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Investigating Student Engagement in an ESP Sophomore English Course in Taiwan

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***Abstract*—This study investigates student engagement in an ESP Sophomore English course in Taiwan. It aims to understand students' ESP learning experiences and how they influence engagement across different English proficiency levels. The research involved 39 engineering undergraduates and employed a mixed-method approach, including a Likert-scale engagement questionnaire, end-of-class feedback, and semi-structured interviews. Descriptive statistics measured engagement across three dimensions: behavioral, emotional, and cognitive. A Kruskal-Wallis H test compared engagement scores across three proficiency levels, and a Mann-Whitney U test analyzed differences between basic and intermediate groups. Content analysis of feedback and interview data identified key themes. The results showed that emotional engagement was the highest (mean = 4.25), suggesting a strong connection to the course. Behavioral engagement scored 3.92, indicating active participation, while cognitive engagement was lower (mean = 3.68), revealing room for improvement in learning strategies. The Kruskal-Wallis H test demonstrated significant engagement differences across proficiency levels ($p < 0.05$), with intermediate students displaying the highest scores. The Mann-Whitney U test confirmed a significant difference between basic and intermediate groups, highlighting the influence of proficiency on engagement. Students found the ESP course beneficial to improving language skills, particularly in vocabulary and language structure, while enhancing collaboration, communication, and multimedia skills. Challenges like narrowing project topics and overcoming language barriers were addressed through teamwork and technology, improving both project outcomes and language proficiency. The study also discusses the implications of the findings.**

***Index Terms*—ESP, student engagement, university-level English education, English proficiency levels, EFL learners**

I. Introduction

In response to the demands of globalization, educational authorities in contexts of learning English as a foreign language (EFL) have recognized the critical importance of enhancing English proficiency to boost international competitiveness (Kirkpatrick, 2016). For example, this commitment is evident in Taiwan's implementation of the 2030 Bilingual National Policy Development Blueprint (National Development Council, 2018) and significant investments in the Forward-looking Infrastructure Development Program (Executive Yuan, 2023). These efforts underscore the government's dedication to creating a bilingual teaching environment, particularly in higher education.

As part of these initiatives, Taiwan's Ministry of Education (MOE) has launched the Program on Bilingual Education for Students in College (BEST Program), which is designed to strengthen bilingual learning environments and promote English as a medium of instruction (EMI) (MOE, 2021). In addition, the university involved in this study participates in the second phase (2023–2027) of Taiwan's MOE Higher Education SPROUT Project (MOE, 2023). This initiative aims to improve the quality of Taiwan's universities and enhance their international competitiveness by focusing on diverse educational development and the establishment of internationally competitive research and education centers.

In line with these goals, the university has implemented its Bilingual International Promotion Plan, which includes the transformation of Sophomore English courses into ESP courses. Beginning in the fall semester of 2023, the College of Science and Engineering introduced the English for General Science: Intermediate (EGSI) course as a key step in this transformation. The EGSI course combines language learning with discipline-specific content to prepare students for EMI courses within their departments. It focuses on meeting professional language needs and equipping students for field-specific communication.

However, despite these significant efforts, students often face challenges such as declining engagement and insufficient proficiency. These issues are particularly pronounced among those with low motivation towards learning English, leading to resistance or even abandonment. As educational reforms progress, many universities have transformed traditional Sophomore English courses into more specialized ESP programs to better address students' professional language needs and prepare them for field-specific communication. This shift prompts the author to explore how students engage with these new formats.

II. Literature Review

A. University-Level English Education in Taiwan

Most universities in Taiwan include English courses as part of their general education core curriculum, commonly referred to as general English courses, with Freshman English typically being a required component. This course plays a critical role—and for many students, the only role—in improving their English language proficiency, as it is frequently their sole exposure to English after entering university. To bridge the gap between high school and university-level English instruction, many universities position the course within the framework of English for General Purposes (EGP), emphasizing skills such as reading, listening, cultural understanding, and oral practice. However, due to the absence of a unified national syllabus, the EGP courses vary widely in terms of credits, content, and graduation requirements. Under the principle of academic autonomy, universities independently determine the content of their EGP courses, with individual instructors often having significant influence over the course design. As a result, the weekly teaching hours and required credits differ across institutions, ranging from four to fourteen credits, with course duration spanning from one to four years.

Chern (2010) examined the planning and implementation of EGP courses in Taiwanese universities, highlighting that previous research by Taiwanese scholars focused heavily on teaching methods and effectiveness (e.g., Chang, 2002; Lee, 2002), student and teacher perspectives (e.g., Fang, 2004; Huang & Yang, 2021; Wang, 2003a), and initiatives to enhance the EGP instruction (e.g., Huang & Yang, 2021; Wang, 2003b), including recommendations for establishing standardized tests to assess English learning outcomes. While previous research has extensively examined various aspects of the EGP instruction, it is crucial to recognize that meeting students' evolving needs is at the heart of meaningful learning. Wang (2003a) found that 85.7% of students strongly wished to improve their English skills through university English courses, and 91.8% believed that English would have a significant impact on their future careers, underscoring the importance students place on English education. Building on this, Chern (2010) emphasized that practicality is the primary demand from both students and teachers. She suggested that to meet these evolving needs, university-level English education should prioritize enhancing language proficiency through diverse and engaging content that better equips students for real-world challenges.

