To What Extent are Japanese University Students Successful in Motivating Themselves to Learn English through Project-based Language Education? An Assessment of Students after Two Years of PBL-based English Language Education

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Abstract

The objective of this study is to evaluate the efficacy of project-based learning (PBL) methods in teaching English at the Japanese university level from the perspective of motivational research. The case study focuses on the Project-based English Program (PEP) at a large private university in Japan, examining whether the program not only enhances English proficiency, but also motivates students to a higher level of self-determination. By analyzing these outcomes, this paper discusses the added value of PBL-based English education in terms of its effectiveness in motivating students. The analysis reveals that PEP has improved the English proficiency of the participants over the two-year curriculum, and that in terms of motivation, PEP has been successful to some extent in cultivating identified regulation, a relatively high level of self-determination among extrinsic motivation for English language learning. The results also indicate that the group tended to develop intrinsic motivation, a motivation with an even higher level of self-determination, suggesting that PBL-style classes are effective in facilitating the acquisition of high self-determined motivation. However, the results for stimulation, one aspect of intrinsic motivation, tended to show almost no acquisition, and the results for introjected regulation, an extrinsic motivation, were also scattered, suggesting that learners may retain some hesitation, conflict, and stress according to motivation theory. These findings can be utilized to improve educational programs in the future.

Keywords: Project-based Learning (PBL), Project-based English Program (PEP), intrinsic motivation, extrinsic motivation, Test of English for International Communication (TOEIC), self-determination level

1. Introduction

The purpose of this paper is to clarify the extent to which project-based learning (PBL) approaches are effective in teaching English at Japanese universities from the perspective of motivational research.

Recently, "active learning" has gained popularity in Japan, with a greater emphasis on learner independence, autonomy, and creativity. To move away from the passive, lecture-style teaching that has been criticized as overly knowledge-oriented, various reforms have been implemented at Japanese universities to make education more engaging and effective. The authors have been involved in English education at universities and have implemented the Project-based English Program (PEP) for many years, which employs a project-based approach to teaching English. We have published various research results on PEP (see, for example, Yamanaka, 2015; Sugiyama, Yamanaka & Odagiri, 2022). While PBL approaches to teaching English at universities are still relatively scarce, they are gaining traction (see, for example, Horai, 2011, Yamanaka & Kawai, 2017, Yasuda et al., 2020, etc.).

However, objectively determining that active learning is more efficacious than traditional pedagogical methods, as posited by Bielefeldt et al. (2010), is hindered by the small sample sizes of students participating in the various programs and the lack of unified assessment efforts, resulting in a lack of statistical significance.

Presently, in the realm of English language education, it is uncommon to find quantitative evidence that objective test scores, such as TOEFL or TOEIC, have seen a significant improvement with PBL-based education compared to the control group. In most instances, English language proficiency has been observed to improve even under traditional education methods. Although questionnaire surveys may suggest enhancement in students' experience, it is challenging to ensure objectivity and comprehensiveness as they are subjective in nature. Therefore, this study aims to investigate the motivation of English language learners who engage in PBL.

Motivational research, primarily within the field of psychology, has been widely studied and codified as self-determination theory by Deci & Ryan (1985, 1991, Ryan & Deci, 2000, 2002). It originated with deCharms (1968), who proposed a classification of motivation as intrinsic and extrinsic. Within the current concept of "self-determination," motivation is classified into three categories based on its level: no motivation, four types of extrinsic motivation, and intrinsic motivation (cf. Figure 1).
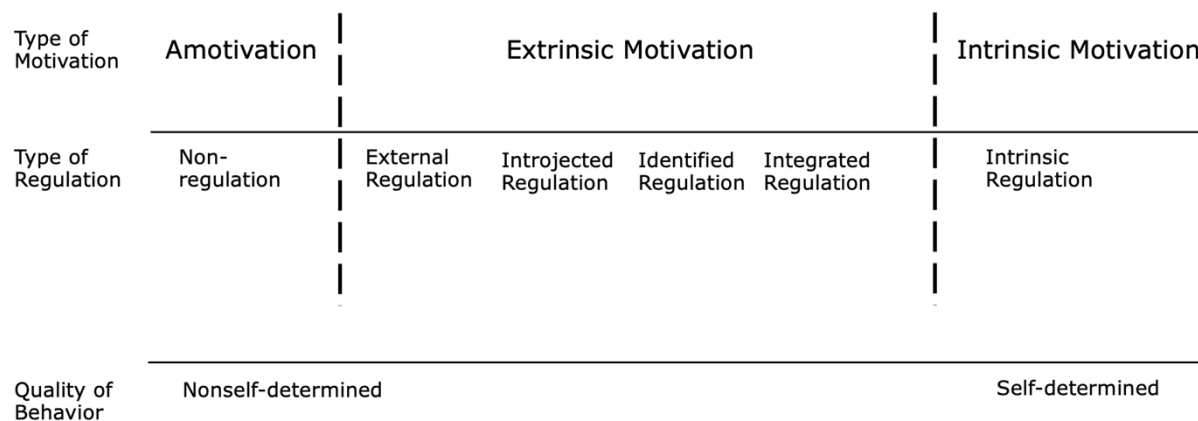

Figure 1. Self-determination levels and motivational categories (Ryan & Deci, 2002, p. 16)

