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The Role Of Demographic Factors On Students' Online Self-Regulated Learning Strategies In Higher Education: Evidence From Indonesian University Students

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Abstract

Self-regulated learning (SRL) is widely recognized as a crucial factor contributing to students' academic success, particularly in online and technology-enhanced learning environments. This study examined the role of demographic factors in students' use of SRL strategies in higher education. A quantitative survey design was employed involving 236 university students from public and private universities on Lombok Island, Indonesia. Data were collected using the Indonesian adaptation of the Online SRL Questionnaire (OSLQ). Independent-samples *t*-tests and one-way analyses of variance (ANOVA) were conducted to examine differences in SRL strategies based on gender, age group, field of specialization, and year level. The findings revealed no statistically significant differences in SRL strategies between male and female students, $t(94.41) = 0.55$, $p = .587$. Similarly, no significant differences were found across age groups, $F(3, 232) = 2.36$, $p = .073$, fields of specialization, $F(4, 231) = 1.11$, $p = .352$, or year levels, $F(2, 233) = 2.63$, $p = .075$. The effect sizes for all analyses were small, indicating that demographic characteristics explained little variation in students' SRL strategies. The findings suggest that SRL may be influenced more by psychological, instructional, and environmental factors than by demographic characteristics. Implications for higher education practice and future research are discussed.

Keywords: SRL, higher education, demographic factors, online learning, gender differences, university students

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INTRODUCTION

SRL has become one of the most influential concepts in contemporary educational research because it emphasizes learners' active role in managing their own learning processes. SRL refers to the degree to which learners are metacognitively, motivationally, and behaviorally engaged in planning, monitoring, and evaluating their learning activities to achieve academic goals (Zimmerman, 2000,

2002). Students who effectively employ SRL strategies are more likely to demonstrate higher academic achievement, greater persistence, improved problem-solving abilities, and stronger adaptability to changing learning environments (Kizilcec et al., 2017; Sutarni et al., 2021; Hemmler & Ifenthaler, 2024).

The importance of SRL has become increasingly evident in higher education, particularly with the expansion of technology-enhanced, blended, and online learning environments. Research has consistently shown that students' ability to regulate their learning influences their academic success in both traditional and digital learning contexts (Barnard et al., 2009; Delen & Liew, 2016; Yot-Dominguez & Marcelo, 2017). In online and distance education settings, where learners are expected to assume greater responsibility for managing their learning, SRL has been identified as a key determinant of successful learning outcomes (Samruayruen et al., 2013; Ambreen et al., 2016; Ucar, 2023). Furthermore, studies conducted during and after the COVID-19 pandemic highlighted the critical role of self-regulation in helping students cope with educational disruptions and maintain academic performance (Berger et al., 2021; Meshram et al., 2022; Turan et al., 2022).

Theoretical perspectives suggest that SRL is influenced by the interaction of cognitive, motivational, emotional, and contextual factors (Efklides, 2011; Boekaerts, 2011). Consequently, researchers have sought to identify individual and demographic characteristics that may explain variations in students' use of SRL strategies. Among the most frequently examined demographic variables are gender, age, field of specialization, and year level. These characteristics may shape students' educational experiences, learning opportunities, and exposure to different academic demands, potentially influencing the development and application of self-regulatory skills.

Previous research examining demographic influences on SRL has produced mixed findings. Some studies have reported differences in self-regulation across student groups, while others have found that SRL is more strongly associated with motivational, environmental, and technological factors than with demographic characteristics (Wang et al., 2013; Santoso et al., 2022; Lin et al., 2021). Similarly, studies conducted in higher education have suggested that students from different disciplines and academic stages may exhibit varying levels of SRL due to differences in curriculum requirements and learning experiences (Yot-Dominguez & Marcelo, 2017; Lilian et al., 2021; Arrafii & Kasyfurrahman, 2024). However, evidence regarding the effects of gender, age, major, and year level remains inconclusive, indicating a need for further empirical investigation.

Understanding whether demographic factors influence SRL is important for both theory and practice. From a theoretical perspective, such knowledge contributes to a more comprehensive understanding of the factors associated with SRL. Practically, identifying demographic differences can help higher education institutions develop targeted interventions and support systems to strengthen students' self-regulatory capabilities and academic success (Brenner, 2022; Fischer, 2023).

Therefore, the present study examined the role of demographic factors in students' use of SRL strategies in higher education. Specifically, the study investigated whether SRL strategies differed according to gender, age range, field of specialization, and year level. By exploring these relationships, the study sought to contribute to the growing body of literature on SRL and provide evidence regarding the extent to which demographic characteristics influence SRL among university students.

