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Article

Transitioning from Other-Regulation to Self-Regulation in e-Learning Strategies Among Japanese EFL University Students

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Abstract
Frequent and regular engagement is essential for effective e-learning, and self-regulated learning strategies play a crucial role in enhancing such engagement. However, recent research has suggested that learners may initially rely on other-regulated strategies, eventually transitioning to self-regulation. This study examines the impact of Time and Study Environment Management (TSEM) strategy instruction on students' e-learning behaviors, particularly in reducing procrastination, and explores whether it initially promotes other-regulated strategy use, which evolves into self-regulation. Japanese university students participated in a two-semester e-learning assignment as an out-of-class activity. Group A received TSEM instruction in the spring semester, while Group B did not. Neither group received instruction in the fall. Students' e-learning behaviors were measured through login frequencies, and their strategy use was assessed via interviews. Results showed that in the spring semester, Group-A students initiated learning earlier and completed tasks well before the deadline, whereas Group-B students procrastinated. In the fall, both groups tended to complete tasks at the last minute. Interviews revealed that Group-A students applied TSEM strategies when receiving instruction but tended to forget them once guidance was removed. However, some students continued using TSEM strategies independently, reflecting on the benefits they experienced when applying them in the spring semester. These findings suggest that other-regulated TSEM instruction can promote autonomous learning behavior. Furthermore, fostering a sense of accomplishment and perceived value of these strategies may encourage sustained use, supporting the transition to self-regulated strategy use.

Keywords
e-learning, self-regulation, other-regulation, learning strategies, Time and Study Environment Management (TSEM)

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1 Introduction

With the advancement of information and communication technology (ICT) and the rapid expansion of online education triggered by the COVID-19 pandemic, the use of electronic learning (e-learning) in education has been increasing at an accelerated rate (Teng, 2024, 2025). In recent years, the widespread availability of mobile technology, such as smartphones, has enabled learners to access educational content at convenient times and places. Moreover, advancements in artificial intelligence (AI) have contributed to the development of more personalized and adaptive e-learning experiences. Against this backdrop, e-learning has been increasingly integrated into foreign language education as an out-of-class assignment to provide more effective, efficient, and personalized language-learning experiences.

To date, several ICT developers in the field of foreign language education have developed e-learning applications with innovative methodologies, allowing language learners to access a much wider range of content than before (e.g., Kic-Drgas & Kılıçkaya, 2024). For this educational content to be learned effectively, learners' consistent and frequent engagement with these resources is required (Jo et al., 2016; Kim et al., 2019). However, previous studies have identified substantial challenges, such as high rates of learner procrastination and dropout, particularly when e-learning is assigned as an out-of-class assignment (Li et al., 2018; Sasaki & Takeuchi, 2024).

In learning environments lacking direct involvement from teachers or instructors—such as e-learning outside the classroom—learners need to develop self-regulated learning capacity (Cerezo et al, 2020; Cerón et al., 2020; Rowe & Rafferty, 2013), which is "the ability to initiate and direct one's own learning, rather than relying on others, such as teachers and instructors" (Sasaki & Takeuchi, 2023, p. 34). This aligns with Zimmerman's (1989) widely accepted definition of being self-regulated as "the degree that they [learners] are metacognitively, motivationally, and behaviorally active participants in their own learning process" (p. 329). Generally, learners with a high degree of self-regulation are considered to "actively and constructively use strategies to manage their own learning" (Oxford, 2017, p. 7). Although strategy use is only one aspect of self-regulated learning, which also involves motivational, affective, and goal-oriented processes (Ueno et al., 2025), the ability to employ effective learning strategies is a key component of self-regulated learning capacity as indicated by past studies (Dörnyei, 2005; Tseng et al., 2006).

However, some researchers have argued that these strategies are not necessarily self-regulated (Thomas & Rose, 2019). In general, learners do not initially possess self-regulated learning strategies for managing their learning. Instead, strategies are typically taught and guided by others, such as teachers, parents, or peers. As time progresses, learners gradually internalize these strategies and, as a result, begin to apply them independently in a self-regulated manner. In e-learning environments, other-regulation in the form of strategy instruction can promote learners' use of effective strategies and increase engagement with learning (Fung, 2024; Thomas et al., 2022). However, few studies have illustrated how learners' other-regulated strategy use changes into a self-regulated one.

This study focused on Time and Study Environment Management (TSEM) strategies, which are among the most effective e-learning strategies for promoting independent engagement by learners with limited external support. While other self-regulated learning strategies such as task strategies and self-evaluation are also important (Ueno et al., 2025), TSEM was selected as the primary focus because it plays a key role in avoiding procrastination and supporting consistent study behavior, especially in online contexts (e.g., Goda et al., 2009; Jo et al., 2016). Broadbent and Poon (2015) also identified time management and environment structuring as self-regulated learning strategies strongly associated with academic success in online learning environments. These strategies provide a foundation for sustained engagement and are particularly crucial when learners study independently without external monitoring. The study specifically examined whether receiving instruction on these strategies not only increased immediate engagement but also supported the transition from other-regulation (instructor-led) to self-regulation (autonomous) in use of TSEM strategies. Understanding this transition is essential, as fostering

self-regulated learning enables students to take ownership of their learning process. This is particularly important at university, where learners are expected to independently manage a large volume of diverse academic tasks. By investigating this process, this study aims to inform the design of instructional approaches that better support the development of self-regulated e-learning behaviors.

2 Literature Review

2.1 Language learning strategies in self-/other-regulation

Since early studies shed light on the learning strategies used by good language learners (Rubin, 1975; Stern, 1975), extensive research has examined the characteristics and impact of such strategies. By the 1990s, various language learning strategies were identified and categorized in a systematic manner (O'Mally & Chamot, 1990; Oxford, 1990), and numerous studies examined their practical applications (e.g., Chamot, 2005; Nambiar, 2009). In the 2000s, however, criticism emerged regarding the definitional ambiguity and lack of robust measurement in strategy research. Critics have argued that successful learners actively and autonomously regulate their own learning process, including the use of strategies (Tseng et al., 2006). Consequently, the growing belief is that studies on learning strategies should be replaced with research on self-regulation (Dörnyei, 2005).

