# The Effect of Classroom Interventions of Reflection and Foreseeing on Mitigating Passive Procrastination in a Hybrid Learning Environment

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## Abstract

Online learning is often overlooked by teachers, making it easier for learners to procrastinate compared to face-to-face learning. Conversely, the online setting offers the advantage of customizable study schedules for learners to fit into their busy lives. Hybrid learning utilizes a combination of online and face-to-face instruction, and becomes a widely adopted approach to foreign language education. The focus of this study is to examine how teacher support can enhance self-regulated learning (SRL) awareness when conducting online learning tasks, while still promoting learner autonomy in a face-to-face environment The findings indicated that students' tendency to procrastinate could not be regulated through assignments that were optimized for difficulty. However, some students were able to achieve learning without procrastination through reflection activities, even though the tendency to procrastinate was predictable based on psychological factors.

*Keywords:* hybrid learning environment, language learning behavior, psychological state, reflection activity

## 1 Introduction

The spread of the novel coronavirus (COVID-19) has had a significant impact on the educational environment. Online learning has become the standard in educational settings. Despite the return to normalcy in most of Japan, online education has not been entirely replaced by in-person instruction. Instead, educational settings have adopted a combination of online and face-to-face education. [1] suggested that the optimal ratio of online to face-to-face instruction is 30% to 70%. Consequently, hybrid learning has become prevalent in educational settings, encompassing both blended learning and hybrid flexible learning. Teachers should utilize this learning environment not only during face-to-face lectures but also for homework assignments. It's worth noting that in online environments, particularly when it comes to assignments, students often tend to procrastinate. According to [2], approximately 95% of learners delay their learning. Therefore, in addition to online assignments, face-to-face classes can play a role in enhancing students' self-regulated learning awareness. Face-to-face activities can encourage students to engage more actively in their studies and reduce procrastination. This study aims to investigate learners' behaviors within the context of hybrid learning and explore the psychological effects and teacher support.

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## 2 Previous Studies

### 2.1 Learning Behavioral Type

Learning behavior is generally confirmed from self-assessment. However, [3] conducted an analysis of actual log data on learning behaviors within a 15-week out-of-class e-learning assignment in a blended learning environment. Their study revealed that learning behaviors could be categorized into seven distinct types: (a) *procrastination*, (b) *learning habit*, (c) *random*, (d) *diminished drive*, (e) *early bird*, (f) *chevron*, and (g) *catch-up*. (a) *Procrastination* is a type of postponing the tasks and rushing to take courses before the deadline. (b) *Learning habit* is a type of habitual learning that is likely to be highly effective. (c) *Random* is a type of learning behavior that is influenced by internal and external factors. (d) *Diminished drive* is a type of learning behavior in which the initial motivation is not sustained and progress on assignments is gradually slowed down. (e) *Early bird* is a cautious and diligent type who finishes well ahead of the deadline. (f) *Chevron* is a type who increases the amount of learning in the middle of the assignment period and then slows down again. (g) *Catch-up* is a type who starts slow and then increases the pace of learning in the middle of the assignment period and gradually catches up to an appropriate pace. Moreover, these seven types of learning behaviors were also shown in [4], which conducted tasks in an online learning environment.

### 2.2 Self-Regulated Learning Awareness

[5] showed that learners with SRL awareness are capable of self-control and self-regulation. [6] proposed a cyclical three-phase model of SRL in which learning effects are maximized when SRL awareness is activated at all three phases of learning: *performance or volitional control*, *self-reflection*, and *forethought*. The model is based on a cyclical three-phase model of SRL. While the significance of SRL awareness was initially believed to be effective only in face-to-face environments, [7] indicated that the cyclical three-phase model of SRL is equally applicable to online environments. The Motivated Strategies for Learning Questionnaire (MSLQ) developed by [8] contains five factors: *self-efficacy*, *internal value*, *cognitive strategies*, *self-regulation*, and *test anxiety*. Furthermore, [9] proposed the 2×2 model of procrastination as a temporal measure of learning behavior. The mental state and learning behavior categories related to procrastination include *procrastination-approach*, *procrastination-avoidance*, *timely engagement-approach*, and *timely engagement-avoidance*, which can also be assessed through questionnaire surveys.

