Demographic Factors in Influencing Self-Regulated Language Learning Using Technologies among Malaysian Universities Students

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ABSTRACT

This study aims to explore the use of self-regulated learning (SRL) strategies using technologies among students at selected Malaysian universities when they are learning language. Utilising quantitative method, this study examines the influence of demographic factors and digital readiness in shaping students' engagement with technology. 121 students from several public universities in Malaysia answered the Survey of Self-regulated Learning with Technology at the University (SRLTU) and the findings revealed that students are most inclined to metacognitive and resource management strategies when using technology for language learning. There were also variabilities found in terms of gender, age and device use in influencing students' use of SRL. This study contributes to the growing body of literature on technology use in higher education by illuminating the critical role of self-regulated learning strategies and digital readiness in affecting students' language learning. It also highlights the variability among students in various factors which can help inform instructors and institutions in taking the appropriate measures to ensure effective learning experience for all students.

Keywords: self-regulated learning strategies, technologies, language learning

INTRODUCTION

Technology in language learning has transformed the way students are able to take charge of their progress, especially in the environment that stresses autonomy and flexibility. Recent research has shown that self-regulated learning strategies (SRLS) appear to mediate between motivation and increased self-efficacy of learners, particularly in English language learning. In many cases, more motivated learners are the ones who organize, track, and assess their learning patterns. It is not just a question of discipline but a dynamic process where confidence grows with skill, which results in a reinforcement loop where improvement leads to confidence and skill leads to improvement (Almayeza et al., 2025). It is possible that technological tools can enhance such processes, as they offer platforms which enable autonomous regulation to be more viable and efficient. Students can adjust learning speed and practices to personal requirements by using learning management systems, mobile applications, interactive online resources, etc., which is why different levels of proficiency can be accommodated (Halim et al., 2024).

An emerging literature also emphasizes the importance of digital preparedness--the combination of the technical skill and the mental attitude required to effectively utilize the online learning technologies. Practically, this preparedness affects the ability of the students to be able to transform motivation into long-term, self-regulated action (Gu, 2025). Comfort with the tools available is not only a matter of familiarity, but it can often be a matter of mobilization of learners towards regular interaction with technology. With a more active involvement in organized digital environments, students are likely to have better results in self-regulated learning, yet there are still gaps in those who are less confident or experienced with digital environments. More recent studies also indicate certain technological applications that assist SRLS in English as a Second Language (ESL) context.

LITERATURE REVIEW

In educational settings that focus on direct teacher instruction, transitioning students to technology-mediated and independent learning can be difficult. Students who are used to very structured models might find online tools less intuitive at first. Additionally, addressing cultural predispositions, such as the collectivist orientation documented among Saudi learners, could help adapt strategies that encourage confident engagement with independent study platforms over time (Almayeza et al., 2025).

Additionally, Technology-supported SRL does not operate independently but overlaps with psychological variables such as decreased anxiety, heightened enjoyment, and the sense of self-esteem due to incremental accomplishment (Lia et al., 2025). Thus, access to resources and immediate feedback cycles could further enable iterative adjustments in study approaches, which are hallmarks of effective self-regulation.

There is empirical evidence that technology-embedded strategies tend to be associated with better outcomes in all language skills in the cases of sustained engagement (Halim et al., 2024). How well these strategies work is not only related to the commitment of the learners but also the correlation between the functionality of the tools and the needs of the learners at various levels of competence. The most recent results suggest that adaptive ecosystems, which integrate various modalities, e.g., text-based and oral communication, assist the learners in flexibly switching between tasks based on the changing goals (Annamalai et al., 2023; Halim et al., 2024). Although the interest of AI-based systems in ESL/EFL settings is on the rise, there are concerns regarding the need to strike a balance between novelty appeal and pedagogical value.

Self-Regulated Learning

Self-regulated learning in language acquisition is generally conceptualized as a complex process in which learners actively direct and control their cognitive, motivational and behavioural involvement with tasks to accomplish specific goals. At its simplest, this concept means having not only the knowledge of which strategies to use, but also the awareness and the discipline to use them consistently and assess their effectiveness over time. Self-regulation involves interconnected areas: cognitive strategies for processing and applying knowledge, metacognitive strategies for planning and tracking progress, behavioural adjustments that coordinate the effort and time effort with goals, and motivational mechanisms that maintain persistence through the learning process.