The issue of student needs also reflects broader changes and developments in university-level English education. Since the implementation of the 12-year compulsory education system, schools at all levels have gradually introduced diverse teaching models (MOE, 2018). However, despite the good intentions behind the Taiwanese government's promotion of diverse teaching models, these efforts are often constrained by the university entrance examination system, which continues to dominate English teaching, aligning learning content with exam requirements to a large extent. Chen et al. (2005) use the term "required motivation" to describe how many Taiwanese students are motivated to study English due to external requirements, such as gaining admission to top universities, where English is a key subject in entrance exams. In contrast, once they enter university, many students no longer see entrance exams as a primary reason for continuing their English studies.

To raise awareness of the importance of English learning and to enhance internationalization, many universities have established English proficiency requirements for graduation (Chern, 2010). However, there is limited evidence to demonstrate that these measures have significantly improved students' ability to engage internationally. In the era of globalization, enhancing students' international competitiveness through university-level English education has become increasingly important (Tsou et al., 2016). Achieving meaningful learning outcomes is essential, but traditional approaches may not fully address the diverse needs of students. As such, specialized English instruction, such as ESP, offers a more targeted approach that could better align with students' academic and professional aspirations, making English learning more relevant and impactful.

B. The Shift From EGP to ESP

Since the early 2000s, ESP has played a crucial role in driving educational reforms in university-level English education in Taiwan. Literature reviews have shown that ESP courses enrich the diversity of English programs, meeting students' needs for future professional development while offering practical English application opportunities (Chen, 2010; Tsou, 2009; Tsou et al., 2016). The inclusion of ESP emphasizes the practical use of English in academic settings, while also providing students with a broader knowledge base and competitive edge in their careers.

Traditionally, universities, apart from National Cheng Kung University (NCKU), focused their EGP courses on enhancing basic language skills, particularly reading, with occasional listening and speaking training. ESP courses, however, were only offered when required by specific departments. This was largely due to English instructors' specialization in literature, language, or education, making it challenging for them to address the diverse professional demands across different fields (Chern, 2010).

Despite these challenges, EGP courses in Taiwan are facing a growing need for reform. Tsou et al. (2016) noted new trends in university-level English education, calling for a gradual shift from traditional EGP to ESP instruction. Unlike EGP, which focuses on general language skills, ESP is designed around specific academic disciplines or professions. It takes a learner-centered approach, focusing on language skills that are directly applicable to real-world scenarios, thereby preparing students for their future careers. As part of this transition from EGP to ESP instruction, Tsou (2009) studied NCKU's ESP program (known as Eagle Program), which integrates a four-year framework of university-level English education. In this program, students start with freshman EGP, move on to sophomore ESP courses, and later take pre-employment English courses in their junior and senior years. This structured curriculum equips students with the English proficiency necessary to compete in the global job market.

The shift towards ESP-focused courses in the second-year English curriculum aligns with Taiwan's MOE BEST Program, which aims to ensure a smooth transition for students into department-specific EMI courses (MOE, 2021). Costa and Mastellotto (2022) emphasize the potential of ESP to enhance communication, academic skills, and intercultural competence within EMI courses. Similarly, Huang et al. (2024) examine a glocalized professional development program for EMI university faculty in Taiwan's medical and healthcare fields. This program, collaboratively designed by ESP teachers and EMI instructors, significantly improved participants' pedagogical knowledge, self-efficacy, and awareness of effective EMI practices. These findings demonstrate the value of ESP teachers as professional development designers. However, there remains a need for further research involving a broader range of students and institutions to fully realize ESP's potential, particularly in enhancing student engagement.

C. ESP and Student Engagement

ESP instruction has increasingly been recognized for its role in enhancing engagement in English learning. Research, such as Stefanova (2021), highlights how ESP deepens student engagement with course material, making the learning process more meaningful. Stefanova (2021) refers to "engagement" as learner engagement, which plays a key role in making learning more impactful.

The concept of engagement was first introduced by Mosher and McGowan (1985) when discussing high school dropout rates. Since then, research has extended the term to university settings, particularly focusing on how students engage in the learning process. Engagement is typically analyzed through multiple dimensions, including behavioral, emotional, and cognitive engagement (Appleton et al., 2008; Bender, 2017; Newmann et al., 1992; Zepke & Leach, 2010). Behavioral engagement reflects students' proactive participation, such as attendance, class participation, and effort. Emotional engagement relates to the connections students form within the academic environment, such as positive relationships with teachers and peers. Cognitive engagement, on the other hand, refers to students' intellectual investment in learning. These definitions of behavioral, emotional, and cognitive engagement will be used in this study to analyze students' overall participation and experiences in the ESP course. Stefanova (2021) argues that ESP instruction enhances all these dimensions by being learner-centered, addressing students' specific academic and professional needs through tailored curriculum design and authentic language applications.