The four types of extrinsic motivation are: "external regulation," which is the lowest level of self-determination; "introjected regulation," which is the state in which behavior is initiated without reliance on external factors. The progression continues to "identified regulation," the state in which the individual recognizes the significance of external values, and then to "integrated regulation," a state in which the meaning and value of behavior are fully integrated with the individual's values and fused without contradiction with their identity. The level of self-determination is differentiated in stages, with "integrated regulation" being the highest. On the other hand, intrinsic motivation refers to the state in which an individual acts out of their innate curiosity and pleasure-seeking nature, acting because of the stimulation, satisfaction, excitement, and pleasure associated with the action. It is considered to possess the highest level of self-determination (Hayashi, 2006). It is worth noting that motivation is an important indicator of a wide range of activities, not just limited to English language learning, and has been employed as a measure for various activities, including the motivation for friendship scale (Okada, 2005), the motivation for learning nursing scale (Tanaka, 2001), the motivation for sports scale (Pelletier et al, 1995), and a motivation scale for political involvement (Losier, Perreault, Koestner and Vallerand, 2001). Research on motivation to learn English and the development of scales to assess it are an ongoing effort in this field.

Research on motivation in English language learning has a historical foundation in the work of Vallerand et al. (Vallerand, Blais, Briere & Pelletier, 1989; Vallerand et al., 1992, 1993), who examined the development of motivation scales in general education. Building on the Academic Motivation Scale (AMS), which comprises seven sub-scales: one type of amotivation, three types of extrinsic motivation (external regulation, introjected regulation, and identified regulation), and three types of intrinsic motivation (stimulation, knowledge, and achievement), the AMS has been particularly employed to assess the College version of the Academic Motivation Scale (AMS-CV, Vallerand et al. 1992, 1993). Subsequently, a motivation scale specifically for foreign language learning was developed by Noels, Pelletier, Clement & Vallerand (2000). In Japan, Hiromori (2003) developed a scale of English learning motivation for high school students, which was later adapted for university students (Hiromori 2005), followed by Honda & Sokyu (2004). The motivation scale used in this paper is the one developed by Hayashi (2006), which features a more diverse participant pool, including students specializing in English language and literature, in contrast to prior scales that were limited to university students

in non-English fields. Additionally, Hayashi (2006) employed a method of item creation that utilized Japanese directly rather than back translation, considering the cultural and linguistic disparities between Japanese and English, to make the items more relatable to the context of Japanese university students.

Given these considerations, the objective of this study is to partially elucidate the motivation of learners who have undergone English education at Japanese universities utilizing project-based teaching methodology, by means of an established evaluation scale. The study also aims to assess the pros and cons of its educational outcomes. The study centers on university students who have undergone extensive exposure to this pedagogy, having completed a minimum of two years of project-based English language instruction. By clarifying the extent and nature of English motivation attained by these individuals, this study will not only shed light on the reality of project-based English education, but also serve as a pioneering examination of the correlation between the acquisition of motivation and the outcomes of English education. Although there have been some studies in Japan that have examined the outcomes of English education in relation to motivational research. For example, Iida et al. (2020) found that international studies students at their university had higher levels of "interest in English and culture," "obligatory self and instrumental avoidance," and "ideal self and self-efficacy" than nursing students, while nursing students had higher levels of "negative attitude towards English," and both groups had the same level of "nervousness about speaking English". However, this was a large-scale survey conducted at a university offering general English education, and when specifically examining project-based English education, previous research is limited. The use of motivational scales as an evaluation method, as opposed to relying on subjective surveys based on opinions or objectively measurable test scores, should be an area of increased focus in future research on English education.

2. Method

2.1 Participants

The participants of this study were students enrolled in two junior-level classes at a private university in Japan, who had completed two years of mandatory instruction in PEP, a project-based language learning (PBL) curriculum for English language education. Of the 46 students who consented to participate in the online questionnaire, 44 (22 male and 22 female), with the exclusion of two individuals with incomplete responses, were included as valid responses. The participants were primarily science majors specializing in life sciences or pharmacy and were approximately 20-21 years of age at the time of the survey. The university required the students to take the TOEIC (Test of English for International Communication) periodically throughout their enrollment, to track the progression of their English proficiency. The survey was administered in April 2022, at the start of their junior year, concurrent with the beginning of the Japanese academic calendar.

2.2 PEP (Project-based English Program)

PEP is an English education program developed at Keio University in Japan and implemented at several faculties of Ritsumeikan University. The program allows students to independently determine their research themes based on their own interests or concerns, through which they explore and share their ideas through presentations and other forms of communication (Suzuki, 2003; Yamanaka et al., 2021).

As PEP is applied within a university setting, the curriculum frequently includes the following components: during their first and second years, students participate in presentations, debates, panel discussions, and other activities that focus on familiar themes such as daily life and classes; during the second term of their second year, students work on term papers that are approximately 1,500 words in length; during their third year, students focus on themes related to their specialist fields, and conduct poster presentations; and, for those who choose to do so, fourth-year students write an English summary of their graduation thesis and give an oral presentation. Freshmen and sophomores are required to attend one project class and one skills workshop class per week, for a total of 30 weeks per semester, while juniors are required to attend one project class per week during the spring semester and have the option of taking one elective class per week during the fall semester. There are no elective classes for fourth-year students.