### 2.3 Two Types of Procrastinators

Traditionally, procrastination has been predominantly seen in a negative light, as a lack of self-regulation and unproductive behavior that postpones actions necessary to achieve goals [2][10]. However, research conducted by [11] has demonstrated that procrastination can lead to reduction in stress and improvements in physical and mental health. Additionally, two distinct categories of procrastinators were identified by [12]: *passive procrastinators* and *active procrastinators*. Passive procrastinators are procrastinators in the traditional sense, meaning that they do not finish what they are supposed to do due to unintentional procrastination. In contrast, active procrastinators, procrastinate with the intention of time management. Given the fundamental differences in cognition and behavior between these two types of procrastinators, it is essential to reevaluate active procrastinators and instruct not to be passive procrastinators.

## 2.4   Limitations of Previous Studies

In line with prior research, [4] conducted an analysis of learning behaviors in online learning environments, considering both psychological and environmental factors. Referring to the seven learning behavioral types proposed by [3], they classified learners' task-related behaviors into seven distinct types based on log data. These learning behaviors encompassed seven categories, with Procrastination representing a significant portion, accounting for one-third of the total class. Regarding the factors influencing learning behaviors, the results of cluster and decision tree analyses of data obtained from psychological questionnaires revealed that the PAv (procrastination-avoidance) factor was the primary determinant of learning behavioral types. In terms of the external environmental, since the participants were university students juggling multiple courses, it became evident that learning behaviors were influenced by factors such as the availability of other lecture schedules, assignment deadlines, and exam schedules. Although the results initially suggested successful completion rates for assignments, subsequent experiments uncovered a misalignment between assignment difficulty and learners' proficiency in another class, leading to a substantial number of passive procrastinators who failed to complete assignments due to low SRL awareness. These findings highlight the limitations of previous studies and underscore the importance of task design that tailors assignment difficulty to individual learners and the implementation of regular interventions to mitigate procrastination.

# 3   Research

## 3.1   Purpose and Research Questions

In this research, actual learning behavior was investigated to discuss the relationship between learners' psychological state and learning materials. The present study addressed the following three research questions:

RQ 1: Which learning behavioral types are observed in working to an assignment optimized for difficulty?

RQ 2: How does each learning behavioral type and psychological state relate?

RQ 3: How did the reflection activity affect learners' SRL awareness?

This research was conducted in both an online learning environment and face-to-face learning environment. By analyzing learning behavior and its psychological aspects, this study provides new insights into task design and interventions that teachers should consider.

## 3.2   Procedure

This research utilized a mandatory face-to-face language learning course at a national university in Japan. The course was provided for university freshmen for a duration of 15 weeks. Weekly lectures were offered in the face-to-face classroom, and students were given a fully-online assignment for this project that was unrelated to the content of their class. In addition, students were

informed that additional points would be added to their final grade based on the degree of completion of the assignment. In this research, a class comprising school of comprehensive studies, social sciences, and international studies students ($n = 29$) was analyzed. Their test of English for international communication (TOEIC L&R) scores ranged from 675 to 925 ($M$=740.17, $SD$=55.15). Assignment was given over 13 weeks, and was asynchronous learning activities, carried out individually. Students were required to work on the online courseware "ReallyEnglish TOEIC L&R comprehensive English course". The courseware comprises grammar, reading and listening sections. Students were instructed to take a placement test before working on their assignments. The results of this test determined their learning level and optimized their proficiency and difficulty in each section. Students were allowed to adjust the number of efforts in each section on their own, and were tasked with completing a total of 39 units. To analyze actual learning behavior, data from assignment logs as well as students' learning times and methodologies were collected. These data accumulated weekly, and individual learning durations and approaches were represented on a timeline. In addition to the individual working on assignments, students were given time each week in class to reflect on their own efforts and make plans. The reflection described three items: the previous week's learning outcomes; the percentage of achievement; and the next week's schedule. This data was compiled online and provided clues for analysis.