In Taiwan, the challenges of declining student motivation and poor learning outcomes have driven researchers to focus more closely on student engagement. Yang et al. (2014) developed a set of evaluation tools, drawing on Fredricks et al.'s (2004) framework of learning engagement, which integrates behavioral, emotional, and cognitive dimensions. These tools, which have proven to be both reliable and valid, have become valuable resources for researchers and educators in Taiwan, helping to identify ways to improve both student engagement and teaching methods. In the current study, the term "student engagement" refers to students' involvement in various aspects of their learning, including emotional, behavioral, and cognitive dimensions. The focus is on students' overall participation in the learning process, with particular attention to how they engage emotionally, behave in class, and apply cognitive skills. Guo and Yu's (2022) study provides further insights into the connection between ESP instruction and student engagement. While their findings highlight the effectiveness of ESP in improving proficiency in listening, speaking, and professional communication, they also reveal challenges. Low-level students, in particular, faced difficulties with group discussions and impromptu speeches, often finding speaking in English uncomfortable and requiring significant preparation. These results underscore the importance of tailoring teaching methods to align with students' proficiency levels and target skills, ensuring equitable engagement and better learning outcomes.

In essence, while the existing literature emphasizes the importance of ESP in enhancing student engagement, there remains a scarcity of research on its impact, particularly in helping those sophomore students who struggle with poorer English learning outcomes. This study seeks to address this gap by investigating how ESP influences engagement, alongside students' perceptions of the relevance to their academic and professional futures. To guide this inquiry, the following research questions are posed:

1. How are different dimensions of engagement (behavioral, emotional, cognitive) manifested in students participating in an ESP Sophomore English course?
2. How does English proficiency level (basic, intermediate, advanced) influence student engagement in the course?
3. What are students' perceptions of their learning experiences and growth in the course, and what factors influence these outcomes?
4. What challenges do students face when engaging with the ESP project, and how do they tackle these challenges?

III. METHOD

A. Participants

This study initially involved 45 second-year engineering undergraduates enrolled in a Sophomore English course at a private comprehensive university in northern Taiwan. These students had an average of over 11 years of English learning experience. They were required to complete two years of general English courses, beginning with Freshman English in their first year and continuing with Sophomore English in their second year. Previously, students from the College of Science and Engineering took two years of general English courses focused on EGP. However, starting in fall 2023, second-year students were enrolled in a newly introduced ESP course, as part of the university's initiative to reform and

transition its Sophomore English curriculum toward ESP. Due to various personal circumstances, including leaves of absence, some students withdrew from the course, resulting in a final group of 39 students who completed the entire study.

All participants were local Taiwanese students, initially placed into different English proficiency levels—*Basic*, *Intermediate*, or *Advanced*—during their first year in the Freshman English course. The university implemented an ability-grouping policy, which assigned students to classes based on their proficiency. At the university, Freshman English is a required, institution-wide course, and all students are grouped by ability levels based on their English proficiency at entry. In contrast, Sophomore English is organized by individual colleges and departments. For participants in this study from the College of Science and Engineering, Sophomore English groups students by department rather than by prior proficiency levels, prioritizing department-specific needs. This policy underscores the institution's emphasis on aligning courses with departmental objectives rather than reassessing students' English proficiency for ability-based grouping.

Thus, in their second year, all participants were enrolled in the same Sophomore English course, forming a mixed-ability class. This course composition provided a unique opportunity to explore how ESP content could address the diverse learning needs of students with varying English proficiency levels in a single classroom setting. Table 1 provides a detailed breakdown of the participants' demographics, including their age, gender, and the English proficiency levels assigned by the university.

TABLE 1
PARTICIPANT DEMOGRAPHICS

Category	Subcategory	Number of Students
Age	19 years old	5
	20 years old	33
	21 years old	1
Gender	Female	4
	Male	35
English proficiency level	Basic	22
	Intermediate	16
	Advanced	1

B. Research Site and Course Design

The university involved in this study introduced the EGSI course in the fall semester of 2023 as part of its efforts to transform Sophomore English into ESP courses. This course is part of the university's general English education curriculum and is taught by language instructors. It emphasizes developing language skills required in science and engineering fields, providing students with opportunities to acquire technical vocabulary and communicate effectively within their disciplines.

The course culminates in a capstone project where students deliver an oral presentation in English on a specialized topic related to popular or general science. This presentation includes four key components: (1) the topic and its significance, (2) the main argument or stance, (3) explanation and analysis, and (4) references. To prepare for this presentation, students work in groups of four to create an 8- to 10-minute video, encouraging collaboration and professional communication.

C. Data Collection

This study utilizes a mixed-method approach to gather data, incorporating both quantitative and qualitative instruments. The quantitative data provides measurable insights, while the qualitative data offers deeper perspectives. Three instruments were used: an engagement questionnaire, student feedback, and semi-structured interviews. The following sections will detail the data collection process.