PEP is distinguished from traditional pedagogical methods that center on the transmission of knowledge from educator to student through the utilization of textbooks. A recent and similar approach, known as CLIL (Content and Language Integrated Learning), an applied linguistic methodology that amalgamates instructional content and foreign language instruction, has garnered attention. Furthermore, prior to this, a content-based approach, which is predicated on the learner's interests and concerns, was also implemented in foreign language learning. While there is no denying the relative success of these approaches, one of the primary limitations of CLIL is that the learning content is prescribed by the teacher (or selected from a pre-determined list), and thus may not align with the individualized interests of each student. In contrast, PEP grants the learner autonomy in selecting their

own content, thereby catering to their fundamental communicative motivations. Additionally, PEP places a significant emphasis on the incorporation of each faculty member's research expertise in the conception and execution of student projects. PEP has been implemented at various other institutions of higher education, such as Osaka University, Kinki University, Chiba University of Commerce, and Hokuriku University, and is considered a model for the reform of English education in Japan (Kambara and Yamanaka, 2022)

2.3 TOEIC (Test of English for International Communication)

The Test of English for International Communication (TOEIC) is a standardized assessment tool that measures a wide range of English communication skills, particularly those utilized in the business context. Among the various TOEIC programs offered (such as the TOEIC Listening & Reading Test, TOEIC Writing & Speaking Test, and TOEIC Institutional Program), the TOEIC Listening & Reading Test (herein referred to as L&R) and the TOEIC Institutional Program (herein referred to as IP) are scored on a scale of 990 points, with a maximum score of 495 points allotted for each of the Listening and Reading sections. Additionally, the TOEIC L&R is designed to simulate realistic scenarios and environments to assess communicative proficiency in English, meaning that proficiency in answering test questions is not only indicative of proficiency in test-taking, but also indicative of communicative competence (Tanaka, 2017). However, it should be noted that as TOEIC tests mainly the receptive skills and not productive skills (Wilson, 1989; Daller and Phelan, 2013).

The TOEIC program utilized in this study is the TOEIC IP, which participants are required to take regularly at their institutions. As all the participants were in their third year of university, the oldest data used in this study was the TOEIC score from their first year of university, and the most recent score from the IP (group test) taken approximately four months prior to the survey data in December of their second year. This allows us to determine the participants' English level (upper, middle, and lower) and track the growth of their English proficiency over the two-year period from the time of their enrollment.

2.4 Self-Determination Scale for Learning English (University Student Version) (Hayashi 2006)

The present study employs a Japanese version of an English learning motivation scale, which is based on self-determination theory, and is derived from the works of Hiromori (2005) and Honda and Sokyu (2004). The rationale for selecting this model over prior ones lies in the fact that the participants in the former studies were primarily composed of university students specializing in non-English fields, while the proposed model includes a more diverse group of students, comprising both those specializing in the English language and English literature. As detailed in Hayashi (2006), a promax rotation was applied to the scale using the main factor method, resulting in a six-factor solution, which accounted for 63.7% of the total variance. These six factors are: intrinsic motivation (accomplishments/knowledge), intrinsic motivation (stimulation), extrinsic motivation (identified regulation), extrinsic motivation (introjected regulation), extrinsic motivation (external regulation), and amotivation.

Hayashi (2006) posits that this may be reflective of the fact that the first two factors pertain to intrinsic motivation at the cognitive level, whereas the latter factors pertain to intrinsic motivation at the emotional level. This tendency is consistent with the findings of other studies utilizing self-determination scales (e.g., Tanaka, 2001; Noels et al., 2000), which have consistently found the strongest correlation to exist between intrinsic motivation (accomplishments) and intrinsic motivation (knowledge). The actual scales utilized in this study can be found in the appendix of this paper.

2.5 Study Design

This study employed a questionnaire survey utilizing the Self-Determination Scale for Learning English developed by Hayashi (2006) to evaluate the experiences of junior university students who had completed two years of the Program for English Proficiency (PEP), a Problem-Based Learning (PBL)-based university English education program. The results were analyzed by comparing the most recent Test of English for International Communication (TOEIC) score and the oldest TOEIC score at the time of enrollment.

The research questions of this study are as follows:

(1) Will involvement in the PEP program result in an increase of TOEIC scores?

(2) Will participation in PEP be reflected in increased motivation to learn English?

(3) Is there a correlation between TOEIC results and responses on the motivation scale for learning English?

3. Results

3.1 Changes in TOEIC Scores over Time

To assess changes over time, we used the oldest score available (the participant's first year of college, April, as "Pre") and the most recent score (the participant's second year of college, December, as "Post") to test the difference between the means of the two corresponding samples of TOEIC scores over the first year and eight months after taking PEP. The "t-Test: Paired Two Sample for Means Test of Means" in Microsoft Excel was used and the results are shown in Table 1.

Table 1. Changes in participants' TOEIC scores over time (Listening, Reading, Total)

	First year in April (Pre)	Second year in December (Post)	Values on both sides of P
TOEIC Listing Score	251.1	262.8	0.47105
TOEIC Reading Score	280.0	293.5	0.11135
TOEIC Total Score	531.1	556.4	0.01869*

As the table shows, while there were numeric increases in the average scores for all items, statistically significant differences were found only in the TOEIC total score, with no significant differences found for TOEIC Listening and Reading.

3.2 Results of the Self-Determination Scale for Learning English (University Student Version) (Hayashi 2006)

The Self-Determination Scale for Learning English (University Student Version) (Hayashi 2006) was used to examine PEP students' motivation for learning English by motivational category (a. Amotivation, b. Extrinsic motivation - external regulation, c. Extrinsic motivation - introjected regulation, d. External motivation - identified regulation, e. Internal motivation - accomplishments, f. Internal motivation - knowledge, g. Internal motivation - stimulation). The mean of the responses and the standard deviation of the variability of the responses were calculated for each question. The results were also presented as bar graphs for each item, so that the overall trend could be grasped.

