discussions, etc in each group), and the requirements of the final project.
2. Students are allowed to ask any questions, when necessary during the lectures.
3. It will be followed by an introduction to the course content.

Phase 3: Lectures

1. In between the lectures, each group is an important entity to undertake case studies (within each group) and group discussions. Students are required to present their thoughts and discussion outcomes in English. The leader of each group will encourage the discussion and be responsible to keep a log record of each classroom activity. The log record, the presentation performance and the 3-minute reflection will be used as the basis for teaching adjustment.
2. Bonus marks will be awarded to the whole team for the best performance.

Phase 4: Final project

1. Presentation: An important part of the course is the final project presentation. Students are required to present their innovative social enterprise both orally and in writing.

Phase 5: Post-test

- The post-test consisting of 2 parts is used to assess English proficiency and second language anxiety at the end of the course.

Phase 6: Data preparation and analysis

- The quantitative data will be collected through the test. The qualitative data will be gathered through open-ended survey responses, interviews, and 3-minute reflection.
- The quantitative data will be analyzed by statistical software, Minitab, using the paired sample T-test to determine the means of the two measurements taken from the same individual. Qualitative data will also be analyzed to compare with the quantitative data findings to draw conclusions.

6. Teaching and Research Outcomes

In this research, data was collected from 25 non-English speakers. Quantitative data was collected through the use of pre-test and post-test surveys. Before the comparison of pre-test surveys and post-test surveys begin, the survey data was first quantized by converting Likert scale responses into numerical values to facilitate statistical analysis. Responses were assigned as follows:

Responses	Likert scale
Strongly Agree	4
Agree	3
Disagree	2
Strongly Disagree	1

Table 1: Likert scale of Responses

This transformation allowed for the numerical treatment of ordinal data. Following the quantization, the data was analyzed using statistical software such as Minitab. A paired sample T-test was employed to determine the means of the two measurements taken from the same individual. The purpose of this analysis is to determine whether there is statistical evidence that the mean difference between paired observations (pre-test and post-test scores) is significantly different from zero.

Quantitative data analysis

The t-test analysis was conducted based on the average values of the pre-test and post-test scores. The average score for each participant was calculated by summing the pre-test and post-test scores and dividing the total by two. The t-test was conducted to determine the

significance of the difference between the null hypothesis (H0) and the alternative hypothesis (H1).

H0 Statement:
The null hypothesis (H0) assumes that there is no significant difference between the means of the two groups being compared.

H1 Statement:
The alternative hypothesis (H1) contradicts the null hypothesis and proposes that there is a significant difference between the means of the two groups.

The statistical test calculates a t-value and a p-value to evaluate the hypotheses. If the p-value is less than the predetermined alpha level of 0.05, it indicates a statistically significant difference, supporting the alternative hypothesis. Conversely, if the p-value is greater than or equal to the alpha level, we fail to reject the null hypothesis. However, it's important to note that failure to reject the null hypothesis does not imply its truth but rather indicates that the alternative hypothesis is not supported by sufficient evidence.

Quantitative data analysis of all students
A total of 52 students enrolled in the class, however only 28 of them completed both the pre-test and post-test, including 10 females and 18 males, The t-test values were calculated using Minitab to facilitate this analysis. The t-test, Paired Two Sample for Means, was conducted to compare the means of two dependent groups in this research.

The results of the T-test of 28 students shown in Table 2 are the statistical results between the pre-test and post-test of anxiety levels score including their mean and the p-value.

From Appendix 3 (Table 1), the average pre-test score was 85.18 with a standard deviation of 6.25, and the post-test score averaged 87.46 with a standard deviation of 8.86. The estimated mean difference of -2.29, with a 95% confidence interval spanning from -6.40 to 1.83, does not show a statistically significant change, as the confidence interval includes zero.

Statistically, with a T-value of -1.12 and a p-value of 0.270, the results do not reject the null hypothesis, which states there is no difference between the pre-test and post-test scores. This implies that the intervention or teaching methods applied between the two tests did not have a significant effect on the student's scores. The result suggests that, at least by the measures used, the educational approach did not result in a significant improvement in the tested outcomes.

This result occurred because most of the students in the class had moderate anxiety levels at the beginning of the class, therefore resulting in no significant change in anxiety.