LITERATURE REVIEW

SRL in Higher Education

SRL is a multidimensional process through which learners actively regulate their cognition, motivation, emotions, and behaviors to achieve academic goals (Zimmerman, 2000, 2002). Rather than being passive recipients of knowledge, self-regulated learners engage in planning, monitoring, and evaluating their learning activities while adapting their strategies to changing academic demands (Zimmerman & Martinez-Pons, 1986). Theoretical models of SRL emphasize the dynamic interaction among cognitive, metacognitive, motivational, and affective processes (Boekaerts, 2011; Efklides, 2011).

The importance of SRL in higher education has increased significantly with the expansion of technology-mediated learning environments. Studies have shown that students who effectively use SRL strategies demonstrate higher levels of academic achievement, persistence, engagement, and learning satisfaction (Kizilcec et al., 2017; Sutarni et al., 2021; Cabrera & Distor, 2022). In online and blended learning environments, SRL has been identified as a critical predictor of successful learning outcomes because students are required to manage their own learning with less direct instructor supervision (Barnard et al., 2009; Delen & Liew, 2016; Samruayruen et al., 2013).

Recent studies have further highlighted the role of SRL during periods of educational disruption. During the COVID-19 pandemic, students with stronger self-regulatory skills were better able to cope with remote learning challenges and maintain academic performance (Berger et al., 2021; Meshram et al., 2022; Turan et al., 2022). Similarly, research conducted in Indonesia found that learners' self-regulation skills contributed significantly to their academic achievement and adaptation to digital learning environments (Santoso et al., 2022; Sulisworo et al., 2020). Consequently, SRL is increasingly viewed as a fundamental competency for academic success in contemporary higher education.

Demographic Factors and SRL

Researchers have investigated whether demographic characteristics influence students' use of SRL strategies. Gender is one of the most frequently examined variables. Some studies suggest that female students tend to report greater use of planning, monitoring, and organizational strategies than male students, while other studies have found little or no gender-based differences in self-regulation (Wang et

al., 2013; Lin et al., 2021). These inconsistent findings indicate that the relationship between gender and SRL may vary across educational and cultural contexts.

Age has also been considered a potential factor influencing SRL. Older students are often assumed to possess greater maturity, academic experience, and self-management skills, which may facilitate the use of SRL strategies. However, empirical evidence remains mixed, with some studies reporting positive associations between age and self-regulation and others finding negligible effects (Jansen et al., 2020; Ucar, 2023).

Academic specialization and year level may likewise shape students' self-regulatory behaviors. Different disciplines require distinct learning approaches, assessment methods, and academic expectations, which could encourage the development of particular SRL strategies (Yot-Dominguez & Marcelo, 2017; Lilian et al., 2021). Similarly, students at more advanced stages of study may be expected to demonstrate stronger self-regulatory competencies as a result of accumulated academic experience. Nevertheless, research findings remain inconclusive regarding whether students from different majors or year levels significantly differ in their use of SRL strategies.

Existing literature suggests that demographic characteristics may influence SRL; however, the magnitude and consistency of these relationships remain unclear. This inconsistency highlights the need for further research examining demographic differences in diverse higher education settings.

SRL in Digital and Contemporary Learning Contexts

The growing integration of digital technologies into higher education has transformed the nature of learning and increased the importance of self-regulation. Online learning environments require students to independently manage their study schedules, learning resources, and academic progress (Acar & Prudente, 2021; Fung et al., 2018). Consequently, SRL has become a central focus of research in digital education.

Studies have demonstrated that self-regulated learners are more likely to engage effectively with digital learning platforms, utilize learning analytics feedback, and achieve desired learning outcomes (Fan et al., 2021; Siadaty et al., 2016). Research on MOOCs and online learning environments has similarly shown that SRL strategies predict learner engagement, persistence, and goal attainment (Kizilcec et al., 2017; Vilkova & Shcheglov, 2021). Furthermore, technological readiness and digital learning environments have been found to support the development and application of SRL strategies (Ucar, 2023; Santoso et al., 2022).

In Indonesia and other developing contexts, however, variations in access to technology, learning opportunities, and educational experiences may influence students' ability to regulate their learning effectively (Hidayah, 2022; Zecca & Cotza, 2020). Understanding whether demographic characteristics contribute to differences in SRL within these contexts remains an important area of inquiry, particularly as

higher education institutions continue to adopt flexible and technology-enhanced learning models.