However, in reality, learners do not always employ learning strategies in a self-regulated manner to achieve their goals. Young learners, for example, often need scaffolding by adults until they can effectively engage in learning by themselves (Mak & Wong, 2018). Even advanced learners, such as university students, are often teacher-dependent (Tao & Gao, 2017). These learners rely on other-regulated strategies rather than self-regulated ones and successfully accomplish their learning tasks. Similarly, in autonomous learning environments such as out-of-class e-learning, which is the focus of this study, learners continue to utilize strategies taught by teachers or peers to achieve effective learning outcomes, as confirmed in a prior study by the authors (Thomas et al., 2022).

Recently, some researchers have proposed a novel view of learning strategies, incorporating other-regulated strategies and emphasizing their development into self-regulated usage through teacher interventions (Shalizar & Razaei, 2023; Shi, 2018). Thomas and Rose (2019) conceptualized learners' strategy use as a continuum that shifts between other-regulation and self-regulation and proposed seeing learners' strategy use along the "Learning Strategies Continuum" (p. 253). Additionally, Thomas et al. (2021) suggested that teacher-led strategy instruction could enable learners to move along this continuum, achieving more self-regulated strategy use (i.e., internalization), and they emphasized the need for studies to empirically examine this potential process (e.g., Fung, 2024; Thomas et al., 2022).

2.2 Language learning strategy instruction

Research on strategy instruction for language learning—a pedagogical approach in which teachers systematically guide learners on how to use strategies to learn a foreign/second language—has been actively pursued since the 1990s, when studies on learning strategies gained considerable attention. A number of these studies have reported the effectiveness of strategy instruction for enhancing learners' self-regulated strategy use (e.g., Ardasheva et al., 2017; Chamot, 2004; Zhang & Zou, 2022). Chamot and Kupper (1989), for example, implemented strategy instruction for foreign language learners in the United States. Their findings suggest that strategy instruction can foster students' metacognition and motivation in learning, and that strategy instruction approaches identifying learners' existing strategies and enabling practice of additional strategies can help them become more effective, independent language learners. Relatedly, Cohen (2000) proposed a form of strategy instruction named strategies-based instruction, which involves students not only receiving strategy training but also sharing their

own strategy repertories with peers. Teachers implementing this approach found that it helped students take greater responsibility for autonomous learning outside the classroom and gain more confidence in language learning.

In addition to general strategy instruction approaches, strategy instruction for specific language skills has also been shown to enhance learners' self-regulated strategy use. Ikeda and Takeuchi (2003) investigated the effects of explicit reading strategy instruction on Japanese university students with different proficiency levels. While positive effects were observed mainly among high-proficiency learners, a key finding was that students continued to use the instructed strategies for up to five months after the intervention, indicating that strategy instruction can promote sustained, autonomous use of reading strategies beyond the classroom. Similarly, Lam (2015) demonstrated that explicit strategy instruction fosters self-regulation in writing by enhancing learners' metacognitive awareness and use of planning, reorganizing, and problem-solving strategies. These studies illustrate that explicit strategy instruction promotes learners' self-regulated strategy use. However, they did not address how strategy use became internalized within learners or the transition from other-regulated to self-regulated use.

Research on strategy instruction has also addressed how learners adapt and effectively utilize strategies. For example, Takeuchi (2003) investigated the learning strategies used by Japanese university students majoring in English. Compared to their lower-proficiency peers, higher-proficiency students not only used a wider range of learning strategies with greater awareness but also adjusted their strategy flexibly according to their learning stage and specific situations. Similarly, Griffiths and Cansiz (2015) reported that 16 successful English language learners from various parts of the world employed a wide variety of strategies and adapted them flexibly depending on their individual learning situations (e.g., studying independently when external support was unavailable) and learning goals (e.g., aiming for full mastery of English through extensive reading and listening). Furthermore, Macaro (2006) argued that effective learners do not rely on a single strategy or apply multiple strategies in a linear manner. Instead, they exercise metacognition to select, cluster, and orchestrate strategies that suit the specific demands of a given task. Aligning with these findings, Gu (2012) argued that the strategies learners employ and their effectiveness are significantly influenced by factors such as the learners themselves (e.g., attitudes, motivation, age, and proficiency level), learning task at hand (e.g., objectives, type, complexity, and difficulty), and learning environment (e.g., learning culture and the availability of input and output opportunities). Applying Gu's insight (i.e., person-task-context configuration), the strategy instruction provided in the current study should incorporate strategies suited to first-year Japanese university students' proficiency levels who engage in listening-focused e-learning activities outside the classroom (see Section 3 for details).

2.3 Time and study environment management strategies

In out-of-class e-learning environments where students progress at their own pace, many face challenges in maintaining consistent engagement with learning activities (e.g., Goda et al., 2015; Li et al., 2018). However, some students independently and regularly engage with e-learning assignments. These differences are considered to result from the presence or absence of effective learning strategies appropriate to this autonomous learning situation (Goda et al., 2015; Michinov et al., 2011). One such strategy is TSEM, defined as "the ability to effectively manage learning time and environment" (Jo et al., 2016, p. 199), which "involves planning the necessary time for learning, utilizing time effectively, and minimizing external stimuli that hinder learning" (Sadi & Uyar, 2013, p. 22).

Pintrich et al. (1991) also identified TSEM as essential strategies for academic study of university students and provided its detailed explanation. First, time management refers to scheduling, planning, and managing one's study time. Scheduling and planning can range from organizing study sessions for one evening to weekly or monthly scheduling. Managing study time involves not only allocating study time but also ensuring its effective use by setting realistic goals and time limits. Study environment

management entails optimizing the learning environment. For example, a well-organized, quiet place without visual and auditory distractions would be ideal. Zimmerman et al. (1996) also regarded these strategies as a key component of self-regulated learning, adding the importance of consistently using a designated study place as part of study environment management.