(a). Engagement Questionnaire

At the end of the EGSI course, an engagement questionnaire (see Appendix) was administered to assess students' engagement after participating in this ESP course. The questionnaire was adopted from the English Learning Engagement Scale developed by Yang et al. (2014), which evaluates three dimensions of engagement: *behavioral* (Items 1–6), *emotional* (Items 7–10), and *cognitive* (Items 11–16). The 17-item scale uses a 5-point Likert scale: 5 (strongly agree), 4 (mostly agree), 3 (somewhat agree), 2 (mostly disagree), and 1 (strongly disagree). Mean scores are used to interpret students' levels of engagement. A mean score of 4 or higher indicates higher engagement, a score near 3 suggests mild engagement, and a score close to 2 or lower reflects lower engagement. These levels provide a basis for analyzing students' overall participation and involvement in the course. Item 17 is a reverse-coded, non-scored item designed to detect contradictory responses and identify invalid data. To uphold ethical standards, participants were assured anonymity, and it was clearly communicated that their responses would not affect their course grades.

This scale was chosen for its reliability and validity in assessing engagement among university students learning English in Taiwan, with Cronbach's alpha coefficients of 0.870 (behavioral), 0.844 (emotional), 0.891 (cognitive), and 0.928 (overall). Its validity was established through Principal Component Analysis with Varimax rotation, which extracted three factors explaining 67.135% of the variance, and communality values ranging from 0.481 to 0.844. The

questionnaire used in the current study demonstrated strong reliability, with a Cronbach's alpha coefficient of 0.89, indicating excellent internal consistency.

(b). Student Feedback

In addition to the questionnaire, all students were invited to provide written feedback on their learning experiences at the end of the EGSI course, specifically focusing on their insights and reflections related to the course content. They responded to a series of open-ended questions (adapted from Suskie, 2004), covering aspects like course usefulness, advice for success, personal growth, key skills developed, and challenges faced during the ESP project. Feedback was collected anonymously during the final class session to encourage honest and reflective responses. Participants were also assured that their feedback would remain confidential and would not affect their course grades. This qualitative data offers a broader understanding of students' engagement.

(c). Semi-Structured Interviews

To gain a deeper understanding of the specific challenges students faced during the ESP project and how they tackled these challenges, semi-structured interviews were conducted with six participants. These participants were recruited through a snowball sampling technique, where two initial participants (Jason and Wayne) recommended additional classmates (see Table 2 for interview participant profiles). This method enabled the formation of a diverse group of interviewees, providing multiple perspectives on their engagement with the project. The interviews allowed for a detailed exploration of the challenges encountered, complementing the broader feedback gathered from the entire class.

Interview questions were adapted from the course feedback questions and centered on the challenges students faced during the ESP project and the strategies they employed to overcome these challenges. Key questions included: "What challenges did you face when engaging with the ESP project?" and "How did you tackle these challenges?" Follow-up questions encouraged participants to elaborate and provide specific examples.

TABLE 2
INTERVIEW PARTICIPANT PROFILES

No.	Pseudonym	Age	Gender	English Proficiency
1	Jason	20	male	Intermediate
2	Andy	20	male	Intermediate
3	Wayne	19	male	Basic
4	Jim	20	male	Basic
5	Len	20	male	Intermediate
6	Chad	20	male	Basic

The six interview participants were divided into two groups, corresponding to their ESP project teams, with three students in each group. Although interviews were conducted in a group setting, the format was not a focus group interview. Each participant was asked the same set of questions and responded individually, ensuring equal opportunities to express their views. The group setting was chosen for practical reasons and to facilitate comfort among peers, not to generate collective discussion or interaction. Participants were encouraged to add or supplement their individual responses only after all questions had been addressed.

Each of the two interviews lasted approximately 60 minutes. All interviews were recorded and transcribed for detailed analysis.

D. Data Analysis

The data analysis comprised both quantitative analysis of the questionnaire and qualitative analysis of student course feedback and interviews, with details of the procedures provided in the following sections.

(a). Quantitative Analysis

The data from the engagement questionnaire were analyzed using both descriptive and inferential statistics to identify trends and significant differences in student engagement. Descriptive statistics summarized engagement across three dimensions: behavioral, emotional, and cognitive. To examine correlations between engagement levels and proficiency groups, inferential statistics were applied. Given the small and uneven group sizes—particularly with only one participant in the advanced group—a non-parametric test was deemed appropriate. Therefore, a Kruskal-Wallis H test was conducted to compare engagement scores across the three proficiency levels. Due to the limitation of having only one participant in the advanced proficiency group, a Mann-Whitney U test was subsequently used to compare engagement between the basic and intermediate proficiency levels.