Self-assessment data analysis of all
In terms of the anxiety level, there are no significant changes, but when we move to the self-assessment English level it is a whole different story.

A total of 45 students have completed the open-ended survey, The t-test values were calculated using Minitab to facilitate this analysis. The t-test, Paired Two Sample for Means, was conducted to compare the means of two dependent groups in this research.
From Appendix 3 (Table), the average self-assessment score at the beginning of the class was 2.756 with a standard deviation of 0.933, and the average self-assessment score at the end of the class was 3.089 with a standard deviation of 0.848. The estimated mean difference of -0.3333, with a 95% confidence interval spanning from -0.5255 to -0.1412, indicates a statistically significant improvement in the student's English proficiency levels.

The paired t-test shows a t-value of -3.50 with a corresponding p-value of 0.001. This p-value is less than the conventional significance level of 0.05, suggesting that the null hypothesis (no difference) can be rejected. Therefore, we can conclude that the intervention (the educational course or method applied) has a significant positive effect on the students' self-assessed English proficiency. This improvement is not just statistically significant but also practically important, as indicated by the confidence interval of the mean difference, which does not include zero. Based on these results, we reject the null hypothesis

Qualitative data analysis

In this research, the primary focus of the qualitative data collection was to assess the enhancement of English presentation abilities among students within the field of Technology Management. A range of instructional strategies was utilized to foster active learning and participation, such as lectures, participatory discussions, team-based projects, and individual presentations. Analyzing the qualitative data allows for an understanding of how students perceive their progress, the changes in their levels of anxiety, and the obstacles encountered throughout their language acquisition journey.

The qualitative data report in this study is centered around three main points:

Q1: What do you think about your professional English-speaking improvement after this course?

The responses to the first question reveal significant insights into the students' perceptions of their professional English-speaking skills. Many students reported noticeable improvements, attributing their success to the immersive environment and targeted practice opportunities provided throughout the course. Several responses highlighted specific instances where interaction with peers and instructors in English substantially enhanced their confidence and proficiency.

Q2: What do you think about your presentation skill improvement for this course?

For the second question, students frequently mentioned that their presentation skills had markedly improved. The incorporation of regular presentation exercises and constructive feedback sessions was particularly appreciated. Students felt these activities not only improved their ability to communicate effectively in English but also helped in structuring their thoughts more clearly and presenting them more engagingly.

Q3: What do you think about your English anxiety changes after this course?

Regarding the third question, many students reported a reduction in their English-speaking anxiety. The supportive classroom environment and the encouragement of peer feedback were noted as key factors that helped lessen their apprehension. Additionally, the practical exposure to real-world communication scenarios was seen as vital in building their confidence, helping them transition from anxious beginners to more assured speakers.

These findings are detailed further in the appendices, where direct quotes and thematic analysis highlight the transformative experiences of the students in their journey toward becoming proficient English communicators within the realm of Technology Management.

Student reflections

Based on the students' reflections, the English-medium instruction (EMI) course effectively improved their English proficiency, particularly in professional settings. Students reported becoming more accustomed to listening and speaking in English, which reduced their apprehension about using the language. They appreciated the course's focus on presentations and reports in English, which provided ample opportunities for practice.

Additionally, the course structure and the instructors' methods were highly praised. Students highlighted the supportive and patient approach of the teachers, who were willing to explain concepts in both English and the local language to ensure understanding. The course's interactive and engaging format, including humor and group discussions, also made learning more enjoyable and impactful.

In addition to the survey, interviews were conducted with selected students to gather more in-depth insights into their experiences. The interviews involved 6 students. Through these interviews, a deeper understanding was gained regarding their perceptions, challenges, and overall growth in their professional English-speaking skills. The thoughts and reflections of the students gathered during the interviews are presented in Appendix 1 (Table 1: Student's thoughts and reflections).

The feedback from the interviewees collectively underscores the effectiveness of the English course in enhancing linguistic skills and reducing speaking anxiety. Several participants observed notable improvements in their English proficiency, particularly in fluency and grammatical accuracy, which they attributed to the immersive nature of the course and consistent practice. Confidence in speaking English also appeared to increase, with many reporting a newfound ease in engaging in spontaneous conversations and formal presentations. Notably, the course seemed to alleviate the anxiety associated with speaking English. Interviewees mentioned feeling more comfortable and less fearful of making mistakes, which encouraged more frequent use of the language in both academic and informal contexts. Overall, the course was highly effective in not only improving English language skills but also in boosting confidence and reducing anxiety, thereby enhancing overall communication effectiveness.

