Undergraduate Students' English Self-Efficacy and Technology-Assisted Self-Regulated Learning

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Abstract: Greater access to learning sources resulting from the advancement of the Internet and information technology helps students regulate their learning habits and achieve specific learning targets, including English language learning. This study analyzed English self-efficacy and technology-assisted self-regulated learning strategies among undergraduate students and how the two variables correlate. A total of 510 undergraduate students at Sam Ratulangi University, Indonesia, participated in the study. Two sets of questionnaires, including the Questionnaire of English Self-Efficacy (QESE) and the Technology-Based Self-Regulated Learning Strategy Questionnaire (TSRLQ), were administered in data collection. The data analyses included descriptive statistics and bivariate Pearson correlation calculations. This study found a heterogeneous profile of English self-efficacy and technology-assisted SRL. Meanwhile, the Pearson correlation calculation results revealed that English self-efficacy was significantly correlated with technology-assisted SRL in a positive direction. Thus, this study suggests that more efficacious students are more likely to apply technology-assisted SRL in their English language learning.

Keywords: self-efficacy, self-regulate learning, technology-assisted learning

Introduction

Information and communication technology advancement has benefited young people for diverse purposes in their daily lives. Abundant studies have revealed young people's dependency on technology and the Internet in the digital era to perform various activities, including social, entertainment, and educational purposes (Assapari & Hidayati, 2023; Chan et al., 2023; Çoban,

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2019; H. Lee et al., 2017; Yot-Domínguez & Marcelo, 2017). In English language learning, the flexibility and ease of accessing information through digital technologies can encourage students, as digital natives, to effectively utilize it to improve their language proficiency regardless of time and location. Ideally, this high use of technology provides students with access to knowledge. It makes them not merely rely on the so-called formal education at school to improve their language learning, where teachers are always considered the primary source of information. According to Kivunja (2014), students have access to a variety of ubiquitous information sources, which can be accessed through the Internet and other digital platforms. As a result, students can do more attractive and dynamic activities from online sources, simulations, games, wikis, and blogs rather than performing monotonous learning activities such as reading full of black-and-white text (Barile et al., 2022; Muthuprasad et al., 2021). Thus, it is not exaggerated to say that technology helps students be active learners who can regulate themselves to perform better academically.

Widespread use and dependency on digitalization and the Internet can provide bigger chances for learners in this era to succeed in their learning due to the development of active learning. According to Kim et al. (2015), to be successful active learners, students possess at least two things: self-regulated learning (SRL) and self-efficacy (SE). Self-regulated students exploit technology not just to assist them in completing their college-related tasks but also to strategically organize their use of technology to maintain their learning. This form of learning enables students to comprehend that learning encompasses extensive processes that necessitate sustained effort, monitoring, and evaluations, and achieving good academic outcomes is just one aspect of the process. Meanwhile, SE can be characterized as the students' confidence in assessing their own capacities to do selected activities (Alqurashi, 2016; Bartimote-Aufflick et al., 2016). This belief also contributes to students' persistence when encountering challenges during the learning processes, ensuring the sustainability of SRL.

In addition to enhancing language learning strategies, understanding the impact of technology on students' SRL and SE is crucial for improving educational outcomes, adapting to digital environments, and promoting active learning. As digital environments become more prevalent, understanding how technology is incorporated into SRL and improves students' self-efficacy can help educators design interventions that help students navigate and thrive in these environments (Findyartini et al., 2024). Studies on technology-assisted SRL and English self-efficacy may also help educators understand students' diverse learning styles and needs. By obtaining how students utilize technologies in their learning, educators may also design and develop personalized learning experiences for students according to their learning styles and needs. Eventually, these learning experiences can assist students to develop the essential skills of active learning and lead them to lifelong learning.