(b). Qualitative Analysis

1. Student Course Feedback

To ensure a thorough and systematic analysis of students' course feedback, the following steps were taken:

a. Transcription and data organization: Responses were transcribed verbatim into a spreadsheet to ensure accurate representation, facilitating systematic sorting and analysis.

b. Code development: Initial categories were identified from the responses and refined into specific codes, which were consistently applied to capture key ideas expressed by the students.
c. Coding and thematic analysis: Each response was reviewed, and relevant codes were assigned to represent underlying themes or categories. This iterative refinement process ensured the accuracy of the codes in reflecting the data.
d. Frequency analysis: The frequency of each code was calculated using spreadsheet functions, providing a quantitative measure of the prevalence of specific themes across responses.
e. Thematic grouping: Responses were grouped according to identified themes, offering a comprehensive overview of commonalities and differences in student feedback. This grouping highlighted frequently mentioned skills, learning outcomes, and challenges.
f. Quantitative and qualitative integration: Frequency counts were integrated with qualitative themes to provide a balanced interpretation of the data, combining numerical summaries with a deeper exploration of themes.

2. Semi-Structured Interviews

The interview transcripts were analyzed using a four-step coding process to identify emerging themes related to the challenges students faced in the ESP project and the strategies they employed to tackle these challenges:

a. Familiarization with data: The researcher read the transcripts multiple times to gain a comprehensive understanding of the content, identifying recurring themes and patterns.
b. Initial coding: Relevant text segments were highlighted and annotated with preliminary codes, capturing project-related challenges, and strategies used by students.
c. Interpretation and thematic development: Coded excerpts were interpreted, and detailed notes were written on students' experiences. Similar excerpts were grouped into initial categories or themes that represented broader challenges and their effects on learning.
d. Refinement of categories: Categories were iteratively refined by revisiting coded excerpts and interpretations to ensure clear, distinct, and well-supported themes. This process continued until a coherent and comprehensive categorization of the data was achieved.

The refined excerpts were translated into English for inclusion in the *Results and Discussion* section, ensuring that the findings accurately reflected students' experiences and perspectives.

IV. Results and Discussion

This section presents the results of the data analysis and an extensive discussion of the findings, organized around the four research questions.

A. How Are Different Dimensions of Engagement (Behavioral, Emotional, Cognitive) Manifested in Students Participating in an ESP Sophomore English Course?

The engagement dimensions—behavioral, emotional, and cognitive—were evaluated using descriptive statistics, specifically the mean scores, to understand students' perceptions of their engagement. The responses were measured using a 5-point Likert scale, where higher scores indicated stronger agreement with the statements reflecting their learning experiences. As shown in Table 3, emotional engagement emerged as the highest (mean = 4.25) among the three dimensions. Emotional engagement, represented by Items 7-10 in the questionnaire (Appendix), reflects students' sense of belonging and attachment to the course, their attitudes towards the teacher and peers, and overall course satisfaction. The high score suggests that students "mostly agree" that they felt emotionally connected to the course and their learning environment.

Table 3
Descriptive Statistics for Engagement Dimensions

Dimension	Valid no. of students	Range		*M*	SD
		Min.	Max.		
Behavioral	39	2.67	5.00	3.92	.77
Emotional	39	2.75	5.00	4.25	.67
Cognitive	39	1.67	5.00	3.68	.88

Behavioral engagement followed with a mean score of 3.92, indicating strong levels of participation, effort, persistence, and adherence to class rules (Items 1-6). This score, nearing 4, implies that students were generally committed to fulfilling the course requirements, both inside and outside the classroom, and were attentive and involved during lessons.

The lowest score was recorded for cognitive engagement (mean = 3.68), which captures students' attitudes towards academic challenges, their use of self-regulation and learning strategies, and their resilience in the face of difficulties (Items 11-16). Although a score of 3.68 suggests that students tend to "mostly agree" with the statements in this dimension, it reflects a relatively lower level of confidence and determination when encountering challenges.

These results suggest that while students demonstrate higher emotional and behavioral engagement in the ESP Sophomore English course, their cognitive engagement, particularly in terms of problem-solving and strategic thinking,

requires further development. The role of ESP in stimulating emotional factors resonates with Stefanova's (2021) research, which highlights how the learner-centered and tailored nature of ESP courses fosters meaningful and impactful learning experiences. When language courses address students' specific academic and professional needs through authentic applications, students are more likely to engage emotionally. Furthermore, ESP courses are designed to meet students' future professional needs while emphasizing the practical use of English in academic and workplace settings (Chen, 2010; Tsou et al., 2016). This alignment with real-world scenarios and career demands makes the course content both relevant and motivating, contributing to students' emotional investment and proactive participation. As students feel emotionally connected to the course and their learning environment, they are further encouraged to participate actively and follow class norms, thereby supporting behavioral engagement.

The results also align with the perspective of Tsou et al. (2016), who advocated a shift from traditional EGP to ESP instruction in university settings. While the emotional and behavioral dimensions of engagement appear well-supported by the current ESP course design, the lower cognitive engagement highlights a need to enhance the instructional approach to problem-solving, self-regulation, and resilience. Addressing this gap is crucial for fully realizing the potential of ESP instruction, as it involves fostering not only emotional and behavioral engagement but also cognitive growth and critical thinking skills.