3.2.1 Amotivation

The means of the responses to all questions are skewed toward 1 and 2. The standard deviations are small, approximately 0.8, indicating very small variability compared to the other categories (see Table 2 and Figure 2).

Table 2. List of Amotivation questions (AM(1), AM(2), AM(3)) and mean and standard deviation per response

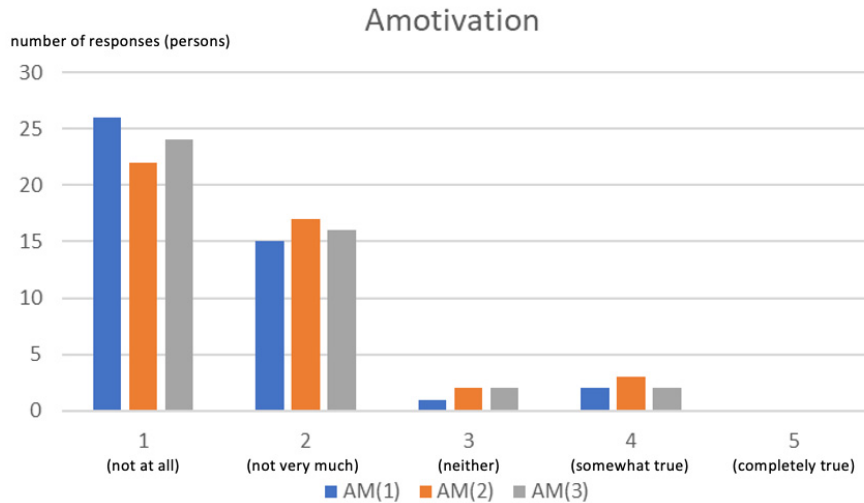| Amotivation	Description of question	Standard deviation	Response average (1-5)
AM(1)	I don't think learning English will help me.	0.76	1.5
AM(2)	I don't understand why I need to learn English.	0.86	1.7
AM(3)	Learning English is a waste of time and there is no reason to learn English.	0.79	1.6

Figure 2. Actual number of responses for each question (AM(1) on the left, AM(2) in the middle, and AM(3) on the right) for the category

3.2.2 Extrinsic Motivation-external Regulation

The responses to EX(1) and EX(2) questions were polarized toward 4 and 5, with standard deviations in the low 0.8 range, indicating that they were less scattered than the other categories. On the other hand, the responses to EX(3) were similarly skewed toward 4 and 5, but with a standard deviation of 1.13, showing a relatively large variation (see Table 3 and Figure 3).

Table 3. List of Extrinsic motivation (External regulation) questions (EX(1), EX(2), EX(3)) and mean and standard deviation per response

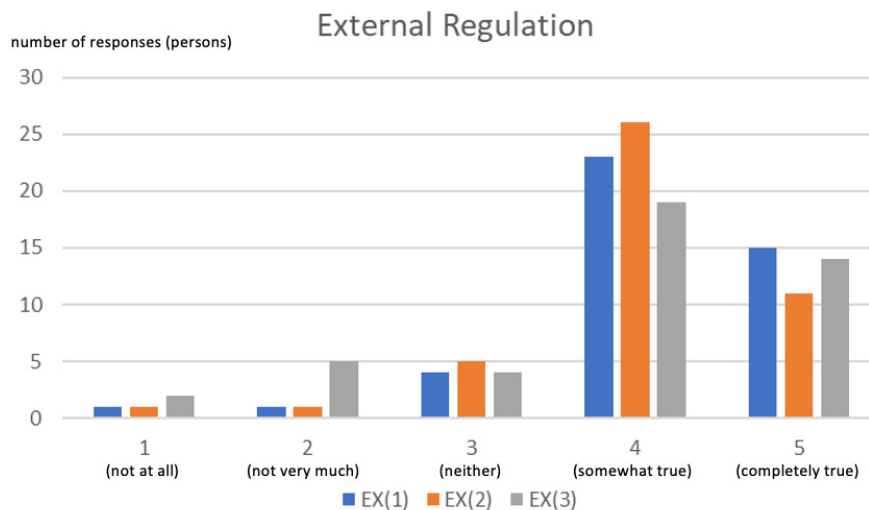| Extrinsic motivation-external regulation	Description of question	Standard deviation	Response average (1-5)
EX(1)	Because I have to earn credits.	0.85	4.1
EX(2)	Because there is an English course at the university.	0.82	4.0
EX(3)	Because I cannot graduate without studying English.	1.13	3.9

Figure 3. Actual number of responses for each question (EX(1) on the left, EX(2) in the middle, and EX(3) on the right) for the category

3.2.3 Extrinsic Motivation-introjected Regulation

Responses to all questions varied from 1 to 4. The standard deviation was around 1.1, which is more varied than other categories of extrinsic motivation (see Table 4 and Figure 4).