There have been many studies investigating self-efficacy and self-regulated learning in academic settings in Indonesia (Agustiani et al., 2016; Anam & Stracke, 2020; Elitha & Purba, 2020; Hendikawati et al., 2019; Hermita & Thamrin, 2015; P. H. Lee et al., 2021). Another study exploring students' self-efficacy in learning EFL in primary schools in Indonesia has also been conducted by Anam & Stracke (2020), focusing on the role of SE and its relation to language ability. Although numerous studies have examined the relationship between SRL, SE, and student learning, there are only a few (if any) that focus on how students in the English as a Foreign Language (EFL) context utilize technology to enhance their SRL and SE. Therefore, to address the lack of research on SE and SRL in EFL contexts, specifically with regard to the incorporation of technology to enhance students' SRL in learning English in Indonesia, this study aims to examine how students utilize technology to support their SRL, their level of confidence in their English

abilities, and how their confidence relates to their decision to use technology-assisted SRL in learning English.

Method

The research design utilized a quantitative approach through the administration of questionnaires for data collection. It was conducted at Sam Ratulangi University in North Sulawesi, Indonesia, in 2023. The population of this study included non-English Department students from different faculties who took General English Course as a compulsory subject in the English Department, with the total number of students was 1120. This study employed the Lemeshow formula to compute the minimum sample size, which is commonly used when the target group is of unknowned size and can be considered effectively infinite. Based on this calculation, it was obtained that the minimum sample size was 98; however, during the data collection, a total of 510 undergraduate students participated in the survey.

The data collection administered two sets of questionnaires, which were extensively adapted from the Questionnaire of English Self-Efficacy (QESE) (Wang et al., 2014) and Technology-Based Self-Regulated Learning Strategies Questionnaire (TSLSQ) (An et al., 2021). The QESE assessment included 32 items to evaluate students' SE in four language abilities in English: listening (8 items), speaking (8 items), reading (8 items), and writing (8 items). Each question in the QESE evaluates students' confidence in their capacity to use listening, speaking, reading, and writing skills under specific conditions. Furthermore, the 26 affirmative statements in TSLSQ evaluated the extent to which students in the study used technology to facilitate the implementation of SRL strategies. The TSLSQ comprised 5 main categories, including motivational regulation strategies (MRS) – assessing how technology helps improve their motivation in learning English (10 items), goal setting and learning evaluation (GS) – assessing how students set and monitor their technology-assisted English learning (5 items), social strategies – assessing how the students use technology to seek collaborative learning on technology-based social groups (3 items), technology-based English song and movie learning (TE) – assessing how the students utilize songs and movie in their English language learning (5 items), and technology-based vocabulary learning (TV) – assessing how students use technologies (apps or websites) to enhance their vocabulary (3 items). A 7-point rating scale ranging from 1 (not very true of me) to 7 (very true of me) was used to measure participants' responses. Prior to data collection, the measures were critically assessed for their validity and reliability. The Cronbach's alpha coefficients for the English self-efficacy and TSLSQ questionnaires were 0.973 and 0.918, respectively. This coefficient is a statistic used in educational research to show how consistently a set of items measures the same underlying construct.

The data analyses included descriptive statistical tests to identify the profile of respondents' demographic, SE, and technology-assisted SRL. In the descriptive statistical tests, the minimum, maximum, mean, standard deviation, and median scores for each variable were calculated. Furthermore, to investigate the connection between English SE and technology-assisted SRL, a bivariate correlation calculation was conducted with a significance level of $\alpha=0.05$. Pearson correlation test was utilized in data analysis because the data was normally distributed.

Results and Discussion

The study examined various factors related to English SE and technology-assisted SRL. These factors included self-efficacy for all language skills in English, as well as different strategies such as motivational regulation (MRS), goal setting and learning evaluation (GS), social strategies

(SS), English songs and movies (TE), and vocabulary learning using technology (TV). The summaries of descriptive statistical and correlation calculations are displayed in separate tables.

The profile of students′ English self-efficacy

The results of the descriptive statistics for English SE assessment, conducted on 510 undergraduate students, are illustrated in Table 1. Overall, the descriptive statistics reveal heterogeneous results of students' English self-efficacy, meaning that there were students who possessed English self-efficacy scores below the average and vice versa. It was obtained that the lowest score of English self-efficacy was 33, meaning that some students were not sure of their English language skills in general. The results also obtained the highest score of the overall English self-efficacy was 222, indicating that there were students who were strongly confident about their English language performance. Furthermore, the mean score of overall English self-efficacy 125.54 in Table 1 is still lower than the median (score range 32-224; Me= 128).