Data on the students' psychological state were collected via two questionnaires, proposed by [8][9]. [8] developed the MSLQ instrument, which comprises five factors: *self-efficacy* (SE), *internal value* (IV), *cognitive strategies* (CS), *self-regulation* (SR), and *test anxiety* (TA). The questionnaire comprises 44 items rated on a seven-point Likert scale. The MSLQ was used to measure the students' SRL skills. Another questionnaire employed in this study is the time-related academic behavior scale based on the 2×2 model [9]. It consists of 22 items across four factors: *procrastination-approach* (PAp), *procrastination-avoidance* (PAv), *timely engagement-approach* (TEAp), and *timely engagement-avoidance* (TEAv). Students answered each item on a seven-point Likert scale. The students completed both questionnaires during the first class. This procedure of correcting psychological questionnaire was taken as in [4].

Two rounds of interviews were conducted by the researcher to understand the learners' learning environment and learning behaviors. The first interview took place at six or seven weeks and asked about their progress on the assignment and their learning plan at the halfway point. The second interview took place after they had completed the 13-week assignment and asked about their impressions of the assignment and the factors that influenced their learning behavior. Questionnaires were freely determined by the researcher and each interview lasted approximately 5 minutes. In addition to the second interview, a questionnaire survey was also conducted on learning behavior on the task. This questionnaire consisted of a total of 20 questions and included both multiple-choice and open-ended questions.

With regard to data collection, the platform on which the assignments are hosted has a feature that allows administrators to check student progress and the number of hours spent by students on each learning unit. Students were instructed to complete assignments at an appropriate pace of study, 3 units per week. Students were expected to study the material independently and were not given time in class to study the material. The actual number of units completed was counted weekly, but for the purposes of analysis this measurement was taken once every two or three weeks. Studentsa' actual learning behavior was categorized according to the proposed learning behavioral types [3].

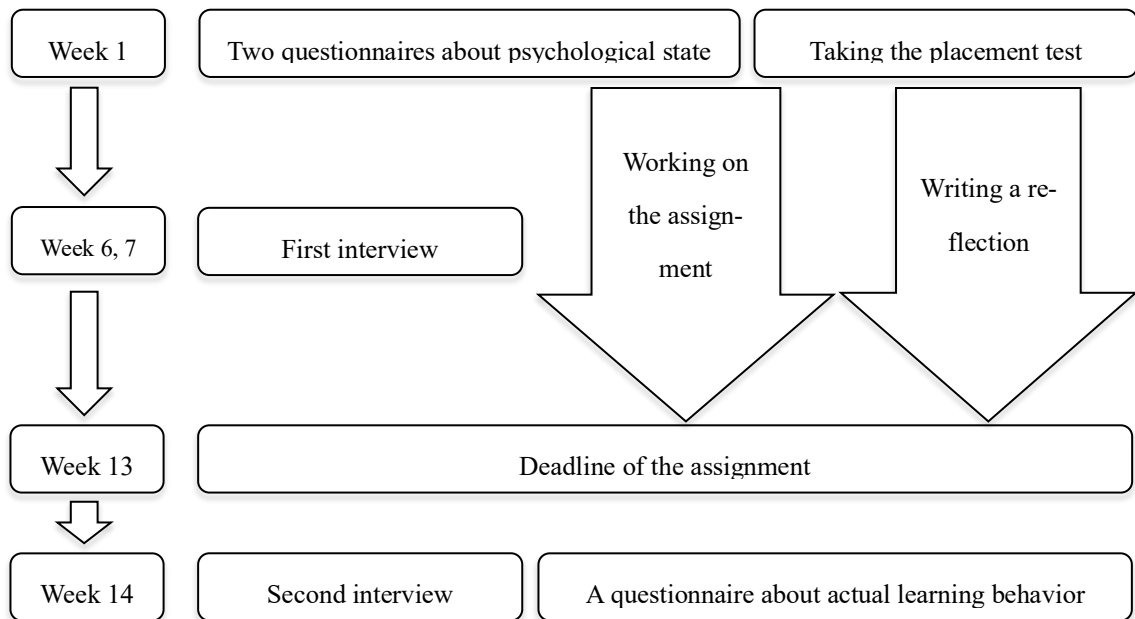The overview of the course flow is shown in Figure 1.