Table 4. List of Extrinsic motivation (Introjected regulation) questions (IN(1), IN(2), IN(3)) and mean and standard deviation per response

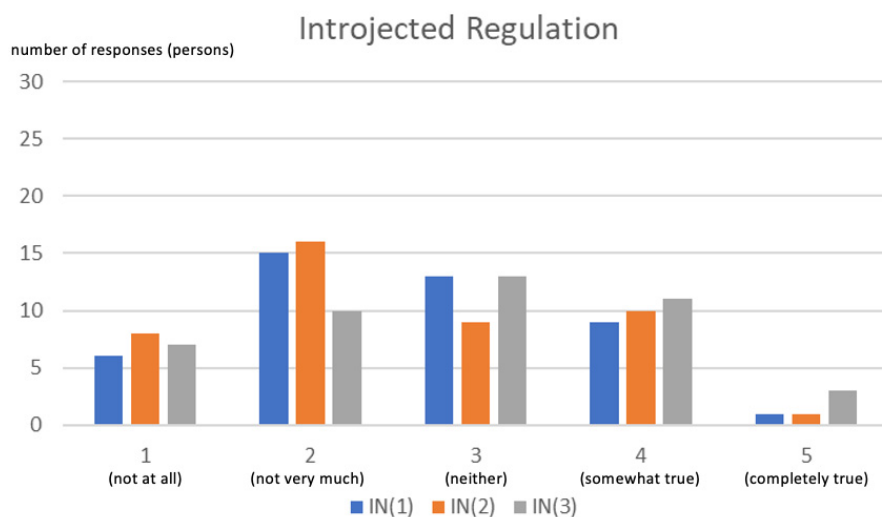| Extrinsic motivation-introjected regulation	Description of question	Standard deviation	Response average (1-5)
IN(1)	Because I cannot forgive myself for neglecting English study.	1.04	2.6
IN(2)	Because I feel sorry if I don't study English.	1.11	2.5
IN(3)	Because I would like people around me to think that I have a command of English.	1.18	2.8

Figure 4. Actual number of responses for each question (IN(1) on the left, IN(2) in the middle, and IN(3) on the right) for the category

3.2.4 Extrinsic Motivation-identified Regulation

Responses to question ID(1) were extremely skewed toward 4 and 5. Responses to the other questions (ID (2) and ID (3)) were also generally skewed toward 4 and 5, with standard deviations of less than 1 for each. Compared to the other categories, the variation was not large (see Table 5 and Figure 5).

Table 5. List of Extrinsic motivation (Identified regulation) questions (ID(1), ID(2), ID(3)) and mean and standard deviation per response

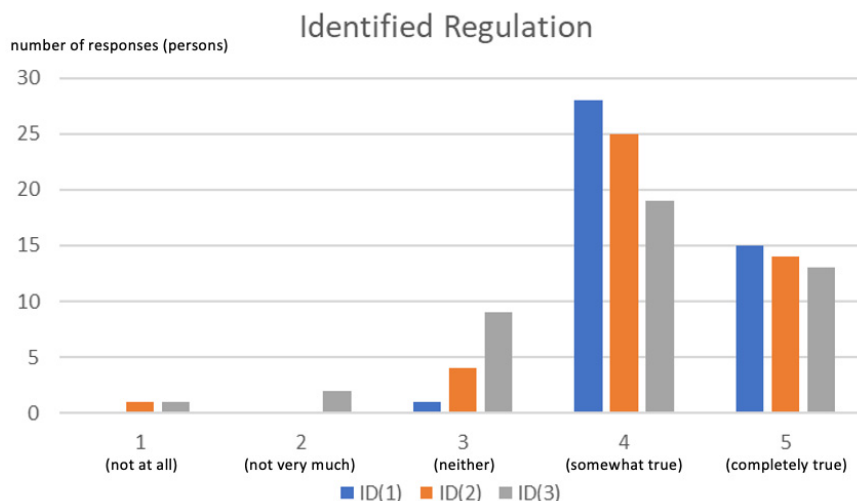| Extrinsic motivation-identified regulation	Description of question	Standard deviation	Response average (1-5)
ID(1)	Because I would like to become a person who can use English.	0.52	4.3
ID(2)	Because English is important for my future.	0.78	4.2
ID(3)	Because I think it is wonderful to live a life where I can be proficient in English.	0.95	3.9

Figure 5. Actual number of responses for each question (ID(1) on the left, ID(2) in the middle, and ID(3) on the right) for the category

3.2.5 Intrinsic Motivation-accomplishments

Responses to all questions were skewed toward 3 to 5, with 4 being the most prominent. The standard deviations were in the 0.7 to 0.8 range, indicating that the variation was small compared to the other categories (see Table 6 and Figure 6).

Table 6. List of Intrinsic motivation (Accomplishments) questions (I-A(1), I-A(2), I-A(3)) and mean and standard deviation per response

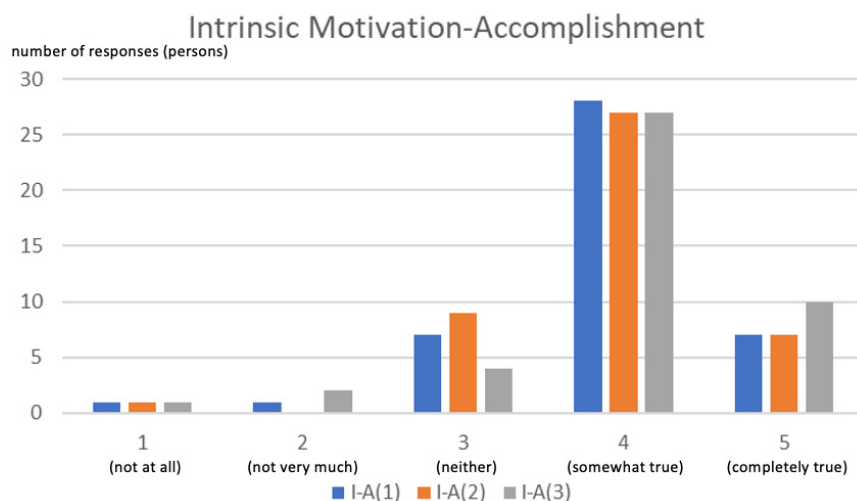| Intrinsic motivation-accomplishments	Description of question	Standard deviation	Response average (1-5)
I-A(1)	Because I am happy when I can understand English that I did not before.	0.78	4.3
I-A(2)	Because it is fun to be able to do what I could not do.	0.78	4.2
I-A(3)	Because I would be happy to improve my English proficiency.	0.95	3.9

Figure 6. Actual number of responses for each question (I-A(1) on the left, I-A(2) in the middle, and I-A(3) on the right) for the category

3.2.6 Intrinsic Motivation-knowledge

Although the responses to question I-K(1) were slightly skewed toward 3 and 4, the overall variation was apparent; as indicated by the standard deviations, I-K(2) was generally more varied (see Table 7 and Figure 7).