Based on the analysis of the survey responses, several key findings emerged. Firstly, the majority of students expressed a solid understanding of the course content. Appendix 3(Char 1) displays the students' responses indicating their level of understanding of the course content. A rating scale ranging from 1 to 5 was used, with 1 representing a lack of understanding and 5 indicating a complete understanding. 7 students assigned themselves a score of 5, 24 students assigned themselves a score of 4, 14 students assigned themselves a score of 3. Notably, no student awarded themselves a score of 0 or 1, indicating that all students possessed a moderate level of comprehension and a high level of clarity and effectiveness in delivering the material.

Teacher's reflection

Students have demonstrated a robust interest in the course, particularly drawn to discussions around sustainability, which indicates a strong alignment between the course content and their personal or professional interests. This engagement not only fosters a positive learning environment but also underpins the students' readiness to delve into complex topics. Additionally, their willingness to participate in speaking exercises showcases their motivation to enhance their language proficiency, which is crucial in a course designed to improve professional English skills in an engineering context.

Throughout the program, there has been a significant improvement in students' speaking abilities. It's encouraging to witness this progression, as students become more confident and articulate in their communications, actively engaging with the course material and each other. This dynamic participation is essential for their linguistic and professional development.

However, the limited frequency of classes—only once per week—poses a challenge in providing a comprehensive educational experience. This constraint makes it difficult to cover all the necessary material in depth, which is particularly challenging for students who do not have a background in engineering. To ensure that every student has the opportunity to fully grasp and engage with the course content, it is imperative to start with basic concepts and provide detailed explanations of all topics.

7.Recommendations and Reflections

Based on the findings of this study, it is recommended to reevaluate and possibly redesign the survey instruments used for measuring anxiety to ensure they are sensitive enough to detect the nuanced improvements that qualitative data suggests. The current quantitative tools may not accurately reflect the subtle changes in students' emotional states that are evident from the qualitative feedback.

Considering the significant discrepancy between the quantitative data showing no improvement in anxiety and the qualitative reports of decreased anxiety, it is evident that achieving proficiency in a language does not automatically lessen anxiety, which may be influenced by deeper psychological factors or the social context of language use. This suggests a need for integrated teaching approaches that not only focus on language proficiency but also provide emotional and psychological support.

Increasing the frequency of classes could provide more continuous learning opportunities, which is crucial for sustained practice necessary for substantial improvements in both language skills and anxiety management. More frequent interactions could also help in providing immediate feedback and continuous assessment, which can reinforce learning and boost confidence.

Furthermore, introducing specific strategies aimed at reducing anxiety, such as stress management workshops, relaxation techniques, and public speaking exercises within a supportive environment, can directly address the emotional needs of students. Expanding on the interactive and participatory aspects of the course could also enhance learning experiences, making them more engaging and less stressful for students.

In reflection, while the course has successfully enhanced English proficiency, the approach to reducing language-related anxiety needs further refinement. The study highlights the complex interplay between language learning and emotions, particularly in a professional setting, and underscores the importance of an approach that addresses both skill acquisition and emotional support to fully support non-native speakers in becoming confident and proficient English communicators.

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Appendix 1: Foreign Language Classroom Anxiety Scale (FLCAS)
Horwitz, E.K., Horwitz, M.B., Cope, J., 1986. Foreign language classroom anxiety. Modern Language Journal, 70 (2), 125–132.