Several empirical studies have emphasized the importance of TSEM strategies in e-learning contexts (e.g., Goda et al., 2009; Jo et al., 2016; Lee, 2004; Molnar, 2025; Parpala et al., 2017; Puzziferro, 2008). Molnar (2025) examined self-regulated learning strategies in an online asynchronous EFL classroom in Japan, and found that students paid attention to time management and intentionally structured their study environments to complete tasks efficiently by the deadline. Similarly, in a study exploring learners' behavioral patterns in online university courses in Korea, Jo et al. (2016) identified a significant correlation between students' use of TSEM strategies and their login frequency, regularity, and total time spent on the learning platform. Lee (2004) found that time management was the strongest predictor of academic success among Korean EFL learners in distance education, surpassing even prior knowledge and motivation. In the context of fully online higher education courses in the United States, Puzziferro (2008) reported that high-performing students employed TSEM strategies more effectively and expressed greater satisfaction with the course experience, compared with their low-performing peers.

Moreover, some studies have suggested that teaching and providing experience with TSEM strategies can help students increase regular engagement in e-learning contexts. Goda et al. (2009) conducted a course aimed at helping Japanese university students develop time-management skills, based on the assertion by Zimmerman et al. (1996) mentioned above. Their findings indicated that students developed better study habits and came to appreciate the benefits of planning their learning. Similarly, Parpala et al. (2017), who investigated time and effort management skills among university students, argued that these skills are directly linked to academic success and motivation to learn and emphasized the importance of its instruction at the outset of university admission.

These studies have shown the usefulness of TSEM strategies and their instruction; however, they have not addressed whether these strategies were initially employed through other-regulation and later evolved into self-regulated use.

3 Rationale for the Present Study

To address this less-examined aspect, the current study aimed to first explore whether teacher instruction and support based on the TSEM strategies (i.e., other-regulation) can improve students' learning behaviors and, second, to determine whether their strategy use continues even after the withdrawal of teacher support, indicating a transition to self-regulation. Accordingly, this study sought to address the following research questions (RQs):

RQ1: Does TSEM instruction affect students' engagement in e-learning and, specifically, help reduce procrastination?

RQ2: Does TSEM instruction have a sustained effect on students' e-learning engagement even in the absence of continued instruction?

RQ3: Do TSEM strategies used by students through other-regulation evolve into self-regulation? If so, what factors contribute to this change?

4 Method

4.1 Participants

This study involved 101 female first-year students at a women's university in Japan, with which the first author is affiliated. The students had received eight years of formal English education before entering

university, with current proficiency levels ranging from CEFR A2 to B1.[1] All students were English majors, and many aspired to pursue careers involving English. As the study was conducted shortly after their university enrollment, their motivation for learning English was rather high.

The students were enrolled in a required English listening course and assigned e-learning materials for listening practice as part of their coursework. This study investigated students in two intact classes: Group A (n = 49), who received TSEM instruction, and Group B (n = 52), who did not.

Ethics approval was obtained from the ethics review committee of the authors' affiliated university. Prior to data collection, the students were informed of the study's purpose, the nature of their involvement, and measures for privacy protection. All participants gave fully informed consent.

4.2 Materials and procedures

The e-learning materials used by the students were commercially developed courseware designed for English listening practice, accessible via smartphones.[2] The courseware provides conversations, dialogues, and monologues using English expressions commonly used in everyday life and educational settings in English-speaking countries. Each lesson consisted of listening practice exercises and a final test, with an estimated completion time of approximately 30 minutes per lesson.

Students were instructed to complete 15 lessons and pass the final test within 12 weeks during both the spring and fall semesters, with their results incorporated into their grades of the listening course. The course grade was determined based on task completion within the online system rather than the frequency of logins. In the listening classes during the spring semester, students in both groups received weekly teacher reminders to independently progress with e-learning.[3] In contrast, in the fall semester, no teacher intervention was conducted.

The TSEM sessions for Group A were conducted by the first author in the middle of the spring semester, weeks 6–10, with each session lasting approximately 10 minutes.[4] The TSEM strategies instructed were those identified by the authors in their previous study (Sasaki & Takeuchi, 2023), which the first-year students at the same university had effectively employed to regularly login for the same e-learning courseware (see Appendix). Time management strategies included *planning* (e.g., one lesson per week/on Fridays), *fixing study time* (e.g., while commuting every day), *using spare time* (e.g., after lunch, before afternoon classes begin), and *setting a time limit* (e.g., aiming to finish by 5 pm). Study environment management strategies involved *choosing a calm place to study* (e.g., in the library), *fixing a place* (e.g., on the train while commuting), and *eliminating distractors* (e.g., turning off social media notifications).[5] These are aligned with the TSEM strategies proposed by aforementioned researchers such as Pintrich et al. (1991) and Zimmerman et al. (1996).

4.3 Data collection

This study collected both quantitative and qualitative data. To investigate RQ1, which examines the impact of TSEM instruction on learner engagement (i.e., on reducing procrastination), the weekly login counts during the spring semester were collected from Group A, who received TSEM instruction, and Group B, who did not. These login data were obtained from the e-learning system server.[6]

For RQ2, which explores the sustained effect of TSEM instruction, Group A's login counts from the fall semester (without TSEM instruction) were additionally collected to compare with data from the spring semester (with TSEM instruction) already collected for RQ1.

To explore RQ3, which focuses on the shift from other-regulation to self-regulation, only Group-A students, who received TSEM instruction, were classified into *Constant Learners* and *Procrastinators* based on their login frequency patterns. *Constant Learners* were defined as those who maintained high login frequency in both the spring and fall semesters, with login counts exceeding the overall

average by more than one standard deviation in both semesters. *Procrastinators* were defined as those who experienced a substantial decline in login frequency from spring to fall, with login counts above the average in spring but below it in fall. Using these criteria, four *Constant Learners* and three *Procrastinators* were selected for semi-structured interviews. The interviews, conducted in Japanese by the first author, each lasted approximately 20-30 minutes and generated qualitative data on students' experiences with e-learning and the TSEM strategies they employed during the two semesters.