Figure 1: The overview of the course

## 3.3  Results

The results of the actual learning behavioral data, questionnaires, and interviews were compiled for all 29 students surveyed. Based on the results of the questionnaire survey related to learning behavior, all 29 participants indicated that the difficulty level of the assignment was correct. This means that even if some of the tasks were difficult, they were not so difficult as to affect the continuation of learning, which is an indication of the effectiveness of the placement test before the implementation of the tasks. The summary record of the aggregated learning behaviors is shown in Figure 2.
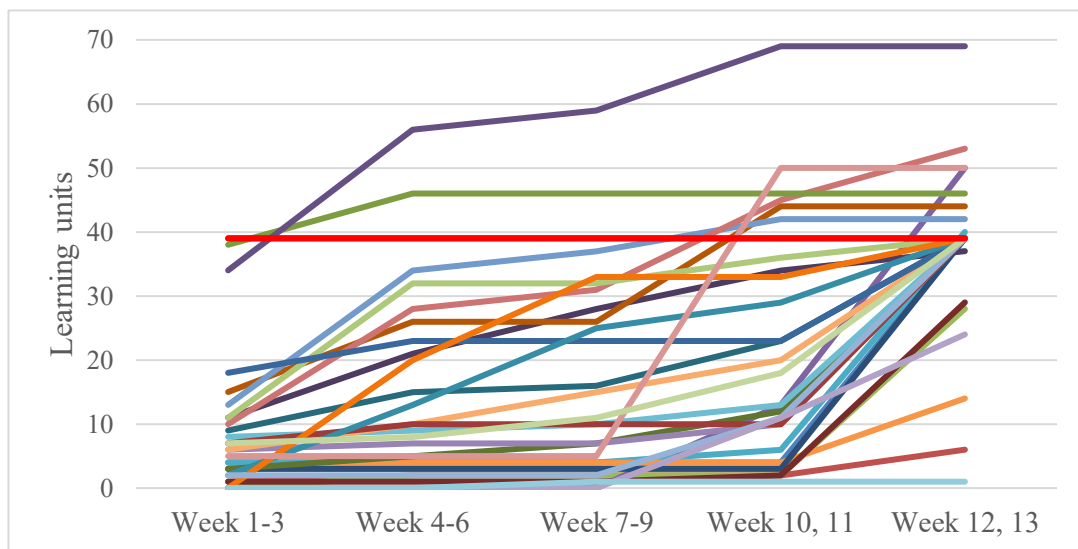


Figure 2: All participants' actual learning behavior

Figure 2 shows the trajectory of all learners' behavior, aggregated at three-week intervals up to Week 9 and every two weeks from Week 10 to 13. The vertical axis shows the number of units completed, with the solid red line represents the 39 units required to complete the task. Despite the fact that two students had completed their assignments within six weeks, some of the students did not complete their assignments before the deadline. The behaviors were classified into seven types, as per the actual learning procedure's characteristics, following the framework presented by [3]. Table 1 shows the number of students classified into seven learning behavioral types and their task completion rates. Students classified as "other" either accessed the material only briefly or were unable to access it due to systemic problems. We labeled them as "Other" and excluded them from further analysis. As Table 1 shows, all seven learning behavior types were identified in the class. Among them, (a) *Procrastination* accounted for about one third of the class, followed by (d) *Diminished drive* and (c) *Random*. The overall achievement rate for the class as a whole was 79.31%, and only (a) *Procrastination* included learners who failed to complete the task, except for the "Other."