(1) I never feel quite sure of myself when I am speaking in my foreign language class.
(2) I do not worry about making mistakes in language class.
(3) I tremble when I know that I'm going to be called on in language class.
(4) It frightens me when I do not understand what the teacher is saying in foreign language.
(5) It wouldn't bother me at all to take more foreign language classes.
(6) During language class, I find myself thinking about things that have nothing to do with the course.
(7) I keep thinking that the other students are better at language than I am.
(8) I am usually at ease during my tests in my language class.
(9) I start to panic when I have to speak without preparation in language class.
(10) I worry about the consequences of failing my foreign language class
(11) I don't understand why some people get so upset over foreign language classes.
(12) In language class, I can get so nervous I forget things I know.
(13) It embarrasses me to volunteer answers in my language class.
(14) I would not be nervous speaking the foreign language with native speakers.
(15) I get upset when I don't understand what the teacher is correcting.
(16) Even if I am well prepared for language class, I feel anxious about it
(17) I often feel like not going to my language class.
(18) I feel confident when I speak in foreign language class.
(19) I am afraid that my language teacher is ready to correct every mistake I make.
(20) I can feel my heart pounding when I'm going to be called on in language class.
(21) The more I study for a language test, the more confused I get.
(22) I don't feel pressure to prepare very well for language class.
(23) I always feel that the other students speak the foreign language better than I do.
(24) I feel very self-conscious about speaking the foreign language in front of other students.
(25) Language class moves so quickly I worry about getting left behind.
(26) I feel more tense and nervous in my language class than in my other classes.
(27) I get nervous and confused when I am speaking in my language class.
(28) When I'm on my way to language class, I feel very sure and relaxed.
(29) I get nervous when I don't understand every word the language teacher says.
(30) I feel overwhelmed by the number of rules you have to learn to speak a foreign language.
(31) I am afraid that the other students will laugh at me when I speak the foreign language.
(32) I would probably feel comfortable around native speakers of the foreign language.
(33) I get nervous when the language teacher asks questions which I haven't prepared in advance.
5-point Likert Scale (SA = strongly agree; A = agree; N = neither agree nor disagree; D = Disagree; SD = Strongly disagree)

Appendix 2

Score	4	3	2	1
Innovative social enterprise design	The social enterprise has fully expressed innovation and incorporates a large number of SDG elements.	The social enterprise is innovative and incorporates SDG elements.	The social enterprise shows little innovation and incorporates only a few SDG elements	The social enterprise is not innovative and incorporates insufficient SDG elements.

Table 1: Group project assessment rubrics. Definitions: The innovation of the social enterprise design in the context of SDG elements.

Week	Content
0	Pre-test - Preliminary test. Students are placed in groups using STAD according to their English proficiency test (EnglishScore) scores by an S-type sorting mechanism.
1	*Introduction* - The first lecture is to give an overview of the course and the impact of technological innovation on society.
2-3	*Strategies* - The importance of strategies, generic competitive advantages and Porter's five forces model. Defining the organization's strategic direction: Assessing the firm's current position (external and internal). Identifying core competencies.
4-6	*Industrial Analysis* - Individual presentation on Porter's five forces model of a freely-chosen industry. Presentation.
7	*Innovation management (planning)* - Types of innovation. Technology S-curves. Technology cycles. Sources of innovation: Creativity, Innovation in collaborative networks. Case study
8	*Innovation management (implementation)* - Timing of entry: First-mover advantages and disadvantages. Factors influencing optimal timing of entry. Standard's battle, modularity and platform competition: Why dominant designs are selected (Learning effects, Network externalities, government regulations), modularity and platform competition. Case study
9	*Midterm exam*
10	*Evaluation and control* - Quantitative methods and qualitative methods.
11-12	*Group discussion* - A case study for each group (5 in a group) to present their findings.
13	*Technology management (planning)* - Collaboration strategies and organization: Reasons for going solo. Advantages. Types of collaborative arrangements. Case study
14	*Technology management (implementation)* - Choosing and monitoring partners. Size and structural dimensions of the firm. Management across borders. Case study
15	*Sustainability challenges and opportunities: UN directives* - Introduce SDGs (Sustainable Development Goals) and the impact on government policies, corporate social responsibility (CSR), individual habits, and lives. What we have achieved so far, what we can do further and how it is related to technological innovation activities. Case study

16-18	*Group project* –Two people form a group. Each group will propose an innovative social enterprise using new technologies and discuss its social impact. Post-test.