It should be noted that login counts were collected to quantitatively assess changes in learner engagement, especially reductions in procrastination after TSEM instruction. Increased login frequency was not assumed to directly indicate strategy use; therefore, to clarify whether and which TSEM strategies were used, and whether their use became more self-regulated, qualitative data from interviews were collected. This mixed-methods approach allowed triangulation of findings and deeper insights into the effect of TSEM instruction.

4.4 Data analysis

To evaluate the impact of TSEM instruction on reducing procrastination (RQ1), the weekly login frequencies of Groups A and B during the spring semester were compared using descriptive statistics and an independent samples *t*-test. Next, to determine whether the effects of TSEM instruction were sustained after instruction ceased (RQ2), Group A's login counts in the spring and fall semesters were compared using descriptive statistics and an independent samples *t*-test.

For RQ3, qualitative analysis was conducted on the interview transcripts following the guidelines of Braun and Clarke (2006) to explore (1) the TSEM strategies used by *Constant Learners* and *Procrastinators*, (2) their perceptions of the strategies' effectiveness, and (3) their explanations for the (in)frequency of login behavior. The responses of *Constant Learners* were analyzed in more detail to examine whether their use of TSEM strategies had evolved from other- to self-regulation and to identify the factors contributing to this change.

5 Results

RQ1: Does TSEM instruction affect students' engagement in e-learning and, specifically, help reduce procrastination?

Table 1 shows the mean and standard deviation of login weeks for Groups A and B during the spring semester, as well as the results of an independent samples *t*-test. During the 12 weeks of the spring semester, the mean login weeks was 3.27 (SD = 1.52, minimum = 1, maximum = 8) for Group-A students and 2.58 (SD = 1.50, minimum = 1, maximum = 8) for Group-B students. The *t*-test revealed a statistically significant difference with medium effect size between the two groups in these values, $t(49) = 2.287$, $p = .024$, $r = .31$. This suggests that Group-A students spread out their e-learning assignments over more weeks compared to Group-B students, rather than completing them within a short period.

Table 1

Average Login Weeks for Groups A and B During the Spring Semester

Group	*n*	*M*	*SD*	*t*-test
A	49	3.27	1.52	$t(49) = 2.287$, $p = .024$*, $r = .31$ (medium)
B	52	2.58	1.50	

Figure 1 illustrates the mean weekly login counts for Group A and Group B during the spring semester, represented by solid lines with square and triangular dots, respectively.

Figure 1

Mean Weekly Login Counts for Groups A and B During the Spring Semester

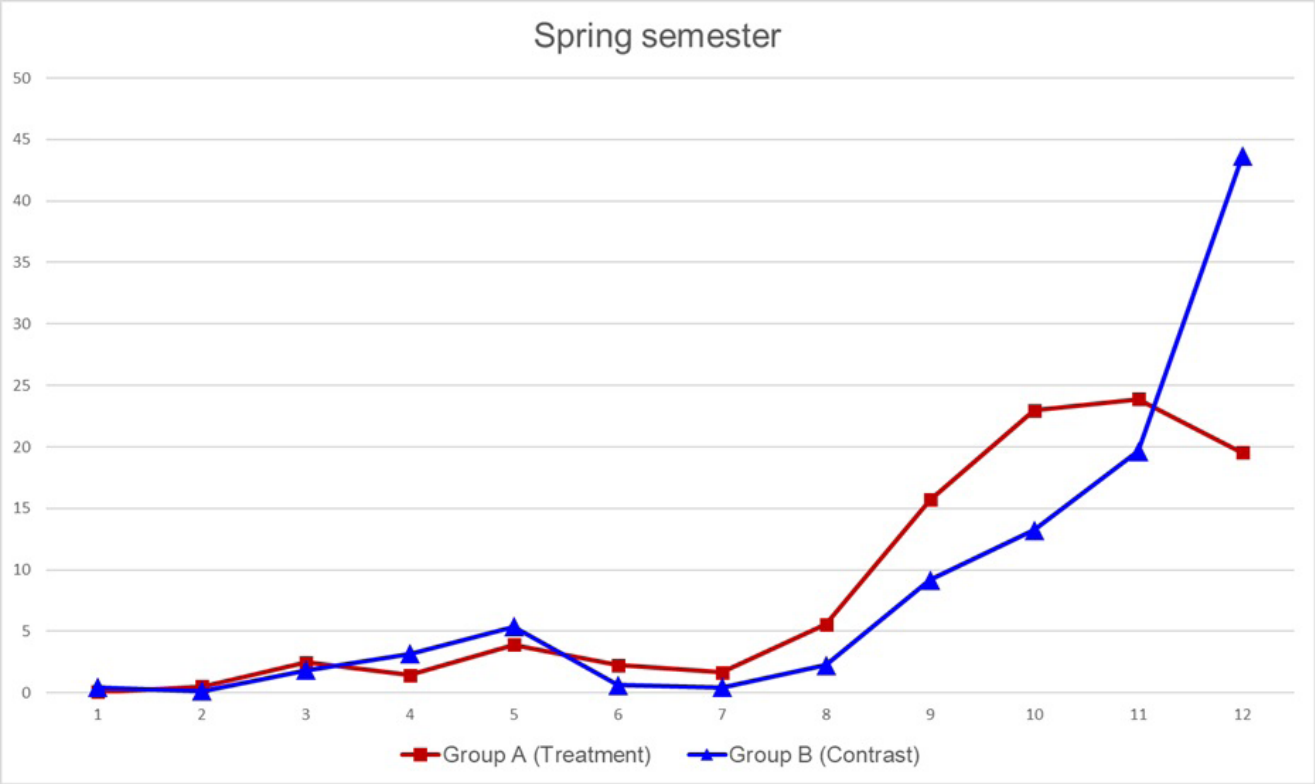

Figure 1 shows little difference in login frequency between the two groups during the first half of the semester (weeks 1–5). The difference became evident in the second half of the semester (weeks 6–12), which coincided with the period when Group A received TSEM instruction.[7] While the peak in Group A's logins occurred during weeks 10–11, Group B showed a surge in the final week, indicating that many students in Group B seemed to have procrastinated and completed their assignments at the last minute.