In the context of English language learning, cognitive strategies can be observed in the way in which students function with linguistic input to construct meaning, transforming isolated pieces of information into integrated knowledge structures (An et al., 2021). Metacognitive strategies function at a supervisory level where the learner is organizing study schedules, keeping track of comprehension during speaking or reading tasks, and switching tactics when progress runs aground. Such regulation is cyclical in nature: goals are established by learners, actions are monitored against these benchmarks, actions are modified based on feedback received (either self-supplied or externally provided), and future aims are once again re-assessed (Yang et al., 2025). Behavioural aspects are about setting up one's environment to make more of this practice sustainable. That could mean creating distraction-free study spaces or using digital tools that have notifications for spaced repetition exercises. The availability of facilitating conditions, technical support, accessible resources, peer collaboration structures, can have a significant impact on the extent to which planned behaviours become actual study time (Lai et al., 2022).

In technologically mediated environments such as mobile assisted language learning platforms or AI enhanced writing assistants, features such as real-time feedback and progress dashboards are external scaffolds that reinforce internal regulation. Another layer is that of affective strategy use. Positive emotions such as enjoyment can increase memory retention and perseverance in a task, whereas negative emotions such as boredom can impede engagement. Educational designs that foster autonomy are likely to support positive affect; for example, flipped classrooms with interactive AI systems give learners time to work at their own pace while experiencing a persistent sense of competence through feedback loops (Namaziandost, 2025). This perspective encourages designing digital environment where each component reinforces each other, goal setting interfaces that spark intrinsic motivation, analytics that reflect metacognitive reflection, adaptive content sequencing for efficient cognitive engagement, and makes certain that behavioural routines are habitual rather than sporadic (Almayeza

et al. 2025) which lead to good practice of teaching and learning and bring positive outcome in learning English language.

The study aimed to investigate various demographic factors, internet connectivity, device usage, and application preferences among students at selected Malaysian universities. This study also aimed to assess the self-regulated learning concept of cognitive, metacognitive and resource management strategies among students who learn English language using technologies.

Research Questions

1. Does demographic factors influence the self-regulated learning using technology among students who learn English language?

2. Does the self-regulated learning concept of cognitive; metacognitive and resource management strategies being used among student who learn English language using technologies?

METHODOLOGY

This study focused on undergraduates from three Malaysian public universities: Universiti Malaysia Perlis, Universiti Malaysia Pahang Al-Sultan Abdullah, and Universiti Teknikal Malaysia Melaka. Data were collected through the Survey of Self-regulated Learning with Technology at the University" questionnaire adapted from Yot-Dominguez & Marcelo (2017). The questionnaire contained 34 Likert-scale items across three sections: Part 1 is demographic information including variables such as the participants' institution, age, course of study, and year of study. Part 2 focused on measuring the frequency of SRL strategy usage among participants where participants rated their agreement with statements regarding their use of cognitive, metacognitive, and resource management strategies. Lastly, Part 3 assessed the technologies utilized by students, focusing on how students engage with various technological tools and platforms in their academic pursuits. This included inquiries about internet connectivity, types of devices used (e.g., mobile phones, laptops, tablets), and the applications favored by students. The survey was administered online via Google Forms and distributed through mailing lists and social media. A total of 221 responses were received, of which 122 were valid. This sample size was deemed sufficient for statistical analysis and provided a diverse representation of students from different institutions and academic backgrounds. Participation was voluntary, anonymous, and confidential.

To ensure the reliability of the questionnaire, a reliability analysis was performed with Cronbach's alpha. The results revealed that there was a high degree of internal consistency for the overall scale with a reliability index of more than 0.70, which is considered satisfactory based on the reliability index of Gliner et al. (2016). The reliability coefficients for each of the categories of strategies were as follows: Cognitive Strategies: Cronbach's alpha = 0.716 (7 items) Metacognitive Strategies Cronbach's alpha = 0.883 (17 items) Resource Management Strategies Cronbach's alpha = 0.848 (9 items) Overall Scale: Cronbach's alpha = 0.926 (33 items) These results confirm the robustness of the instrument and its suitability for measuring SRL strategies and the use of technology with the respondents.