Table 7. List of Intrinsic motivation (Knowledge) questions (I-K(1), I-K(2)) and mean and standard deviation per response

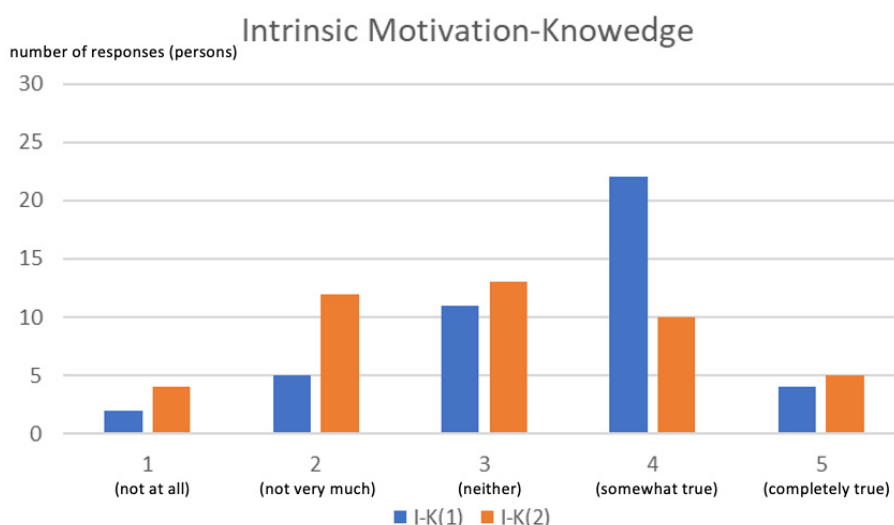| Intrinsic motivation-knowledge	Description of question	Standard deviation	Response average (1-5)
I-K(1)	Because I enjoy learning more about English that I didn't know before.	0.98	3.5
I-K(2)	Because I enjoy learning such as English expressions.	1.16	3.0

Figure 7. Actual number of responses for each question (I-K(1) on the left and I-K(2) on the right) for the category

3.2.7 Intrinsic Motivation-stimulation

Responses to all questions are dispersed from 1 to 5, with a higher standard deviation than for the other categories. Of all the motivational categories, the results can be seen as the most highly varied (see Table 8 and Figure 8).

Table 8. List of Intrinsic motivation (Stimulation) questions (I-S(1), I-S(2), I-S(3)) and mean and standard deviation per response

Intrinsic motivation-stimulation	Description of question	Standard deviation	Response average (1-5)
I-S(1)	Because I am happy when I can understand English that I did not before.	1.22	2.7
I-S(2)	Because it is fun to be able to do what I could not do.	1.13	2.8
I-S(3)	Because I would be happy to improve my English proficiency.	1.21	2.9

Intrinsic Motivation-Stimulation
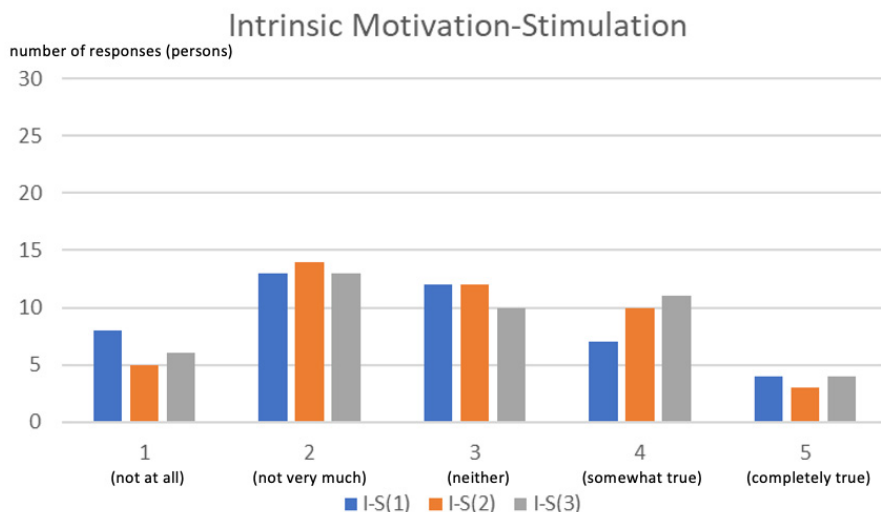
number of responses (persons)

Figure 8. Actual number of responses for each question (I-S(1) on the left, I-S(2) in the middle, and I-S(3) on the right) for the category

3.3 Analysis of the Correlation between Items (Intrinsic Motivation-stimulation) and TOEIC

In order to analyze the participants' factors in the intrinsic motivation - stimulation questions (I-S(1), I-S(2), and I-S(3)), which showed the largest variance in the categories shown in section 3.2, we used the TOEIC scores of the participants. When we examined the correlation between TOEIC growth (April freshman year - December sophomore year) and each question (I-S(1), I-S(2), I-S(3)), we could not find any significant correlation. On the other hand, by examining the relationship between the participants' most recent TOEIC scores as of December of their sophomore year, relatively high correlations were found for the Reading, Listening, and Total scores on the TOEIC.