The 12-week period was divided into three phases—*before*, *during*, and *after* the TSEM instruction (weeks 1–5, 6–10, 11–12, respectively)—and the average login frequencies for each phase across both groups were calculated (Table 2). The results showed that in the *before* phase, Group A had an average login count of 2.37 (*SD* = 4.41, minimum = 0, maximum = 15), and Group B had an average login count of 2.98 (*SD* = 10.08, minimum = 0, maximum = 66). In the *during* phase, Group A had an average login count of 13.57 (*SD* = 11.70, minimum = 0, maximum = 43), while Group B had an average login count of 7.00 (*SD* = 9.24, minimum = 0, maximum = 35). In the *after* phase, Group A had an average login count of 12.24 (*SD* = 13.79, minimum = 0, maximum = 43), and Group B had an average login count of 17.21 (*SD* = 13.77, minimum = 0, maximum = 64). The *t*-test results showed the significant difference with medium effect size between the groups in the *during* phase, with the average login count of Group A exceeding that of Group B, $t(49) = 3.141$, $p = .002$, $r = .30$. Meanwhile, in the *after* phase, although no significant difference was found, Group B's average login count was considerably higher ($M = 17.21$) than that of Group A ($M = 12.24$). As shown in Figure 1, this finding further suggests that Group A tended to complete e-learning assignments well before the deadline, while Group B rushed to finish their tasks at the last moment.

Table 2

Average Login Counts for Groups A and B Before, During, and After TSEM instruction

Group	*n*	*M*	*SD*	*t*-test
Before TSEM instruction (weeks 1–5)				
A	49	2.37	4.41	$t(49) = -0.392$, $p = .696$, $r = .04$ (small)
B	52	2.98	10.08	
During TSEM instruction (weeks 6–10)				
A	49	13.57	11.70	$t(49) = 3.141$, $p = .002$*, $r = .30$ (medium)
B	52	7.00	9.24	
After TSEM instruction (weeks 11–12)				
A	49	12.24	13.79	$t(49) = -1.810$, $p = .073$, $r = .18$ (small)
B	52	17.21	13.77	

These findings indicate a possible link between TSEM instruction and Group A's engagement with e-learning—particularly in terms of reduced procrastination, as it pertains to RQ1.

RQ2: Does TSEM instruction have a sustained effect on students' e-learning engagement even in the absence of continued instruction?

Table 3 presents the mean and standard deviation of login weeks for Group A in the spring (with TSEM instruction) and fall semesters (without TSEM instruction). These values show that average login weeks significantly dropped in the fall semester ($M = 1.82$, $SD = 1.27$) compared to the spring semester ($M = 3.27$, $SD = 1.52$). The *t*-test results indicate that the mean login weeks was significantly lower in the fall semester than in the spring semester with medium effect size, $t(49) = 5.113$, $p = .000$, $r = .46$.

Table 3

Average Login Weeks for Group A During the Spring and Fall Semesters

Group (semester)	*n*	*M*	*SD*	*t*-test
A (spring)	49	3.27	1.52	$t(49) = 5.113$, $p = .000$*, $r = .46$ (medium)
A (fall)	49	1.82	1.27	

Figure 2 shows the mean weekly login counts for Group A's fall (dashed line with diamond dots) and spring (solid line with square dots, as shown in Figure 1) semesters. For comparison, the data for Group B in the fall semester are also included (dashed line with triangular dots).

Figure 2 shows that the login pattern of Group A in the fall semester significantly differed from that in the spring semester. Instead, it closely resembles that of Group B in the fall semester, with both groups exhibiting increased logins toward the end of the semester (weeks 11–12). According to Table 4, which shows the mean login weeks for Groups A and B in the fall semester, the differences between the two groups are minimal (Group A: $M = 1.82$, $SD = 1.27$; Group B: $M = 1.37$, $SD = 1.01$), with no statistically significant difference observed between the groups, $t(49) = 1.981$, $p = .051$, $r = .27$ (small effect size). These observations indicate that the TSEM strategy instruction implemented in Group A had a short-term impact, limited to the spring semester. In other words, once instructor interventions were removed, students' constant engagement tended to decline.

Figure 2

Mean Weekly Login Counts for Groups A (Spring and Fall) and B (Fall)