Data obtained from the questionnaire was processed using the widely used SPSS version 26. Descriptive Statistics Descriptive statistics were used to summarize the demographic characteristics of the respondents and frequency of SRL strategy usage. Measures including means and standard deviations were computed for each strategy category, which gave a clear picture of the engagement of the participants in using SRL strategies. Then, Correlation Analysis were used to analyze the relationships between the SRL strategies and the use of technology, followed by Pearson correlation analysis intended to determine any significant associations between frequency of SRL strategy usage and the different technologies used by students. Correlation coefficients were used to assess the strength and direction of these relationships. Additionally, T-Tests Independent samples t-tests were used to analyze the possible differences in the frequency of SRL strategies usage between males and females. This analysis was intended to identify any gender-based discrepancies in the use of cognitive, metacognitive and resource management strategies. The level of significance was $p < 0.05$ for all statistical tests. Linear Regression Analysis to further examine the influence of SRL strategies on the use of technologies were also performed. This analysis was designed to quantify the degree to which cognitive, metacognition, and resource management

strategies predicted overall use of technology among students. The regression model gave some insights into the relative contributions of each SRL strategy to technology engagement, with the level of significance is also $p < 0.01$.

RESULTS AND DISCUSSION

Table 1: Background of the respondents (N=221)

Institution	**Frequency**	**Percentage**
Universiti Malaysia Pahang Al Sultan Abdullah	35	28.9
Universiti Malaysia Perlis (UniMAP)	82	67.8
Universiti Teknikal Malaysia Melaka	4	3.3
Year of study		
Diploma	2	1.7
Master	2	1.7
PhD	2	1.7
Year 1	64	52.9
Year 2	34	28.1
Year 3	15	12.4
Year 4	2	1.7
Age		
19 - 23 years	101	83.5
24 - 29 years	19	15.7
35 years and above	1	.8
Gender		
Female	66	54.5
Male	55	45.5

The distribution of respondents according to their demographic background can be seen in Table 1. Most of the respondents were from Universiti Malaysia Perlis (UniMAP) with 82 participants (67.8%). This was followed by Universiti Malaysia Pahang Al Sultan Abdullah, which has 35 respondents (28.9%). In contrast, only 4 (3.3%) were from Universiti Teknikal Malaysia Melaka (UTeM). In terms of academic standing, 64 participants (52.9%) respondents were at first year of study, followed by Year 2 students totalling at 34 respondents (28.1%), while Year 3 and Year 4 students were represented by 15 (12.4%) and 2 (1.7%) students respectively.

Similarly, the age distribution of the respondents shows that a significant majority of them (101 participants, 83.5%) were between the ages of 19 and 23 years. This is followed by 19 participants (15.7%) in the 24 to 29 age brackets. Only one (0.8%) of the respondents was aged 35 years and above. The predominance of younger

respondents is typical of university students, suggesting that the results are indicative of the preferences and behaviors of a younger population.

Lastly, the gender distribution of respondents was fairly equal with 66 females (54.5%) and 55 males (45.5%). This small female majority could affect the results in terms of application usage and preferences as gender differences in technology use have been documented in past research.

Table 2: The use of technology

	Frequency	Percentage
Internet connectivity		
Acceptable (Easy connection at certain times;	77	63.6
Unpredictable)	35	28.9
Excellent (Can connect at any time successfully;		
Uninterrupted connection)	9	7.4
Poor (Difficult to connect most of the time)		
Devices		
Mobile phone	114	94.2
Laptob or Computer	91	75.2
Ipad or tablet	52	43.0
Application		
Social media	118	97.5
Lifestyle	43	35.5
Video sharing	67	55.4
Entertainment and games	47	38.8
Productivity	47	38.8
Utility	57	47.1
News and information	18	14.9