Table 1: Learning behavioral types and their task completion ratios

| | Learning behavioral type | Total | | Task completed | | Not completed | |
|---|---|---|---|---|---|---|---|
| | | *n* | % | *n* | % | *n* | % |
| (a) | *Procrastination* | 9 | 31.03 | 5 | 55.56 | 4 | 44.44 |
| (b) | *Learning habit* | 2 | 6.90 | 2 | 100.00 | 0 | 0.00 |
| (c) | *Random* | 4 | 13.79 | 4 | 100.00 | 0 | 0.00 |
| (d) | *Diminished drive* | 5 | 17.24 | 5 | 100.00 | 0 | 0.00 |
| (e) | *Early bird* | 2 | 6.90 | 2 | 100.00 | 0 | 0.00 |
| (f) | *Chevron* | 2 | 6.90 | 2 | 100.00 | 0 | 0.00 |
| (g) | *Catch-up* | 3 | 10.34 | 3 | 100.00 | 0 | 0.00 |
| - | Others | 2 | 6.90 | 0 | 0.00 | 2 | 100.00 |
| | Total | 29 | 100.00 | 23 | 79.31 | 6 | 20.69 |

The learning procedures for each learning behavioral types are shown in Figures 3–9. The vertical axis shows the learning pace of students, as follows: 1 = slow, 2 = appropriate, 3 = fast, 4 = achieved completion. (a) *Procrastination* included those whose pace of learning was "1 slow" until the Week 11. (b) *Learning habit* was classified as those who continuously showed a pace of "2 appropriate." (c) *Random* showed a common decrease in learning pace from Week 7 to 9. This is thought to be due to the overlap of final exams and reports from other classes during this period. (d) *Diminished drive* had a slower pace of learning in Week 4 to 9 compared to the pace of learning by Week 3. It can be said that the learning outlook and leeway to accomplishment tasks due to the dash at the start of the program caused the decrease in pace. (e) *Early bird* is the two students who had achieved learning by Week 6. (f) *Chevron* increased its pace of learning from Week 4 to 9 and decreased its pace at Week 10 and 11. This may be due to fatigue from studying all at once and the final examinations of other classes. (g) *Catch-up* showed a rapid increase in

the pace of learning after Week 9. This can be said to be the result of starting to work on this assignment all at once at the end of the final examinations.

Even if the assignment difficulty was optimized, some of the students tend to postpone their tasks and they could not work on their usual pace.
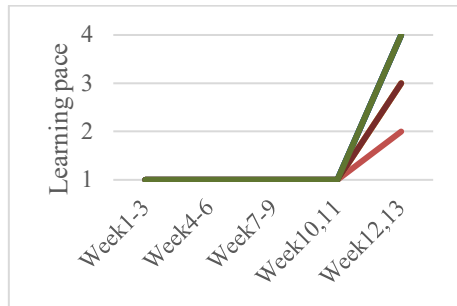
Figure 3: (a) *Procrastination* (*n*=9)

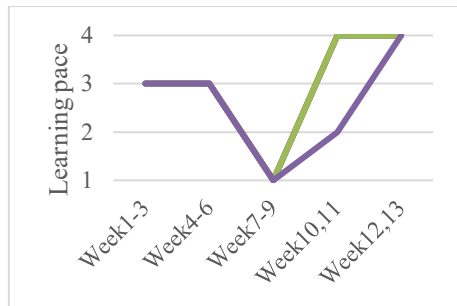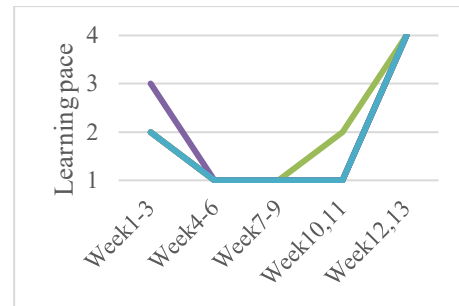Figure 4: (b) *Learning habit* (*n*=2)