B. How does English Proficiency Level (Basic, Intermediate, Advanced) Influence Student Engagement in the Course?

A Kruskal-Wallis H test was conducted to determine if there were statistically significant differences in student engagement across three English proficiency levels: basic, intermediate, and advanced. The test revealed that there was statistically significant difference in engagement scores among the different proficiency levels, (X^2 (df=2, n=39) = 7.036; $p < 0.05$) (see Table 4). This finding suggests that students' level of English had influence on their engagement in the course. Intermediate level students had the highest engagement scores while the advanced student had the lowest. Given the small and uneven group sizes, particularly with only one participant in the advanced proficiency group, these results should be interpreted with caution.

TABLE 4
KRUSKAL-WALLIS H TEST RESULTS BY PROFICIENCY (THREE LEVELS)

Variables		n	Rank Average	df	X^2	*p*
Proficiency	Basic	22	16.41	2	7.036	0.030*
	Intermediate	16	25.63			
	Advanced	1	9.00			

* $p < 0.05$

Considering the limitation of having only one participant in the advanced proficiency group, a Mann-Whitney U test was conducted to compare engagement between the basic and intermediate proficiency levels. The results indicated significant difference in engagement scores between the basic and intermediate proficiency groups, U = 93.000, $p = 0.013$ (see Table 5).

TABLE 5
MANN-WHITNEY U TEST RESULTS: BASIC VS. INTERMEDIATE PROFICIENCY

8	n	Rank Average	Rank Total	U	*p*
Basic	22	15.73	346.00	93.000	0.013*
Intermediate	16	24.69	395.00		

Descriptive statistics were calculated to provide an overview of engagement scores across the three proficiency levels (see Table 6). The median engagement scores for the basic, intermediate, and high proficiency groups were 3.88, 4.34, and 3.31, respectively.

TABLE 6
DESCRIPTIVE STATISTICS FOR ENGAGEMENT SCORES ACROSS PROFICIENCY LEVELS

Proficiency Level	n	Mean	Median	SD
Basic	22	3.70	3.88	0.12
Intermediate	16	4.25	4.34	0.17
Advanced	1	3.31	3.31	

A boxplot was generated to visually inspect the distribution of engagement scores across the basic, intermediate, and advanced proficiency groups (see Figure 1). The boxplot revealed higher variability in the engagement scores of the basic and intermediate groups, while the advanced proficiency group, represented by a single participant, showed no variability. Median engagement scores were higher for the intermediate group, indicating that the course design may have better aligned with their proficiency level.

These results reveal that intermediate-level students exhibited the highest engagement scores, with statistically significant differences in engagement between the basic and intermediate proficiency groups. In the context of higher education in Taiwan, ability-grouping practices, as seen in mandatory general English courses like Freshman English, have proven effective in enhancing learning outcomes by assigning students to proficiency-appropriate classes (e.g., Yu et al., 2022). Similarly, the findings of this study show that the EGSI course was particularly well-suited for intermediate-

level students, as reflected in their higher levels of engagement. This indicates that the course design adequately addressed the needs of this proficiency group. As the course title itself implies, it was intended for students at an intermediate level.

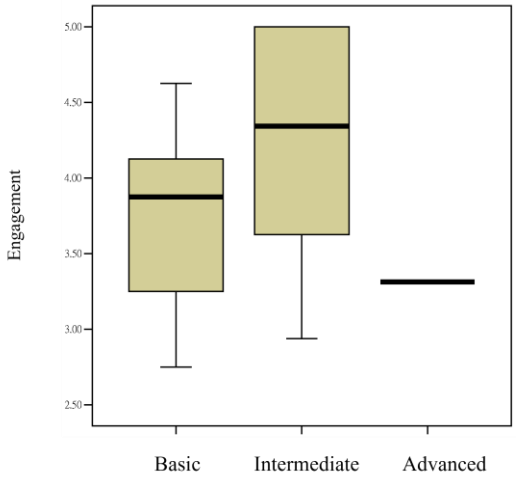

Figure 1. Distribution of Engagement Scores by Proficiency Group

Given these insights, the implementation of ability-grouping in Sophomore English courses should be a critical consideration in future course reforms. Grouping students by proficiency level can not only enhance engagement, as seen in the intermediate group, but also ensure that the course content and instructional strategies align more closely with students' abilities. This approach has the potential to help more students benefit from the ESP instruction and achieve better learning outcomes across all proficiency levels.

C. What Are Students' Perceptions of Their Learning Experiences and Growth in the Course, and What Factors Influence These Outcomes?

To address this research question, the analysis of student feedback demonstrates that the ESP course notably impacted both their learning experiences and growth, particularly in language proficiency (see Table 7). Students frequently cited language structure and vocabulary acquisition as the most meaningful aspects of the course (20 mentions in Q1) and as dimensions where they experienced the greatest growth during learning (15 mentions in Q3). Furthermore, English language proficiency was identified as the most commonly acquired skill, with 50 mentions in Q7 (i.e., three areas of growth achieved in the course). These findings suggest that students perceive the course as greatly helpful in enhancing their language abilities, a core objective of ESP courses that integrate professional content with language learning.