Table 1. Descriptive statistics for English SE (n= 510)

	Min	Max	Mean	SD
English SE	33	222	125.54	39.391
English SE for listening	8	56	33.83	10.145
English SE for speaking	8	56	30.84	10.607
English SE for reading	8	56	33.72	10.512
English SE for writing	8	54	29.15	9.974

Turning to the results of descriptive statistical calculation of English self-efficacy for each skill, this study found that the mean score for listening was 33.83, which was relatively higher than the median (a score range of 8-56; Me= 33). A similar result was also obtained for reading, where the mean score of 33.72 was higher than the median (a score range of 8-56; Me= 33). As the mean scores for listening and reading were higher than the median, it can be inferred that students' self-efficacies for listening and reading were inclined to be higher than the average. Unlike listening and reading, of which the mean scores were higher than the median, the study found that the mean scores for speaking and writing were below the median (median scores were 32 and 31 for speaking and writing, respectively).

The profile of students′ technology-assisted SRL

Table 2 gives information about the application of technology-assisted SRL by the respondents in the study. The data shows that the lowest score of overall SRL was 30, indicating some students barely applied the learning strategy to facilitate their English learning, while the highest score was 182, indicating that students who optimally used technology-assisted SRL were also found in the study. Looking deeper at the mean score of the overall SRL (114.87), which was relatively higher than the median score (score range 30-182; median 78), it is evident that, generally, the application of technology-assisted SRL in the English language learning by the undergraduate students in the study was high. Each category also showed similar results; the mean score of motivational regulation strategies (M=127.54) was greater than the median score (Me= 30), the mean scores of goal setting and learning evaluation (M= 18.32) and technology-based English song and movie learning (M=25.19) were higher than the median scores (15 for either GS or TE), and the mean scores of social strategies (M=11.77) and technology-based vocabulary learning (13.9) were also higher than the median scores (9 for either SS or TE).

Table 2. Descriptive statistics for technology-assisted SRL (n= 510)

	Min	Max	Mean	SD
Technology-Assisted SRL	30	182	114.87	29.889
MRS	10	70	127.54	12.878
GS	5	35	18.32	4.039
SS	3	21	11.77	4.039
TE	5	35	25.19	6.916
TV	3	21	13.39	4.209

Although the mean scores across all SRL categories exceeded the median, the table clearly shows that the use of technology related to songs and movies for facilitating English language learning had the largest gap from the median, approaching the maximum scores. In contrast, the use of technology to regulate social strategies in learning English had the smallest gap from the median.

The correlation between English self-efficacy and technology-assisted SRL

A further bivariate correlation analysis using Pearson's method revealed a significant positive linear relationship between English self-efficacy (both overall and across all skill areas) and technology-assisted SRL in the study ($p < 0.01$). The results indicate that the use of SRL tended to be followed by students' self-efficacy. The higher their confidence in their English skills, the higher their tendency to apply SRL in their learning, and vice versa.

Table 3. Bivariate Correlation Results (N=510)

	Technology-Assisted SRL	
	p-value	Pearson Correlation
English self-efficacy	.000	.663**
English self-efficacy for listening	.000	.629**
English self-efficacy for speaking	.000	.628**
English self-efficacy for reading	.000	.640**
English self-efficacy for writing	.000	.634**

Discussion

The presence of the minimum and maximum scores in the English SE of the respondents in the study reveals the heterogeneity of English language learners in terms of their belief in executing different tasks in the English language (C. Wang et al., 2014). The heterogeneous results of the English SE scores, not only for overall skills but also for each of the four skills, reveal that the English SE of the students in the study was diverse. Students' mean scores both in overall English SE and the four skills were greater than the median scores, which makes the results in line with previous research results (Sun & Wang, 2020). Of the four skills, the study found that students' SE scores for speaking and writing were relatively lower than listening and reading, though the mean scores were still moderate. Similar findings were also suggested by previous studies that Chinese college students in an EFL context had moderate levels of writing SE (Sun & Wang, 2020). Furthermore, writing obtained the lowest scores. This indicates that students' confidence in their writing skills is below average. This result aligns with a study conducted by Male (2018) on undergraduate students in Indonesia, where writing was perceived as the most challenging skill, followed by reading, speaking, and listening. However, different results were found in a study conducted in China, where students' lowest confidence was in listening skills (Kim et al., 2015).