Table 2: Syllabus of Introduction to Technology Management

Week	0	1	2	3	4	5	6	7	8	9
Pre-test										
Lecture										
Oral presentation										
Midterm exam										
Week		10	11	12	13	14	15	16	17	18
Lecture										
Group discussion										
Project report										
Post-test										

Table 3: Timetable of Introduction to Technology Management course

Appendix 3

Estimation for Difference

Difference	95% CI for Difference
-2.29	(-6.40, 1.83)

Descriptive Statistics

Sample	N	Mean	StDev	SE Mean
PRE	28	85.18	6.25	1.2
POST	28	87.46	8.86	1.7

Test

Null hypothesis $H_0: \mu_1 - \mu_2 = 0$

Alternative hypothesis $H_1: \mu_1 - \mu_2 \neq 0$

T-Value	DF	P-Value
-1.12	48	0.270

Table 1: The result of paired t-test all student

Descriptive Statistics

Sample	N	Mean	StDev	SE Mean
before	45	2.756	0.933	0.139
after	45	3.089	0.848	0.126

Estimation for Paired Difference

Mean	StDev	SE Mean	95% CI for μ_difference
-0.3333	0.6396	0.0953	(-0.5255, -0.1412)

μ_difference: population mean of (before - after)

Test

Null hypothesis $H_0: \mu\_difference = 0$

Alternative hypothesis $H_1: \mu\_difference \neq 0$

T-Value	P-Value
-3.50	0.001

Table 2: The result of paired t-test of their English level

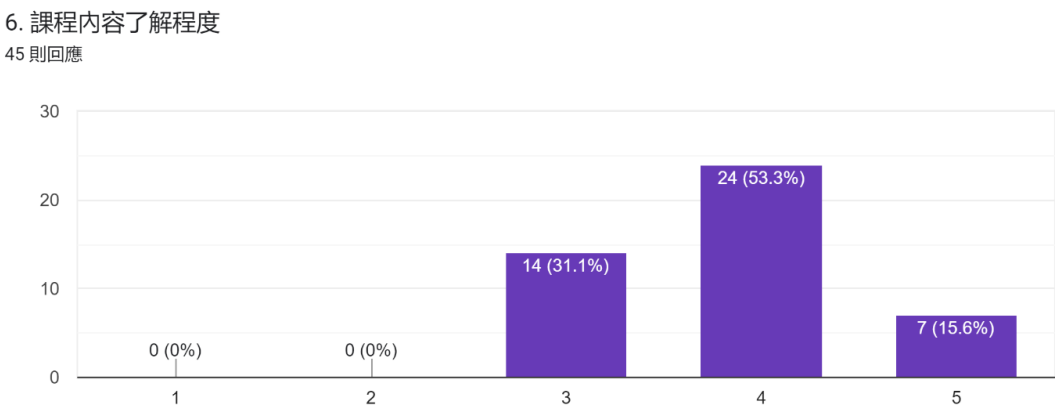


Chart 1 : The bar chart of how well student understands the couse content

Appendix 4

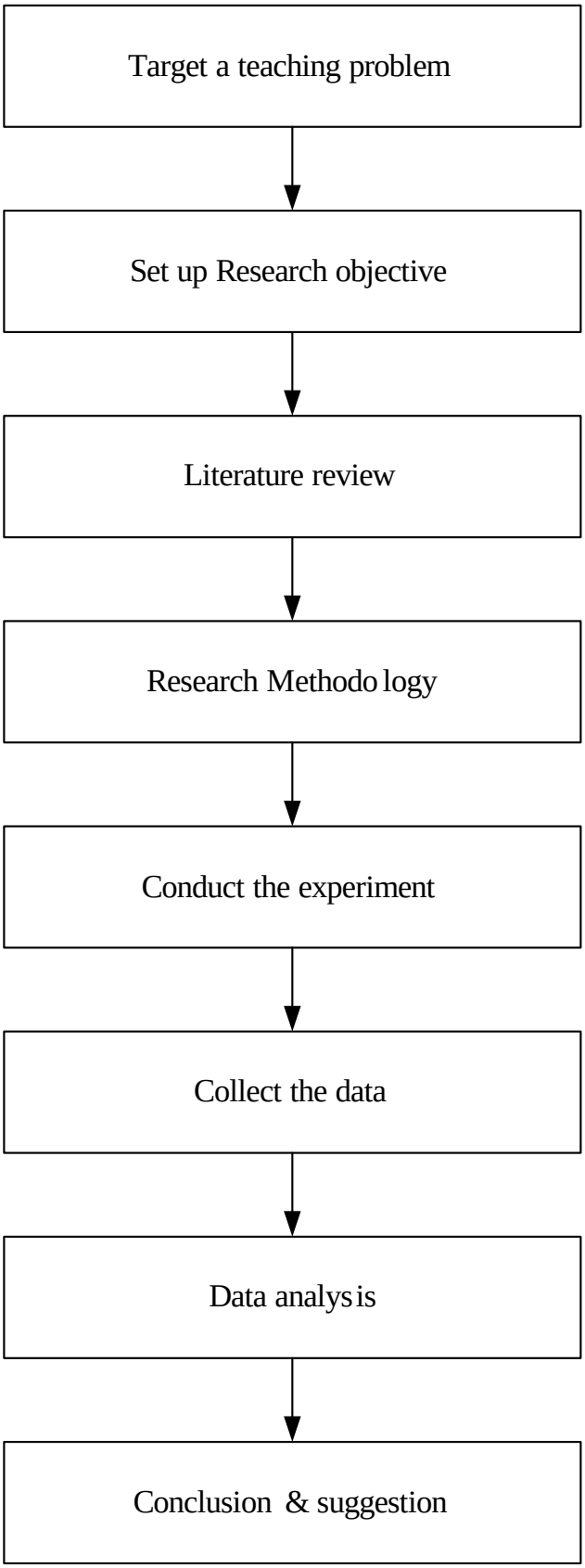


Figure 1 Research Framework

Research Framework (Figure 1)

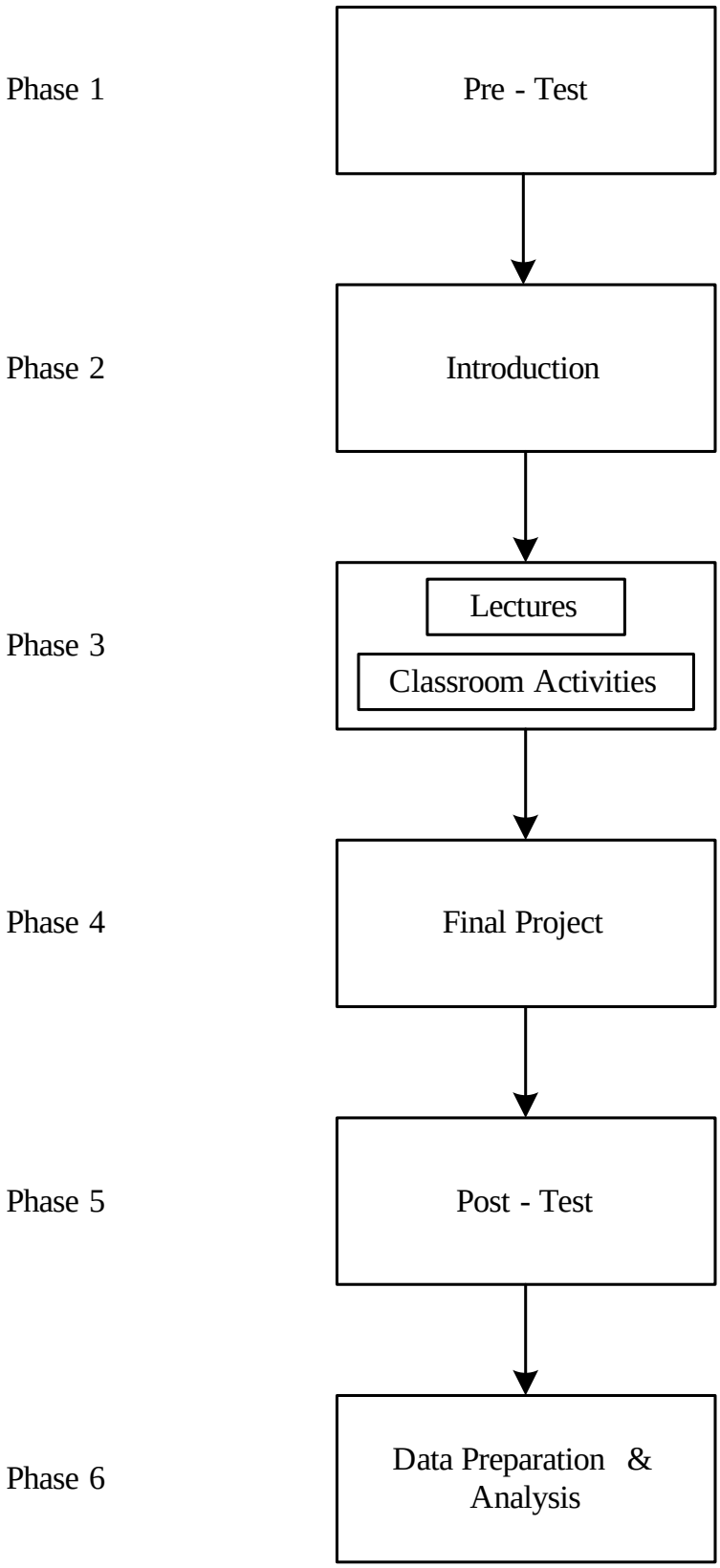


Figure 2 : Implementation Flowchart

Implementation Procedure (Figure 2)