Table 9. Correlations between TOEIC results in December of sophomore year and results of intrinsic motivation-stimulation questions

Intrinsic motivation-stimulation	Description of question	TOEIC Listening Score	TOEIC Reading Score	TOEIC Total Score
I-S(1)	Because it is exciting when I hear English.	0.48	0.35	0.46
I-S(2)	Because it is exciting when I speak English.	0.46	0.44	0.50
I-S(3)	Because I like to be exposed to the English language itself.	0.36	0.43	0.44

4. Discussion and Conclusion

Table 1 demonstrates that the English scores of the PEP students exhibited an overall improvement, from which it can be inferred that the participants who underwent PBL-style English education for a duration of two years or slightly less, generally displayed an enhancement in their English proficiency. Although no comparisons were made with other participant groups, the finding that students who participated in PEP displayed an improvement in their English proficiency serves as evidence of the effectiveness of PBL-based English language instruction. In other words, hypothesis (1) of this study was basically supported. While the results of this study confirmed a significant difference in TOEIC total scores, no significant difference was observed in Listening and Reading scores, the two sub-scores of TOEIC. This outcome implies a need for further refinement of teaching methods and the need to devise ways to further elevate the level of English proficiency through the implementation of PBL-style education.

However, if the primary objective is simply to develop English language proficiency, it may be achieved without the implementation of the PBL approach. The primary focus of this paper in demonstrating the significance of PBL-based English language education, is to investigate whether it is successful in motivating learners. If so, it

can be presented as an added value of PBL-style English education. In the following sections, we will discuss the implications of the results obtained from the Self-Determination Scale for Learning English (University Student Version) (Hayashi 2006). For the sake of comparison, it is worth noting that in the motivational categories where the standard deviation was greater than 1 (c. Extrinsic motivation - introjected regulation, f. Intrinsic motivation-knowledge, g. Intrinsic motivation - stimulation), the responses were varied, indicating that the participants' awareness of learning English was not uniform. Conversely, the responses in the categories with standard deviations below 1 (a. Amotivation, b. Extrinsic motivation-external regulation, d. Extrinsic motivation-identified regulation, e. Intrinsic motivation - accomplishments) were skewed, suggesting that the educational effects of the program were manifested in the overall results.

Next, we examine the results presented in Table 3 and Figure 3, which scrutinize external regulation within the realm of extrinsic motivation. PEP is not entirely left to the discretion of the students, as it is implemented within the context of university English education in Japan. It is structured as a "required class" within the school curriculum and is thus naturally subject to the constraints of the university education system. External regulations are those in which behavior is stimulated by obvious external factors, such as the promise of reward or the threat of punishment, and their influence is also discernible in PEP. These motivations are considered to possess low levels of self-determination, and such motivation to learn English may not always have a positive impact on students, even if the responses are positively skewed. In fact, as demonstrated by Apple et al. (2020), the quality (type) of motivation could to some extent predict higher or lower TOEIC scores. Specifically, they found that even if extrinsic motivation to learn English is strong (which they referred to as Ought-to L2 Self), TOEIC scores remained low, whereas the more positive one's image of oneself as a future English user (which they referred to as Ideal L2 Self), the higher one's TOEIC scores became. This suggests that no matter how robust the motivation represented by external regulation of extrinsic motivation may be, it does not necessarily lead to improved English proficiency, and that to enhance English proficiency and, more broadly, "learning success," it is crucial to possess a higher level of self-determined motivation. Applying this to motivational categories, for example, "introjected regulation," which is a level of self-determination that is one step above "external regulation," is not sufficient. This is because, although the person acts without relying on external factors, they only formally accept given values and act out of a sense of guilt or shame, which is said to be accompanied by hesitation, conflict, and stress. What would be required is motivation such as "identified regulation," "integrated regulation," or even " intrinsic motivation," in which these hesitations, conflicts, and stresses are eliminated, and a higher level of self-determination is attained.

Next, Table 4 and Figure 4, which present the results of introjected regulation among extrinsic motivation, reveal the trend. Here, the participants' responses are relatively varied, and the tendency of their responses is not well-defined, as can be inferred from the standard deviation of 1.1. This result, when considered in conjunction with the preceding discussion, suggests that the participants may have been engaged in English learning with hesitation, conflict, and stress, which may indicate either the inadequacy of PBL-style English education or the limitations of English education within the institutional framework of the university. Additionally, all of the participants in this study were science students who did not major in English, which may also have contributed to these attributes.