Figure 5: (c) *Random* (*n*=4)
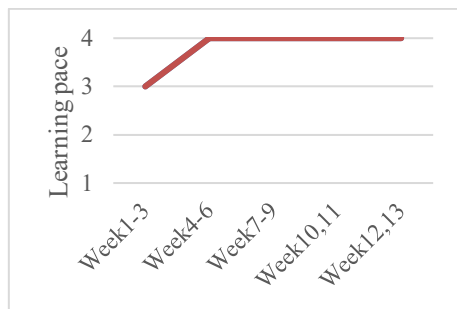
Figure 6: (d) *Diminished drive* (*n*=5)
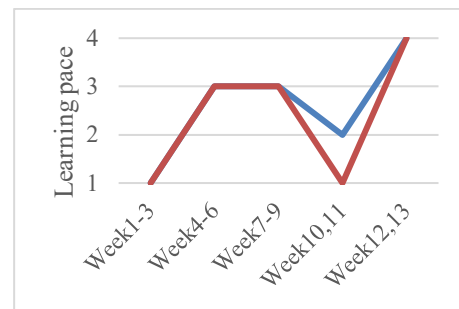
Figure 7: (e) *Early bird* (*n*=2)
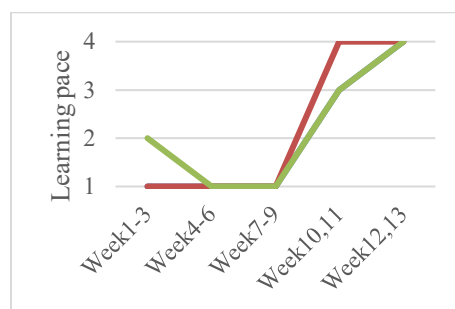
Figure 8: (f) *Chevron* (*n*=2)

Figure 9: (g) *Catch-up* (*n*=3)

In relation to RQ2, the questionnaires were collected once they were completed, and average scores for each factor were calculated separately. These data were subsequently utilized in a cluster analysis to examine their association with the aforementioned behavioral types. Using Euclidean distance, we calculated the distances between each observation and generated three clusters based on the results from the dendrogram: Cluster 1 (*n*=6), Cluster 2 (*n*=15), and Cluster 3 (*n*=6). The relationship between the results of the cluster analysis and each psychological item in the questionnaire survey is shown in Table 2. Furthermore, we standardized the cluster analysis results shown in Table 2 for each variable and present the comparisons between clusters in Figure 10.

Table 2: The results of the cluster analysis

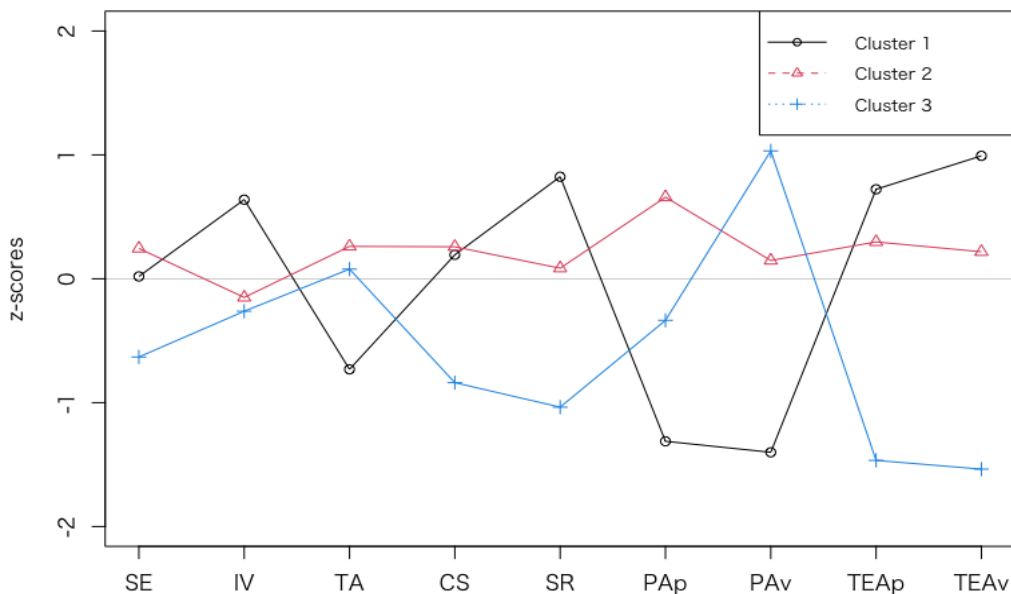| Factor | Cluster1 (*n*=6) | | Cluster2 (*n*=15) | | Cluster3 (*n*=6) | |
|---|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | *M* | *SD* |
| SE | 3.74 | 1.31 | 3.98 | 0.83 | 3.06 | 1.19 |
| IV | 6.31 | 0.28 | 5.86 | 0.60 | 5.80 | 0.67 |
| TA | 3.83 | 2.04 | 5.37 | 1.15 | 5.08 | 1.59 |
| CS | 5.05 | 0.83 | 5.10 | 0.64 | 4.31 | 0.53 |
| SR | 5.61 | 0.80 | 5.05 | 0.49 | 4.21 | 0.65 |
| PAp | 1.62 | 0.61 | 3.92 | 0.74 | 2.76 | 0.64 |
| PAv | 2.12 | 0.65 | 4.75 | 1.07 | 6.25 | 0.82 |
| TEAp | 5.08 | 1.21 | 4.48 | 0.66 | 1.97 | 0.90 |
| TEAv | 6.37 | 0.66 | 5.08 | 0.72 | 2.17 | 0.98 |