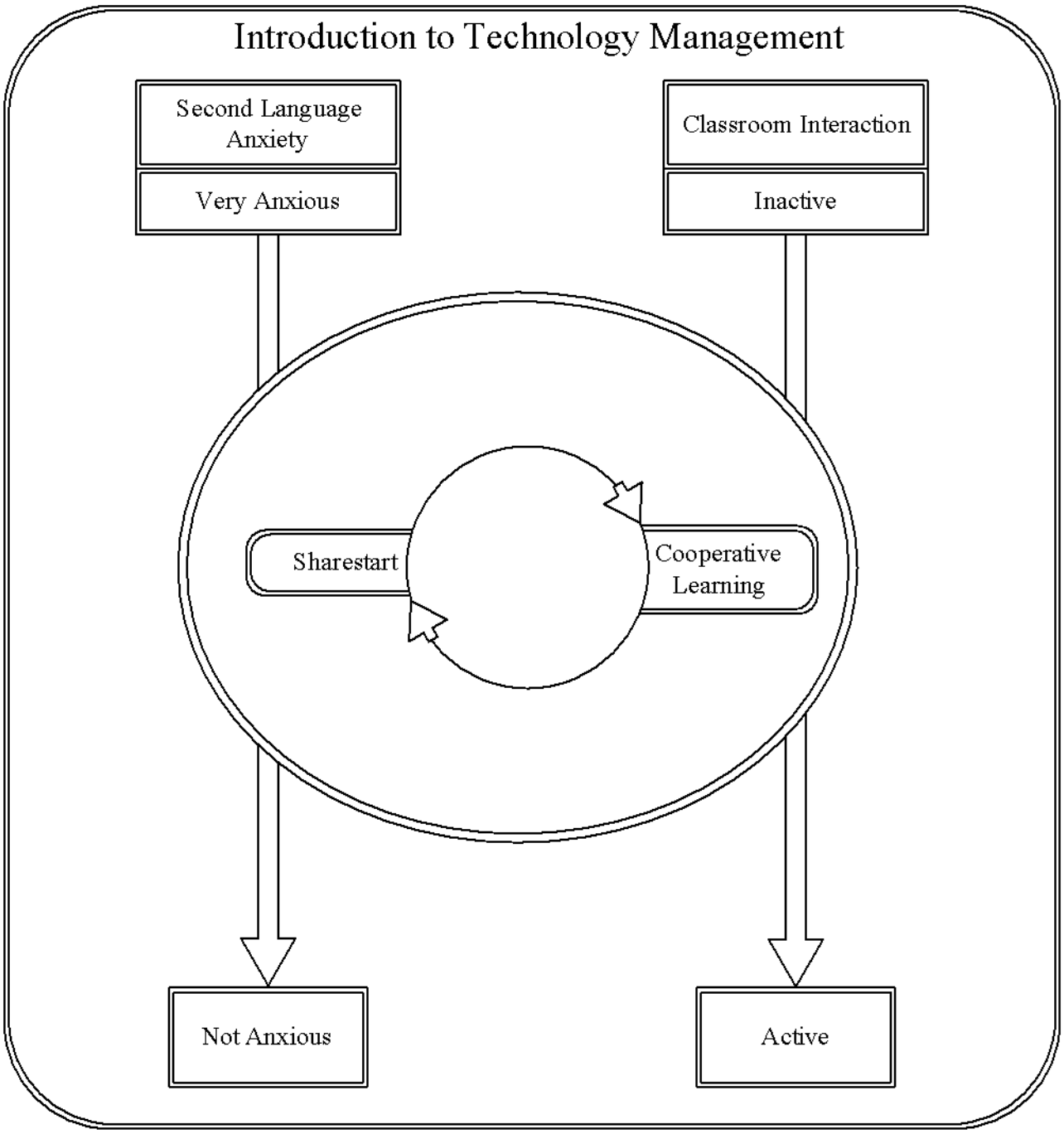
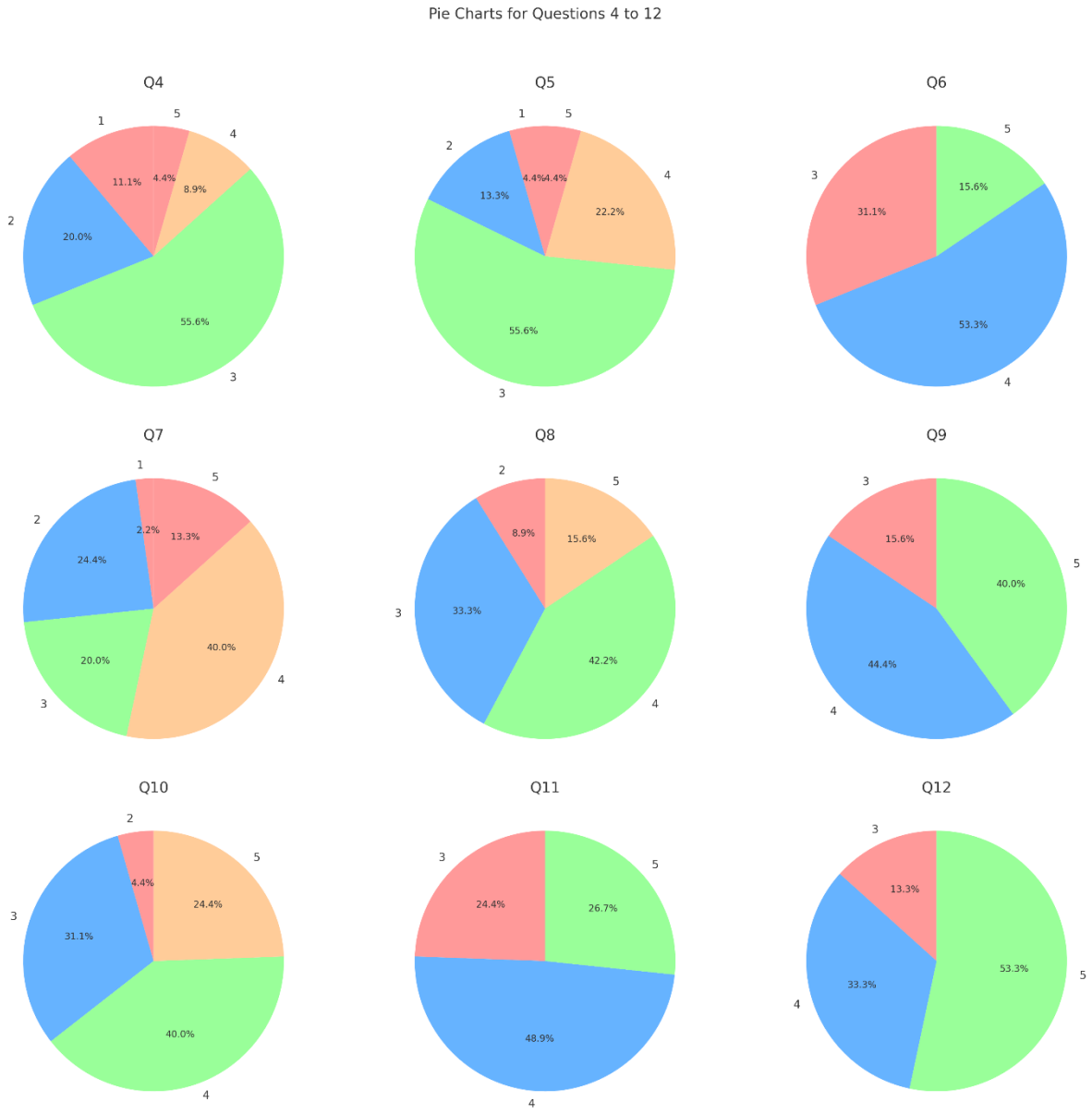


Figure 3 Conceptual Framework

Conceptual framework (Figure 3)

Appendix 5



Graph 1: Pie chart of survey questions 4 to 12