The subsequent section, Table 5, and Figure 5, demonstrate the results of the identified regulation of extrinsic motivation, which are noteworthy for suggesting the efficacy of PBL-type education. This is because the standard deviations across all three items were relatively low, and the responses were generally on the positive side of the question. This indicates that most of the population possesses a similar inclination to answer the questions, and that the content of the questions is somewhat successful in eliciting identified regulation of extrinsic motivation. This implies that PEP participants who underwent PBL-type university English language education exhibit identified regulation, a relatively high level of self-determined motivation among extrinsic motivation for English language learning. Hayashi (2006), in developing his own scale, also posited that identified regulation, one aspect of extrinsic motivation, is correlated to each category of intrinsic motivation, a point also noted by Noels et al. While Noels et al. unequivocally state that they are distinct concepts, they nevertheless contend that they both have crucial roles to play in enhancing language motivation. This concurs with the observations of Koestner & Losier (2002), Hayashi (2005), Hayami (1995), and Hayashi (2006), who emphasize that self-determined extrinsic motivation plays a significant role in the context of "school education." Depending on one's perspective, self-determined extrinsic motivation is as crucial as, or even more crucial than, intrinsic motivation in learning in schooling, and in this sense, it may be one of the significant outcomes of this paper that we were able to illustrate that PEP students may have been successful in such motivation in a less dispersed manner.

Subsequently, let us scrutinize the findings pertaining to intrinsic motivation, which is classified in the same category as "accomplishments" and "knowledge" in Hayashi's (2006) scale. The former elicited a positive response with relatively minimal variance, while the latter was comparatively dispersed. Superimposing the results of identified regulation for this participants' extrinsic motivation with the previous discourse, the correlation with accomplishments can be persuasively rationalized. However, the fact that knowledge is not necessarily positive and is not presented in an aggregated manner raises some concerns.

Finally, we must examine the outcomes pertaining to the stimulation of intrinsic motivation, as evidenced by Table 8 and Figure 8, which demonstrated the most significant degree of variability across both positive and negative responses among all motivation categories. Hayashi (2006) posits that accomplishments and knowledge constitute "intrinsic motivation at the cognitive level," whereas stimulation represents "intrinsic motivation at the emotional level," and the qualitative distinction between the two appears conspicuous. Irrespective of the distinction, PEP students exhibit a lower level of intrinsic motivation compared to other forms of motivation, particularly stimulation. Therefore, a crucial next step in PEP education should be to devise methods to elicit intrinsic motivation for learning English on an emotional level. This is a pertinent consideration for future advancement of PEP. This study also can be considered a success in that it furnished suggestions for specific strategies to be implemented.

To ascertain the reason for the substantial variation in stimulation of intrinsic motivation, we analyzed the correlation between the participants' TOEIC scores as a variable, as depicted in Table 9. As previously mentioned in 3.3, we did not find a correlation between TOEIC score growth in the freshman and sophomore years, however, we did find a correlation with English proficiency as of December of the sophomore year (most recent). When the correlation coefficients of 0.2 to 0.4 are considered "moderately correlated" and 0.4 to 0.7 are considered "strongly correlated," all the intrinsic motivation - stimulation questions and the TOEIC scores (Reading, Listening, and Total) exhibit a consistent correlation, and most of the correlations are strong.

Before bringing this paper to a close, it is imperative to acknowledge the limitations and challenges of this study. One of the primary limitations is that it was not conducted in a controlled environment, thus, the superiority of the PBL method over other teaching methods could not be established. However, as it is not feasible to create a comparable target group, we employed a comparison of motivational items within the same target group to conduct the analysis and derive reasonable recommendations. Additionally, it must be noted that this study only examined a single instance of PEP, and therefore, immediate generalization of the results should be avoided. It is our belief that many similar studies will be conducted in the future and that their cumulative results will persuasively demonstrate the added value of "high-quality motivation" as an added benefit of PBL-based English language education. Further research on this topic, including validation using various measures and intra-attribute comparisons, will further clarify the relationship between PBL-based English language education and motivation.

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Appendix

Self-Determination Scale for Learning English (University Student Version)

(Randomize the order of items when used) [Translated from original in Japanese]

How much do the following points apply to your reasons for learning English? Please circle the number that matches in accordance with the scale below.

5. completely true

4. somewhat true

3. neither

2. not very much

1. not at all

AM(1) [Amotivation] I don't think learning English will help me.

AM(2) [Amotivation] I don't understand why I need to learn English.

AM(3) [Amotivation] Learning English is a waste of time and there is no reason to learn English.

EX(1) [Extrinsic motivation - external regulation] Because I have to earn credits.

EX(2) [Extrinsic motivation - external regulation] Because there is an English course at the university.

EX(3) [Extrinsic motivation - external regulation] Because I cannot graduate without studying English.

IN(1) [Extrinsic motivation - introjected regulation] Because I cannot forgive myself for neglecting English study.

IN(2) [Extrinsic motivation - introjected regulation] Because I feel sorry if I don't study English.

IN(3) [Extrinsic motivation - introjected regulation] Because I would like people around me to think that I have a command of English.

ID(1) [Extrinsic motivation - identified regulation] Because I would like to become a person who can use English.

ID(2) [Extrinsic motivation - identified regulation] Because English is important for my future.

ID(3) [Extrinsic motivation - identified regulation] Because I think it is wonderful to live a life where I can be proficient in English.

I-A(1) [Intrinsic motivation - accomplishments] Because I am happy when I can understand English that I did not before.

I-A(2) [Intrinsic motivation - accomplishments] Because it is fun to be able to do what I could not do.

I-A(3) [Intrinsic motivation - accomplishments] Because I would be happy to improve my English proficiency.

I-K(1) [Intrinsic motivation - knowledge] Because I enjoy learning more about English that I didn't know before.

I-K(2) [Intrinsic motivation - knowledge] Because I enjoy learning such as English expressions.

I-S(1) [Intrinsic motivation - stimulation] Because it is exciting when I hear English.

I-S(2) [intrinsic motivation - stimulation] Because it is exciting when I speak English.

I-S(3) [Intrinsic motivation - stimulation] Because I like to be exposed to the English language itself.

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