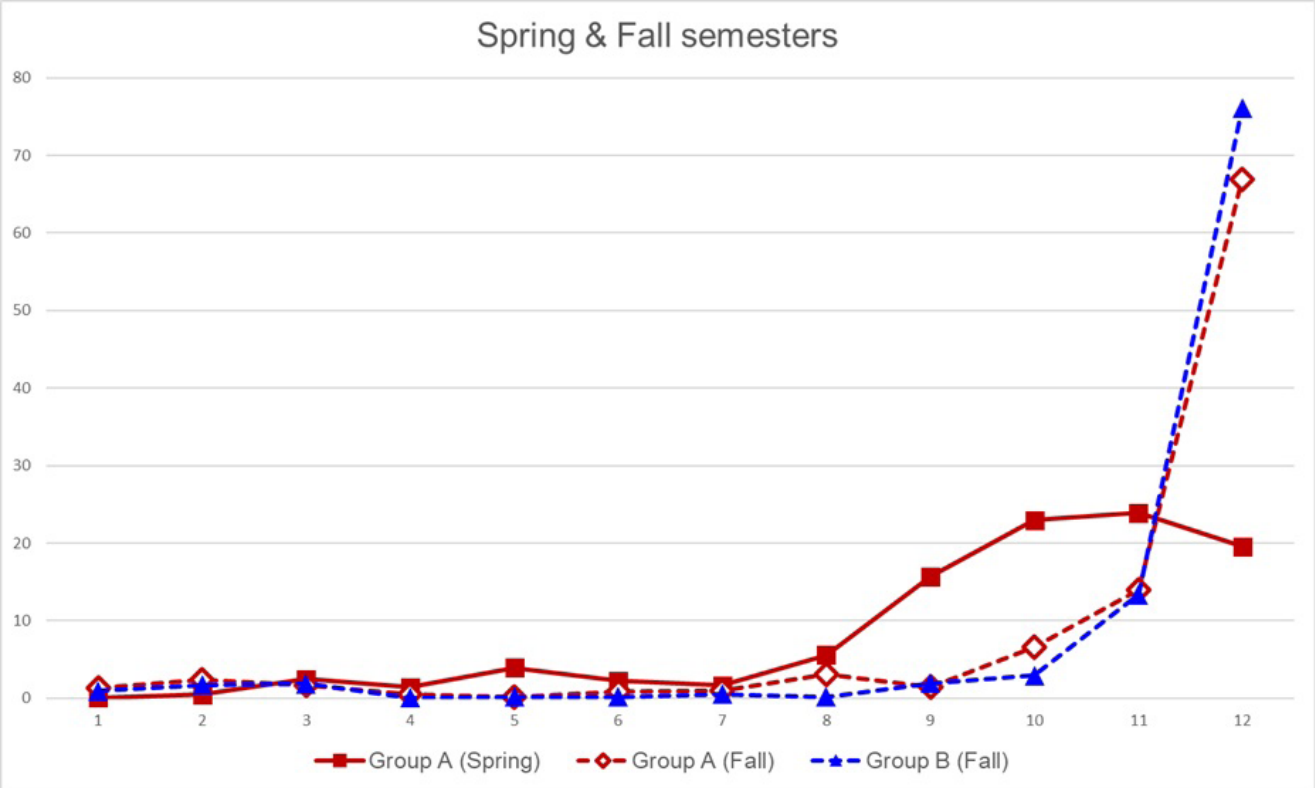

Table 4

Average Login Weeks for Groups A and B During the Fall Semester

Group (semester)	*n*	*M*	*SD*	*t*-test
A (fall)	49	1.82	1.27	$t(49) = 1.981$, $p = .051$, $r = .27$ (small)
B (fall)	52	1.37	1.01	

RQ3: Do TSEM strategies used by students through other-regulation evolve into self-regulation? If so, what factors contribute to this change?

The interviews with Group-A students revealed that they had used several TSEM strategies in the spring semester. In other words, they employed these strategies under other-regulation. However, a closer look at their comments uncovered more intriguing findings—both *Constant Learners* and *Procrastinators* frequently referred to the teacher reminders as being effective for their engagement in e-learning. The following comments from *Procrastinator*s (P1, P2, and P3) indicated that their frequent logins during the spring semester and procrastination in the fall were likely influenced by the presence or absence of these reminders.

> In the spring, I remembered e-learning because the teacher told us every week, but in the fall, the teacher said nothing, so I forgot. (P1)[8]
>
> At first, the teacher mentioned e-learning every week, so I followed the instructions and did it on the train. But in the fall, I often forgot. Even when I remembered, I thought, "I'll do it later," and delayed it. (P2)
>
> In the first semester, we were reminded of e-learning every class, so I kept up with it each time. I also heard tips like "do it during your commute" or "eliminate distractors," and I did them.

> But in the second semester, teacher said nothing, and I forgot about e-learning, and spent my commute time on other things. (P3)

During the spring semester, these students (P1, P2, and P3), prompted by weekly reminders from the instructor, conducted the e-learning assignments as if they were routine homework for each class. As Group-B students also received weekly reminders in the spring semester, they too would have engaged in the e-learning assignments in the same manner. However, despite these similar conditions, a difference in login frequency was observed between the two groups, which suggests that the TSEM instruction may have influenced Group-A students' login behaviors. In fact, P2 and P3 utilized several TSEM strategies in their learning behaviors during the spring semester (P2: "*on the train*"; P3: "*during commute*," "*eliminate distractors*"). Beyond the general reminders, the practical strategy instruction directly linked to learning behaviors (i.e., TSEM strategy instruction) provided to Group A may have contributed to enhancing their engagement.

However, their use of strategies ceased in the fall when teacher reminders and TSEM instruction were no longer available. This suggests that the students' initial use of the instructed strategies under other-regulation was not sustained without instructor's support, indicating difficulty in transitioning to self-regulation.

Conversely, *Constant Learners* (C1, C2, C3, and C4), while mentioning the reminders they received during the spring semester, provided some details regarding their use of the instructed TSEM strategies.

> I was told to do e-learning every week in the spring semester, … I learned how to use spare time on the train. I tried it, and it worked pretty well. … I was able to finish [all the lessons] comfortably before the deadline, so I kept it up in the fall. (C1)
>
> Teacher's reminders were useful, but fixing a time and place really worked for me. I used to sleep on the train, but I found that my time on the train was perfect for my study using my smartphone. … Doing e-learning on the train became a habit. … Now I use my train commute for other studies [assignments for other classes], too. (C2)

These students, while acknowledging the helpfulness of the instructor's reminders, mentioned that they continued to use strategies such as *using spare time* and *fixing time and place* in combination (i.e., using commuting time on the train) even after reminders were not provided in the fall semester. Both students said that they commuted by train for over an hour each way, and TSEM strategy instruction helped them learn how to make effective use of this time. Most significantly, both students reported that their use of TSEM strategies contributed to a sense of accomplishment (C1: completing spring semester tasks more efficiently) and successful experience (C2: realizing the benefit of using commute time effectively). Furthermore, C2 applied this strategy to other areas of study beyond e-learning. Such positive affective experiences may provide an impetus for the shift to their self-regulated use of these strategies.