Different language learning contexts may contribute to these discrepancies in Indonesia and other countries. Besides, limited opportunities to practice writing for students in an EFL setting may explain the low score of students' SE for writing skills, as suggested by Bandura, that experience is a major source of self-efficacy (Bandura, 2021). Highly efficacious students might have acquired more experience performing different English language tasks, which eventually increases their beliefs in what they can do in different contexts and situations. Another reason students' self-efficacy for writing and speaking was relatively lower than listening and speaking was probably because they found writing and speaking more difficult than their counterparts. A previous study also found that students in the EFL context perceived that productive English language skills (writing and speaking) were the most challenging areas in their English-medium classes (Kamaşak et al., 2021).

The low scores of English SE in the present study indicate that some students lack confidence in their English skills. This could be due to various experiences during their learning, including limited exposure to English, previous negative experiences, or lack of practice. A similar result is also evident in the mean score (125.54) being lower than the median (128), which suggests a slight skewness in the data distribution. More students have self-efficacy scores below the median, indicating a larger proportion of students with lower confidence in their English skills. In a study conducted by Fukuda (2019), students with lower English proficiency levels tended to be less self-efficacious than their counterparts. They were less confident about their language skills and were prone to exam orientation.

Looking deeper into the role of SE in students' learning, studies suggest that when students are confident about what they are capable of, they are likely to construe something worth pursuing, which eventually results in their decision to set certain learning goals (Fukuda, 2019; Liem et al., 2008). The hierarchical model of achievement motivation also agrees that students who perceive having competence in certain areas are likely to adopt mastery experience and focus more on exposing themselves to experiences that can develop their competence in various academic tasks (Elliot & Thrash, 2002). In contrast, students with less confidence about their competencies in performing English-related skills are prone to avoid poor performance, which can cause negative judgment from society. As a result, highly efficacious students will make more effort to improve their performance, while the low efficacious students will tend to disengage themselves from learning experiences to improve and challenge their competencies resulting from the apprehension of receiving judgment (Sabti et al., 2019).

Concerning the overall SRL, the study found that, on average, the higher mean score than the median suggests that the students in the study were effectively using SRL strategies more than the median would indicate. This result also shows a positive trend in the adoption of SRL strategies among the students. However, a significantly low score of overall technology-assisted SRL, which was still evident in the study, unveils minimal application of SRL among some students. Though this study did not assess students' proficiency or academic performance levels, the level of proficiency might explain why some students are reluctant to regulate themselves to learn. According to Fukuda (2019) less proficient students tend to quit learning once they are demotivated. Meanwhile, the more proficient learners are aware that their success in their learning is because of a series of learning strategies and efforts they have made. Another reason that can explain the low application of SRL is that while the more proficient learners quickly search for ways to cope with challenges, there is a tendency for the less proficient learners to procrastinate when facing problems during their learning. They also hesitate to seek help from someone more competent.

In terms of each domain of technology-assisted SRL, this study found that motivational regulation strategies obtained the highest mean score. Motivational regulation strategies refer to various attempts or strategies by students to maintain or increase their endeavors or persistence at certain academic tasks (An et al., 2020; Wolters, 1999). According to (Majitol & Yunus, 2023; Wei, 2022) technologies, particularly digital instruments, have attractive, effective, and useful benefits in students' learning motivation. However, the results of this study are insufficient to explain how and what kind of technological instruments can increase students' motivation to learn English.