Beyond language development, students also gained crucial professional and collaborative skills through project-based learning. Collaboration and communication skills were frequently mentioned (e.g., 8 mentions in Q1 and 5 mentions in Q5), highlighting teamwork as a pivotal part of their learning experience. In addition, the development of multimedia and presentation skills (26 mentions in Q5) emerged as another key outcome of the ESP project. This project required students to apply technical skills in conjunction with their language proficiency. When asked about areas of growth achieved in the course, students mentioned technical and professional language skills 24 times in Q7. This demonstrates that the project-based format helped students acquire practical skills relevant to their future professional careers. This aligns with Tsou's (2009) findings, which emphasized that a structured ESP curriculum not only enhances English proficiency but also prepares students to meet the demands of the global job market.

TABLE 7
SUMMARY OF STUDENTS' COURSE FEEDBACK

Questions	Feedback Themes	Mentions
Q1. Most useful/ meaningful aspects	Mastering language structure and vocabulary	20
	Developing project-based collaboration skills	8
	Enhancing cultural and language understanding	7
	Actively participating in class	5
	Learning professional/technical English	4
Q2. Advice for success	Active and responsible class engagement	28
	Strategic planning and collaborative learning	7
	Expanding vocabulary and mastering grammar	3
Q3. Biggest growth during learning	Language structure and vocabulary acquisition	15
	Overall English language proficiency	15
	Professional and academic competencies	10
Q4. Concepts/ insights/knowledge gained from the ESP project	Technical knowledge and vocabulary	22
	Collaboration and teamwork	11
	Language skills development	10
	Research and information gathering	8
	Media production skills	7
Q5. Skills/abilities gained from ESP project	Multimedia and presentation skills	26
	Research and organizational skills	16
	Collaboration and communication	5
	Time management and autonomous learning	3
Q6. Challenges and solutions in the ESP project	Project scope and definition	19
	Language skills	13
	Group dynamics and communication	7
	Technical skills and software challenges	5
	Information processing and research	1
Q7. Three areas of growth achieved in the course	English language proficiency	50
	Technical and professional language skills	24
	Self-management, learning strategies, and organizational skills	18
	Presentation and media production skills	12
	Collaborative, communication, and cultural awareness skills	12

Several factors contributed to students' engagement and skill development in the course. Active and responsible class engagement was the most frequently mentioned success factor (28 mentions in Q2), indicating that students who participated actively felt more engaged in the course. Strategic planning and collaborative learning (7 mentions in Q2) also played key roles in helping students navigate the course's demands, keeping them motivated and focused. The project-based approach itself acted as a motivator, allowing students to apply technical knowledge and improve their language skills (Q4).

Although students faced challenges such as defining the project scope, and addressing language limitations (19 and 13 mentions, respectively, in Q6), these challenges encouraged the development of valuable self-management, learning strategies, and organizational skills (18 mentions in Q7). This suggests that the course not only fostered language and professional growth but also enhanced students' ability to independently overcome challenges. The challenges students encountered and the strategies they employed to overcome them will be further explored in the next section.

D. What Challenges do Students Face When Engaging With the ESP Project, and How do They Tackle These Challenges?

Serving as a capstone experience, the ESP project transitions students from language learners to professional users, integrating scientific or engineering knowledge with language skills. The analysis of student interviews revealed two key themes.

(a). Theme 1: Challenges in Generating ESP Project Ideas

In the EGSI course, students were tasked with independently choosing a project topic related to popular or general scientific understanding. However, many students encountered significant challenges when selecting a topic, primarily due to the broad scope and their limited prior experience in choosing specialized topics.

First, students expressed difficulties in determining where to begin when faced with a vast array of potential topics. As Wayne noted, "The process of going from nothing to something is always harder." This highlights how challenging it was for students to focus and narrow down their topics amidst a wide range of subject knowledge. Len's experience further illustrates this challenge: "I think the biggest challenge was that the topic was too broad at first. The materials I found were scattered, covering various aspects, and I didn't know where to focus, which ended up wasting a lot of time." This reflects the confusion and uncertainty that arose when students faced too many options. The broad nature of potential topics made it difficult to filter and analyze relevant information effectively. Len's account shows how autonomous learning, while offering freedom, also added challenges in managing information and reaching academic goals. This

difficulty in narrowing topics resulted in increased learning burdens, particularly for students lacking prior experience in research.

Chad also shared the challenge his group encountered in generating ideas: "Our group's challenge was that we couldn't focus on what we wanted to convey to the audience... At first, the topic we chose was too broad because we were working on something like AI cars." The broad scope of AI cars made it challenging for Chad's group to focus on specific content. However, through discussions and guidance from the instructor, they were able to clarify their direction. Chad explained: "After consulting with the teacher, who asked us several questions, particularly about our purpose, we decided to focus on whether self-driving cars could reduce accident rates." This example illustrates how the instructor's scaffolding process—without providing direct answers—was essential in helping students refine their project ideas through guided discussions.

An additional solution emerged from group discussions and brainstorming. Andy recalled:

> At first, our topic was just "digital twin," but we had to come up with ways to apply it. Each person in the group suggested a different angle, explained why we should explore it, and then we voted on it.

This collaborative approach not only promoted teamwork but also provided opportunities for students to reflect critically and select the most appropriate topic.