C3 and C4 also reported that the TSEM strategies they learned during the spring semester proved to be effective.

> I was told to do e-learning at fixed time each day, so I did it every morning before leaving for school. But often I didn't have much time, so I set a time limit, like "I'll finish this in 20 minutes," and this was effective. It helped me focus on each lesson and became part of my daily routine. (C3)
>
> In the spring, at first, I tried to do many lessons in one day, but I made a lot of mistakes and failed to pass the lessons. It took up too much time. So, following the teacher's advice, I made a plan to do one lesson a day [in a week]. Then, I was able to do the lessons more calmly, and I think I have improved my listening skills. (C4)

C3 adopted the *fixing time and place* strategy, similar to C2, but implemented it at home before leaving for school rather than during her commute on the train. She also noted that, owing to the limited time

available before leaving home, she utilized the *setting a time limit* strategy as well. As a result, this approach not only facilitated task completion but also contributed to improved focus during e-learning sessions. Furthermore, her e-learning activities, supported by these strategies, became regular practice. Meanwhile, C4, learning from her initial setbacks early in the spring semester, adopted the *planning* strategy to work on tasks in manageable amounts each day. By implementing this, she was able to complete her assignments and also noticed improvements in her listening skills. As these students experienced a sense of accomplishment and success through increased focus, the establishment of learning habits, and improved listening skills, we argue that, as seen in the cases of C1 and C2, such positive affective experiences are key in the shift from other- to self-regulation.

6 Discussion

The present study found that TSEM strategy instruction seemed to have a positive impact on students' engagement in e-learning and help reduce procrastination (RQ1). However, its effect was not sustained after the instruction was removed (RQ2). Several instances were observed in which TSEM strategy use shifted from other- to self-regulation, which appeared to stem from a sense of accomplishment and success that students gained through using these strategies (RQ3).

Students' protocols obtained through interviews suggested that Group A's increased engagement in the spring semester might have been—at least in part—attributable to the instructor's reminders in each class rather than solely to the TSEM instruction itself. Numerous studies have supported the effectiveness of teacher reminders for learners engaging in e-learning outside the classroom (e.g., Dodson, 2017; Martin & Bolliger, 2018), and this influence might have contributed to the students' overall performance during that period.

Nevertheless, engagement in Group B, who also received reminders, was not as high as that of Group A, and the engagement of Group-A students was not consistently high throughout the 12-week period in which reminders were provided but rather increased after the TSEM strategy instruction began; thus, we infer that TSEM instruction had a considerable effect on increasing student engagement. In fact, in the interview, both *Constant Learners* and *Procrastinators* acknowledged the value of the TSEM strategies taught in the sessions, with *Constant Learners*, in particular, utilizing them actively. Therefore, the authors assert that TSEM strategy instruction in this study had a substantial impact on students' e-learning engagement.

The TSEM strategies frequently mentioned by both *Constant Learners* and *Procrastinators* in the interviews were *using spare time* and *fixing time and place*. In particular, they reported utilizing their commute time on the train effectively. In general, many Japanese university students face new challenges after entering university, which they did not experience in high school. For example, they must adapt to long commutes using public transportation,[9] attend various courses, and manage numerous assignments, often struggling to keep up. In such contexts, utilizing spare time while commuting to engage in daily assignments via smartphones could have been regarded as effective strategies that directly address these challenges, potentially fitting their needs.

Additionally, strategies such as *planning* and *setting a time limit* were also employed, and these strategies appear to have enhanced the effectiveness of the students' learning. One student (C4) reported that by planning to manage one lesson at a time rather than attempting to complete multiple lessons, she was able to process the content more deeply, with greater focus. Another student (C3) mentioned that, by setting a time limit, she experienced the pressure of a deadline, which helped her stay focused on learning without being distracted by other things. Considering these facts, the TSEM strategies provided in this study seem to have contributed both quantitatively (by enabling students to effectively manage a larger number of tasks) and qualitatively (by enhancing the depth of their learning) to their task management. Therefore, teaching TSEM strategies to first-year university students, who will face increasingly

challenging tasks in their academic life ahead, appears to be valuable, as suggested by previous research (Parpala et al., 2017).

The overall decline in Group-A students' login frequency in the fall semester suggests that TSEM instruction had only a short-term effect and did not lead to sustained behavioral change. The *Procrastinators*' comments, in particular, clearly indicated that the strategies used in the spring semester, under the instructor's initiative—namely in the other-regulated environment—were no longer employed in the fall semester once instructor's intervention was absent. These findings suggest that, for first-year university students, even effective strategies may struggle to become self-regulated without external support. Therefore, teachers and instructional designers should incorporate a transitional phase following TSEM strategy instruction, during which instructor guidance—such as reminders and/or pacing—is still provided. This scaffolded support can then be gradually removed as learners gain greater autonomy, following Walqui's (2006) view of scaffolding as a contingent and interactive process that adapts to learners' developmental needs. Since instructed strategies do not immediately become autonomous behavior for most students, such instructional designs could help bridge the gap between other- and self-regulation. Particularly in the context of higher education, where students are expected to increase academic independence, such structured intervention seems critical.