Furthermore, the study revealed that social strategies had the lowest mean score among the students' technology-assisted SRL categories. A similar finding was obtained by the previous study conducted on Chinese college students in the EFL context (An et al., 2021). Students did not seem to use social-related technologies to facilitate and improve their speaking despite having bigger chances to connect with different L1 speakers from other countries and communicate with native speakers of English on social media or similar platforms. This finding is also supported by a previous study suggesting that students did not fully utilize technologies to regulate their learning process despite the frequent use of digital technologies (Yot-Domínguez & Marcelo, 2017). The minimal use of social-related technologies to create learning opportunities on social media with native speakers of English or English speakers from other countries is quite common among foreign language learners due to their low English-speaking proficiency (An et al., 2020). This also aligns with a study conducted on a group of Indonesian adolescents concerning their attitudes toward English on social media, which suggests contradicting attitudes toward the language on social interaction in digital platform (Ad'hani et al., 2022). For many young people in Indonesia, despite the positive attitude they have toward the eminent position of English as a global language, difficulties in choosing appropriate diction and fear of negative evaluation are still the primary reasons underlying the reluctance to use social media to seek collaborative assistance in their language learning.

The strong and positive relationship between English self-efficacy and technology-assisted self-regulated strategies by the students in the study is supported by previous studies (An et al., 2021)(Su et al., 2018; W. Wang & Zhan, 2020). Higher self-efficacious students tended to incorporate technologies to regulate themselves in English language learning. Higher beliefs in their capabilities in performing various English-related tasks help students be more active in planning, selecting, and evaluating technologies in their learning. Besides, more efficacious students tend to be more persistent when they encounter difficulties in their learning.

The result of this study, which suggests a strongly positive correlation between English self-efficacy and technology-assisted SRL in learning English, also indicates that as students possess higher self-efficacy, they are more likely to implement technology-assisted SRL in their learning process. This is because students behaviors in learning is impacted by their confidence and beliefs about their performance (Zhou & Thompson, 2023). The linear relationship between the level of students' self-efficacy and SRL explains the necessity of including motivation encouraging learning activities in classroom not only to increase their engagement in regular class activities at school, but more than that, to promote the importance of SRL in their learning. Aside from that, the results also reveal that productive skills (writing and speaking) are still considered as a challenge for students despite the ubiquitous learning sources and means on the Internet which can be used to help them improve their performance (Al Hosni, 2014; Fareed et al., 2016). It is worth to further studying the reasons underlying the students who are reluctant to use the digital technologies in the learning. If we draw our attention back to the results of the students' SRL,

social strategies-related technologies were least preferred by the students despite their benefit to enhance collaborative learning, of which the result is in line with the result of previous studies (An et al., 2020; Lai & Gu, 2011). According to Lai and Gu (2011), even though the students utilize communication tools for various purposes in their daily life, they have limited knowledge of how to use these technologies to support their language learning. Meanwhile, this study found that motivational regulation strategies in the technology-assisted SRL obtained the highest score among the other dimensions of technology-assisted SRL. An et al. (2020) suggested that the frequent use of motivational regulation strategies by foreign language learners demonstrates their efforts in maintaining their motivation and serves as their coping strategies to overcome affective challenges such as boredom amidst their learning process.

Conclusion

This study attempts to unveil the profiles of the English SE and technology-assisted SRL of undergraduate students in Indonesia, and how the two variables correlate. The results reveal that the profile of English SE of the students was heterogeneous, with listening and reading average scores higher than the median while writing and speaking obtained lower scores. Regarding technology-assisted SRL, it is apparent that students incorporate technologies in their English SRL strategies. Moreover, this study also found that English SE is positively correlated with technology-assisted SRL.

The results of this study shed light on understanding how students in the digital era, particularly in an EFL context, incorporate technologies in their learning. Taking into account the tremendous utilization of technologies by students, the results of the present study also help teachers to better understand students as digital natives and decide specific methods appropriate to the student's learning characteristics and behaviors.

Though the study has filled the absence of studies related to technology-assisted SRL and its relation to English SE in the EFL context, several limitations need to be tackled in future studies, including less diverse education background and research locations, limited variables included, and less analysis on gender differences and kinds of technologies used by the students. Therefore, future studies need to include a larger population with a more diverse educational background and more varied variables, such as English learning enjoyment and English language performance in four skills.

Acknowledgements

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