In terms of technology use, firstly, most of the respondents (63.6%) reported having an acceptable level of internet connectivity, characterized by easy connections at certain times with unpredictability. Additionally, 35 respondents (28.9%) said they had excellent connectivity, able to connect at any time, without interruption. On the other hand, 9 people (7.4%) described their connectivity as poor, implying that they have a lot of trouble accessing the internet. These findings reflect the variability in internet access among students, which might impact their academic performance and engagement with online resources. Secondly, the respondents reported that their most used devices were the mobile phone (94.2%), followed by laptops/computers (75.2%) and tablets or iPads, which is (43.0%). As for the most popular applications, social media topped the list (97.5%) followed by video-sharing applications (55.4%), lifestyle applications (35.5%) and entertainment and gaming applications (38.8%). Productivity applications were used by 38.8% respondents, and utility applications were used by 47.1% respondents. Notably, news and information applications were the least used with just 18 (14.9%) respondents indicating that they used them. The overwhelming preference for social media applications emphasizes the role of these platforms in the daily lives of students, acting as vehicles for communication, information sharing, and community building. The important use of video-sharing applications also reveals a trend toward consumption of visual content, which may contribute to educational engagement and entertainment. Correlation analysis on the relationship between the type of devices used and preferred applications of students showed that the users

on mobile phones were much more likely to use social media and video-sharing applications than users on laptops and tablets. This trend indicates that the portability and accessibility of mobile devices make it more likely to be able to participate in social media platforms, which are a key part of social interaction for students.

Table 3: Comparison of the use of SRL strategies between gender groups

	Male	**Female**	**t**	**Sig.**
Cognitive	3.4130	3.4394	-0.229	0.635
Metacognitive	3.5155	3.6373	-1.044	0.815
RMS	3.7051	3.8468	-1.043	0.365

Additionally, gender differences in application preferences were examined. Preliminary analysis suggests that female respondents showed a higher inclination towards lifestyle and social media applications compared to their male counterparts. Conversely, male respondents demonstrated a preference for gaming and video-sharing applications. These findings align with existing literature that indicates gender-specific trends in technology use and content consumption.

Table 4: The use SRL strategies among the respondents.

	Mean	**Standard deviation**
Cognitive	3.4274	0.62800
Metacognitive	3.5819	0.63916
RMS	3.7824	0.74444

According to the research results, various self-regulated language learning (SRL) strategies were adopted relatively often by the participants. The statistics indicate that the students employed different SRL strategies for language learning to a great extent. Metacognitive (mean = 3.58, sd = 0.64) and resource management strategies (mean = 3.78, sd = 0.74) were the most highly used by the students. The frequency of using SRL strategies was compared between the two groups of respondents (male & female) using t-tests to determine any distinctions between them. The results indicated that no notable distinction between the frequency of employing the SRL strategies between the two groups of respondents ($p>0.05$) as indicated in Table 3.

In summary, the results of this study have given insights on the demographic characteristics, internet connectivity, device usage, and application preferences of the students at selected Malaysian universities. The overwhelming representation of younger respondents, especially those in their first year of study, indicates a critical group of respondents who are involved with technology. The fluctuation of internet connectivity means reliable access to online resources might be an obstacle for some students, which could affect their academic success. The overwhelming use of mobile phones and social media applications signal a shift towards mobile-centric engagement among students, which is part of broader societal trends. Gender differences in the use of applications further emphasize the need for specific approaches in understanding student preferences and behaviours in the digital landscape.

The integration of technology into language learning has fundamentally changed the face of the educational landscape, especially in the area of self-regulated learning (SRL) in students. The results of this study support the claim that technological tools not only make language acquisition easier but also enable learners to take control over their educational journeys. In an environment that requires independence and adaptability, self-regulated learning strategies (SRLS) are found to be pivotal in mediating between learner motivation and self-efficacy in aiding the learner in his or her learning, especially in the context of online English language learning. The findings of this study indicated that self-regulated learning strategies are used by students widely, especially