Figure 10: Psychometric scale and the cluster analysis

Cluster 1 had high values for IV, SR, and TEAv and low values for PAp and PAv. Cluster 2 had less variation in values overall, but especially had higher IV. Among the three clusters, it had the highest number of people classified. Cluster 3 had higher values of PAv, IV, and TA and lower values of PAp, TEAp, and TEAv. All three clusters had large values of IV, but Figure 10 clearly shows that cluster 1 had significantly higher values than the other clusters. The values of PAp tended to be low, with cluster 2 being significantly higher. These results suggest that cluster 1 includes those who procrastinate less because they have higher internal values and a higher sense of self-regulation. The higher overall score of Cluster 2 predicted that it not only had intrinsic but also extrinsic motivation. However, they tended to procrastinate for reasons related to positive motivations. Cluster 3 was found as having a weak awareness of time management and an awareness of procrastination for negative reasons.

The results obtained from this cluster analysis, combined with the classification of learning behavioral types presented in Table 1, are shown in Table 3.

For Cluster 1, as predicted by psychological factors, the proportion of students exhibiting (a) *procrastination* decreased, but there was no prominent trend observed in the entire dataset. Cluster 2 also exhibited a variety of learning behavioral types, but the proportion of (a) *procrastination* was higher compared to Cluster 1. Cluster 3, experiencing anticipated difficulties in time management, had a notably high proportion of (a) *procrastination*, accounting for 66.67%. There were an equal number of students exhibiting (a) *procrastination* in Cluster 2 and 3; however, they significantly differed in their task completion rates. While Cluster 2 had a 75% rate, Cluster 3 had a 25% rate. This supports the notion of varying awareness levels regarding procrastination behavior as indicated by the psychological survey. The fact that the largest number of participants were in Cluster-2 indicates that many of the participants in this study were motivated both intrinsically and extrinsically.

Table 3: Learning behavioral types and the cluster analysis

| Learning behavioral type | Cluster 1 | | Cluster 2 | | Cluster 3 | |
|---|---|---|---|---|---|---|
| | *n* | *%* | *n* | *%* | *n* | *%* |
| (a) *Procrastination* | 1 | 16.67 | 4 | 26.67 | 4 | 66.67 |
| (b) *Learning habit* | 0 | 0.00 | 2 | 13.33 | 0 | 0.00 |
| (c) *Random* | 2 | 33.33 | 1 | 6.67 | 1 | 16.67 |
| (d) *Diminished drive* | 1 | 16.67 | 4 | 26.67 | 0 | 0.00 |
| (e) *Early bird* | 1 | 16.67 | 1 | 6.67 | 0 | 0.00 |
| (f) *Chevron* | 1 | 16.67 | 0 | 0.00 | 1 | 16.67 |
| (g) *Catch-up* | 0 | 0.00 | 3 | 20.00 | 0 | 0.00 |
| Total | 6 | 20.69 | 15 | 51.72 | 6 | 20.69 |