In contrast, some students (*Constant Learners*) autonomously continued to apply the TSEM strategies in the fall semester, which suggests that their use of these strategies might have developed into self-regulation. A common factor among these students was that the use of these strategies led to a positive sense of accomplishment (e.g., efficiently completing multiple tasks) and successful experiences (e.g., learning to make effective use of commute time). Furthermore, one student (C2) applied the TSEM strategies instructed for e-learning to different assignments in other classes. This expansion of learning behaviors can be seen as a manifestation of her agency as a learner. Mercer (2012) defines learner agency in terms of both learners' sense of agency and learners' agentic behavior. Learners' sense of agency "concerns how agentic an individual feels both generally and in respect to particular contexts" (p. 42), while learners' agentic behavior is where "an individual chooses to exercise their agency through participation and action" (p. 42). In C2's case, through her learning and practicing the TSEM strategies, she appeared to recognize their effectiveness and value, gaining a sense of achievement, and developed a heightened awareness of her ability to regulate her own learning, which reflects the emergence of her sense of agency. As a result, she applied these strategies to other areas of learning based on her own decision, becoming more actively engaged in her studies, which demonstrated her agentic behavior. These goal-oriented, self-initiated/directed learning attitudes exemplify self-regulatory behavior, and C2's TSEM strategy use has likely evolved from being other-regulated into self-regulated.

Thomas and Rose (2019) proposed that strategy training is necessary for students to become more self-regulated in their learning. Building on their contention, the present study suggests that cultivating a sense of accomplishment and the perceived value of TSEM strategies may further facilitate the transition from other-regulation to self-regulation. These emotional and experiential factors appeared to mediate participating students' internalization of strategy use, supporting socio-cognitive perspectives that conceptualize self-regulated learning as a socially supported process that becomes gradually internalized (Zimmerman, 1989, 1995). One potential pedagogical approach to enhance such internalization is to encourage student reflection on their use of each strategy, including how it supported their learning, what types of tasks it suits, and whether it fits their personal needs. Such reflection may enhance students' awareness of their own successful experiences, reinforce the value of these strategies, and promote agentic behaviors; in turn, their self-regulation capacity may emerge.

7 Conclusion

This study examined the effectiveness of TSEM strategy instruction on Japanese EFL university students' engagement in e-learning as out-of-class assignments, with a specific focus on whether these

strategies promote frequent engagement and whether students would use these instructed (other-regulated) strategies in a self-regulated manner. The results from both quantitative and qualitative analyses revealed that student engagement was higher in the other-regulated environment, but procrastination tendencies were observed when such regulation was removed. Conversely, although few in number, some students continued to employ strategies in a self-regulated manner, recognizing the value of such strategies in improving learning effectiveness and efficiency. These findings suggest that for other-regulated strategy use to evolve into self-regulated use, successful learning experiences and the perceived value of strategies are essential. To facilitate this transition, instructional designs should include a reflective component and provide scaffolded support that is gradually removed, while learners' sense of accomplishment and agency should also be promoted.

Like many other studies, this study has limitations. First, potential differences in proficiency levels between the two intact groups might have affected participants' ability to learn and use learning strategies, possibly leading to different results in this study. Additionally, in the qualitative part of the study, the semi-structured interviews involved a limited number of participants owing to time constraints (e.g., interview participants' busy daily schedules, which made finding mutually available times difficult). Interviewing more participants might have yielded more reliable information about their strategy use, including whether they had already been using strategies before TSEM instruction or relied on others not covered in it. Furthermore, because the same individual served as both the strategy instructor and interviewer, this study may carry a social desirability bias (Kim & Kim, 2016; Kondo et al., 2010), where participants might have provided answers that seemed socially acceptable or favorable to the interviewer. This could have influenced the interviewees' responses and resulted in biased outcomes. Moreover, it is possible that the *Procrastinators'* last-minute completion in the fall semester reflected a high level of self-regulation: that is, they might have strategically delayed their work, knowing that the grade would be the same whether completed early or just before the deadline. It is also possible that they engaged in longer and more focused study sessions despite logging in less frequently. However, since this study did not collect data on participants' self-regulation levels or the quality of their learning, nor explore these aspects in the interviews, these remain unknown and require further research.

While generalization of the study's findings requires that the above variables be controlled appropriately, classroom research of this nature has many practical constraints, which makes completely controlling all variables impossible. Therefore, to generalize the findings from classroom research, we argue that, rather than focusing solely on controlling variables, conducting research within realistic educational contexts such as the one in the present study and accumulating results over time is more beneficial.

Notes

1. The participants' TOEIC Listening & Reading Test scores range from 400 to 600, aligning with CEFR levels A2 to B1.
2. The courseware used by the students was Practical English 9, provided by Reallyenglish Ltd. (now Edulinx Ltd.).
3. The reminders provided to students included messages such as "Are you keeping up with e-learning?" and "The deadline is in three weeks."
4. During the first five lessons of the semester, both groups received instruction on general English listening strategies, such as prediction, attention focusing, inference, and monitoring (Vandergrift & Goh, 2012, pp. 277–284).
5. While trains may not represent a calm or distraction-free study environment, many students in the authors' previous study (Sasaki & Takeuchi, 2023) reported using their commute time as a fixed study routine. This reflects a practical application of study environment management in a real-life context,

where learners adapt available time and space to maintain consistent engagement with the course content.

6. The login data did not include information about learners' physical study location. Therefore, the implementation of study environment management strategies could not be directly verified using these data. However, self-reported data obtained from interviews provided insights into how learners managed their study environments.
7. Although both groups showed increased login activity after week 7, the rise was considerably more pronounced in Group A. This suggests that while common factors such as assignment deadlines or end-of-semester pressures may have influenced both groups, the sharper increase in Group A likely reflects the effect of TSEM instruction.
8. All interview quotations were translated into English by the first author.
9. In Japan, many university students commute from their homes to campus, particularly in urban areas where public transportation is well developed. For these students, long commutes can pose considerable challenges, both in terms of time management and physical fatigue.

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Appendix

Types of Time and Study Environment Management Strategies Provided in Strategy Instruction Sessions

Category	Description
Time Management:	
Planning	e.g., one lesson per week/on Fridays
Fixing study time	e.g., while commuting every day
Using spare time	e.g., after lunch, before afternoon classes begin
Setting a time limit	e.g., aiming to finish by 5 pm
Study Environment Management:	
Choosing a calm place to study	e.g., in the library
Fixing a place	e.g., on the train while commuting
Eliminating distractors	e.g., turning off social media notifications

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