metacognitive and resource management strategies. The mean scores indicate a strong tendency towards planning, monitoring and evaluating study behaviours which is key to effective language acquisition. This is in line with previous research that has focused on the cyclical nature of self-regulation, in which the learner sets goals, monitors their progress, and makes necessary adjustments to their strategies (Yang et al., 2025). The capacity to engage in this reflective practice is extremely important in online learning environments where the lack of direct teacher guidance may make students feel disorientated. Moreover, the findings suggest that motivated learners tend to more often engage in these self- regulatory processes. This observation emphasizes the importance of creating a motivational climate in an educational context, especially for technology mediated education. As noted by Almayeza et al. (2025), the interaction between learner motivation and self-efficacy forms a self- reinforcing cycle that can lead to better language skills. Therefore, it is imperative that educators and institutions create interventions that improve motivation and offer the scaffolding necessary to support students in their self-regulatory efforts.

Another important finding of this study is the important role of digital readiness in facilitating self- directed learning. The ability of students to successfully use online learning technologies is not just a matter of familiarity with these tools, but also a matter of a proactive approach to using digital resources. Gu (2025) proposes that it is the learner who must mobilise themselves towards sustained technological engagement, which can be difficult for those less experienced or with a lack of confidence in digital settings. The variability in internet connection reported by respondents makes this even more complex. While most students rated their connectivity as acceptable to excellent, a significant minority of students reported problems accessing online resources. This gap in access can further the inequalities that already exist in educational opportunities, especially for those who are already at a disadvantage. The implications of this finding are profound, as it suggests that institutions need to prioritize initiatives to improve digital infrastructure and support for students who may struggle with technology. Also, the shift from traditional, teacher-centered educational models to autonomous, technology-mediated learning environments is potentially difficult for students who are used to the structured classroom setting. Thus, instructors should take advantage of learners' inclinations towards metacognitive and resource management strategies by incorporating scaffolding strategies that could gradually build the learners' self-regulating ability. Furthermore, the prominence of social media and video apps in the students' lives could also be leveraged as important tools to enhance students' independent learning experiences.

The study also shows the need for adaptive technological implementations that correspond with learner needs at different levels of proficiency. The evidence seems to indicate that technology-embedded strategies are associated with improved academic performance when there is sustained engagement (Halim et al., 2024). This requires a nuanced approach to the design of learning management systems and digital resources that address a variety of skill levels and learning objectives. An effective implementation strategy should include the development of adaptive ecosystems that integrate more than one modality of learning, such as text-based interaction and oral exchanges. This flexibility enables learners to shift between various modes of engagement as their goals change. However, as much as we are seeing a growing enthusiasm for incorporating AI-based systems into ESL contexts, it is necessary to strike a careful balance between the novelty of these systems and the real merit of their instructional use. Lastly, the demographics of the respondents help put the findings in additional context. The dominance of first year students suggests a particularly important demographic group who are engaged with technology, perhaps because of transition into university. This transitional phase could enable an increased drive to interact with digital resources, as students attempt to create academic identities. Furthermore, the relatively equal gender distribution among respondents, and the differences in application preferences that were observed, suggest that gender may affect technology use and engagement patterns. Female respondents showed a greater tendency towards lifestyle and social media applications, and the male respondents showed a tendency towards gaming and video-sharing applications. These results are consistent with existing literature on differential trends in technology use among genders and highlight the importance of addressing students' preferences and behaviours in a differentiated manner.

Ultimately, by shedding light on the crucial roles of self-regulated learning strategies, digital readiness, and cultural context, this study adds to the expanding corpus of research on the use of technology in language learning. The results highlight how crucial it is to create a motivating environment, improve digital infrastructure, and create flexible technology solutions that meet the needs of a wide range of learners. Future studies should

examine these factors' long-term effects on learning outcomes and student engagement, especially as they relate to resource access and internet connectivity. Furthermore, longitudinal research that monitors how motivation and self-control change over time can offer important insights into the dynamics of language acquisition in settings mediated by technology, as the interaction between psychological factors, such as anxiety relief and pleasure in learning activities, plays a key role in the self-regulatory mechanisms of learners (Lia et al., 2025). By addressing these areas, educators and institutions can enhance the educational experience for all students, ensuring that the integration of technology into language learning is both effective and equitable.

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