For RQ3, the results of the interview and the questionnaire about learning behavior showed the

effectiveness of reflection. In the interviews, students were asked whether they thought the reflection activities had had a positive effect on their learning behavior and attitudes. As a result, 22 out of 27 students answered that there was a positive impact. The reasons given were in terms of being able to reflect on their learning, developing and remembering the learning awareness, and planning the learning schedule. This indicates that SRL awareness had an effect on two of the three necessary phases of SRL awareness as indicated by [6]: *forethought phase* and *self-reflection phases*. In the questionnaire survey, 27.6% of students mentioned that reflection activities as a factor that had a positive impact on their learning. In particular, two people classified as other than (a) *procrastination* in Cluster 3 acknowledged a positive effect. This cluster was considered to have a strong tendency toward passive procrastination based on the results of the psychological survey conducted prior to the implementation of the task. However, these responses clearly indicated that regular intervention support was able to reduce the awareness of procrastination and make SRL awareness. Therefore, it was shown that taking time for objective self-analysis during the implementation of long-term tasks can have a positive effect on learning behavior and attitudes.

## 4    Discussion

As regards the results of RQ1, seven learning behavioral types were identified, similar to [3] and [4]. (a) *Procrastination* was particularly prevalent, with 31.03% of the students postponed the assignment. Among them, 44.44% of the students failed to complete the task. Regarding the difficulty of the tasks, all learners indicated that they were optimized, but this did not eliminate task procrastination. In addition to assignment difficulty, the questionnaire also asked about the amount of work and time required, but none of the respondents reported that the workload was too much or took too much time. Therefore, it could be inferred that there were no problems in terms of overall volume, time required, or difficulty in terms of assignment design.

For RQ2, the results of the cluster analysis enabled us to make predictions about learning behavior based on the psychological characteristics of each cluster. In Clusters 2 and 3, procrastination was specifically categorized based on the strength of procrastination awareness and the presence of extrinsic motivation. In the case of Cluster 3, many participants exhibited procrastination in both their actual behavior and their psychological inclination towards passive procrastination, resulting in a lower task achievement rate. As follows PAv value was said to be a factor influencing procrastination behavior [4], Cluster 3 resulted in a considerably high value of PAv, indicating that it was linked to procrastination.

Interviews and questionnaires were used to analyze RQ3. The results showed the effectiveness of the weekly reflections conducted during class time and suggested that they contributed to the improvement of SRL awareness. In particular, among those who had a passive procrastination mindset, those who felt the effects of reflection led to avoid (a) *procrastination* behavior. Incorporating approaches that activate SRL awareness, rather than direct learning time in the classroom, also had a positive effect on learning behavior. The results suggest that offline learning activities are important in online learning efforts.

# 5   Limitations and Future Implications

Although we were able to discern trends in the relationship between learning behavior and psychological factors from this analysis, we found that it is impossible to perfectly predict learning behavior from psychological factors. It was also predicted that it would be impossible to completely eliminate passive procrastination. This can be attributed to the fact that university students who take lectures for course credit are strongly influenced by both external factors, such as the influence of other assignments and exams, and internal factors, such as personality and learning preferences. It was predicted that their attitudes toward learning English would be fundamentally different from those of working adults who study by choice. Therefore, teachers need to design lessons that take into account students' learning situations, motivations, and personalities.

In addition, while the reflection activities had a positive effect on the learning behavior of some students, it was not possible to change all of them to active behavior. Therefore, it is thought that the content of what should be described in the weekly reflections could be carefully examined, and the method of the activities could be devised. There is also room for research on the impact of allocating time for discussing behavioral issues, especially since some students mentioned that the influence of their friends activated their own learning. In tasks where difficulty is individually optimized, conducting collaborative learning directly related to the task content is not feasible. Therefore, within reflection activities on task implementation, the incorporation of collaborative activities among learners is expected.

In the future of educational settings, the increasing use of technology is anticipated. In online environments or hybrid learning environments where direct intervention by teachers is challenging, particularly in such contexts, measures that activate students' SRL awareness become essential. As a contribution, it is incumbent upon teachers to enhance and integrate the reflection activities conducted in this study, fostering learners' self-reflection and promoting learning behavior. We should consider the relationship between learning behavior and multiple factors with larger number of learners in order to improve learning outcomes for diverse learners.

## Acknowledgements

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