Overall, the primary challenge students faced in the ESP project was narrowing down their project ideas. For many students, such project experiences were uncommon, and the autonomous learning model required them to invest significant time and effort in topic selection. However, this challenge also fostered valuable learning opportunities, allowing them to develop project planning and problem-solving skills.

(b). Theme 2: Addressing Language Proficiency Challenges

For most students, this was their first time delivering a presentation entirely in English to an audience unfamiliar with the topic. As general or popular science presentations, they required students to explain scientific knowledge in simple terms, which amplified language challenges—especially given the varying levels of proficiency among students. The second emerging theme revolves around overcoming these language proficiency challenges, focusing on mastering presentation skills, improving fluency, and refining pronunciation.

When it came to presentation skills, students needed to structure their content clearly to ensure the audience could follow and understand. Jason commented on this: "One of the challenges was making sure each person's [group member's] script was connected; otherwise, the presentation would feel like separate pieces." Jason's reflection underscores the importance of coherence and logical sequencing in maintaining a smooth presentation. He elaborated: "When writing the script, it was important to have order in what we were saying, using words like 'first,' 'second,' and 'next.' But it was hard because using 'next' all the time felt repetitive." Jason's concern about linguistic variety highlights the challenge of maintaining audience engagement through well-chosen transitions. His leadership in the group was evident as he helped revise the script to ensure smooth transitions between sections, ultimately contributing to a more cohesive and fluent presentation.

In addition, students relied on technological tools to tackle language challenges. Wayne, for example, used AI tools to improve his pronunciation: "If I didn't know how to pronounce something [in the script], or what the right tone should be, I used ChatGPT to read it out for me." Wayne's use of AI technology demonstrates how students leveraged resources to enhance their language skills. He further described how listening to online resources helped him improve the naturalness of his speech, moving away from what he termed a "monotonous" delivery typical of "Taiwanese English".

These examples highlight how students utilized both teamwork and technology to overcome language proficiency challenges. Through these strategies, they transitioned from passive learners to active participants in the language learning process, enhancing their English presentation skills and laying a foundation for future language development.

V. Conclusion

A. Findings

This study sought to investigate student engagement in a Sophomore English course with an ESP focus in Taiwan. The findings reveal that emotional engagement was the strongest dimension (mean = 4.25 on a 5-point Likert scale), reflecting a strong connection and satisfaction with the course. Behavioral engagement was also high (mean = 3.92), indicating active participation. However, cognitive engagement was lower (mean = 3.68), suggesting the need for improved learning strategies to better address cognitive challenges.

The Kruskal-Wallis H test showed significant differences in engagement across proficiency levels, with intermediate students showing the highest engagement ($p < 0.05$). The Mann-Whitney U test further highlighted variation between basic and intermediate groups, underscoring the importance of proficiency in ESP courses. Ability-grouping in ESP Sophomore English courses should be prioritized in future reforms, as it can enhance engagement, align course content with students' abilities, and support improved learning outcomes.

Students perceived the ESP course as helpful in improving their language proficiency, particularly in vocabulary and language structure. The course also fostered collaboration, communication, and multimedia skills. Active participation and teamwork were key contributors to students' engagement and skill development.

Challenges such as narrowing project topics and overcoming language barriers were identified. Discussions with the instructor and peers helped students refine their focus and improve presentation skills. In addition, the use of technology, such as AI tools and online resources, supported language practice, thereby enhancing both the project outcomes and students' language abilities.

B. Implications

Educators should continue to promote emotional and behavioral engagement through ESP activities that foster connection and participation. Moreover, structured support for cognitive engagement is essential, especially within ESP projects. Tailoring instructional strategies to different proficiency levels can further enhance student engagement and performance. Future research could explore how specific instructional strategies and technological tools impact cognitive engagement.

C. Limitations and Recommendations

This study's limitations include a small sample size and a focus on a single academic discipline, limiting the generalizability of the findings. Self-reported data may also introduce bias. Future research should address these limitations by expanding sample sizes and employing longitudinal designs to assess the long-term effects of ESP instruction. Further studies could also investigate how different types of ESP projects influence engagement across various disciplines.

APPENDIX. STUDENT ENGAGEMENT QUESTIONNAIRE ITEMS

Adopted from Yang et al. (2014)

1. I attend English class unless I am sick or have important matters to attend to.
2. I am punctual in attending English class.
3. I listen attentively to the English teacher's lecture.
4. I actively participate in activities during English class.
5. I take notes during English class.
6. I review the key points taught by the English teacher.
7. I enjoy attending English class.
8. I like the teaching style of the English teacher.
9. I like the way the English teacher interacts with us.
10. I respect the English teacher.
11. Even if I find English difficult, I still try hard to learn it.
12. Overcoming difficulties in learning English gives me a sense of accomplishment.
13. I believe I can improve my English skills.
14. I plan my study schedule before English exams.
15. Even if my English is not good, I am not afraid of learning it.
16. When my English grades are not good, I motivate myself to study harder.
17. I do not enjoy attending English class.

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