Although a substantial body of research has established the importance of SRL for academic success, relatively few studies have systematically examined the combined influence of multiple demographic factors on SRL among higher education students. Existing findings regarding the effects of gender, age, academic specialization, and year level are inconsistent, with some studies reporting significant differences and others reporting negligible effects. Moreover, much of the current literature has focused on motivational, technological, and environmental determinants of SRL rather than demographic characteristics.

In the context of higher education, particularly in developing countries and increasingly digital learning environments, understanding whether demographic factors influence students' use of SRL strategies remains important for informing educational policies and support programs. If meaningful demographic differences exist, institutions may need to design targeted interventions for specific student groups. Conversely, if SRL is largely independent of demographic characteristics, institutions may focus on universal approaches to developing self-regulatory competencies among all students.

This study was conducted to examine whether students' use of SRL strategies differs according to gender, age range, field of specialization, and year level. By addressing these variables simultaneously, the study contributes to the growing body of literature on SRL and provides empirical evidence that can guide student support initiatives and instructional practices in higher education.

METHOD

Research Design

This study employed a quantitative cross-sectional survey design to investigate the role of demographic factors in students' use of SRL strategies in higher education. Specifically, the study examined whether students' SRL strategies differed according to gender, age group, field of specialization, and year level.

Instrument

Data were collected using the Online SRL Questionnaire (OSLQ) developed by Barnard et al. (2009). The OSLQ is one of the most widely used instruments for measuring SRL in online and technology-mediated learning environments and has been validated in several countries, including the United States, China, Russia, Israel, and various European contexts (Fung et al., 2018; Vilkova & Shcheglov, 2021). Previous studies reported high levels of reliability, with Cronbach's alpha coefficients ranging from .87 to .96 (Barnard et al., 2009).

The questionnaire consists of 24 items representing six dimensions of SRL: goal setting, environment structuring, task strategies, time management, help-seeking, and self-evaluation. To ensure linguistic and cultural appropriateness, the questionnaire was translated and adapted into Bahasa Indonesia. The lead researcher conducted the

initial translation using a meaning-focused approach to preserve the conceptual meaning of each item while ensuring clarity for Indonesian university students. The translated version was subsequently reviewed by members of the research team and revised based on their feedback (see Arrafii et al., 2025).

To improve content validity, the translated instrument was evaluated by experts in educational research, survey design, and statistics. Revisions were made based on expert recommendations before conducting a pilot study involving 36 university students. The pilot study aimed to evaluate the clarity of the questionnaire items and examine the instrument's psychometric properties.

The original five-point agreement scale was modified to a four-point frequency scale to better capture students' frequency of SRL strategy use in online learning contexts. Response options consisted of Never (1), Rarely (2), Often (3), and Always (4). Higher scores indicated more frequent use of SRL strategies.

The pilot study demonstrated high internal consistency reliability (Cronbach's $\alpha = .906$). In the main study, reliability analysis showed excellent internal consistency (Cronbach's $\alpha = .911$). Construct validity was examined using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. The pilot study yielded a KMO value of .560, whereas the full sample produced a substantially higher KMO value of .894, indicating that the instrument was appropriate for measuring the SRL construct among Indonesian university students.

Participants and Procedure

Following instrument validation, data were collected from university students enrolled in public and private universities on Lombok Island, Indonesia. The questionnaire was distributed online through Google Forms during July 2023. To maximize participation, lecturers from several universities were invited to distribute the survey link through student groups and courses they taught.

A total of 272 students completed the questionnaire. However, 36 respondents (13.2%) reported that they had never participated in online learning and were therefore excluded from the analysis. The final sample consisted of 236 students.

Table 1

Characteristics of Survey Respondents (N = 236)

Gender	Female	79.9%
	Male	27.1%
Age group	19-20 years	48.3%
	21-22 years	36.9%
	23-24 years	11%
	25-26 years	3.8%
Grades	Semester 1 (year 1)	12.7%
	Semester 2 (year 1)	17.8%
	Semester 3 (year 2)	14%
	Semester 4 (year 2)	9.7%
	Semester 5 (year 2)	5.9%

Above semester 5 (year 3 above)	39.8%

The sample was predominantly female (79.9%), while male students represented 20.1% of respondents. Participants were grouped into four age categories: 19–20 years (48.3%), 21–22 years (36.9%), 23–24 years (11.0%), and 25–26 years (3.8%). Students represented a variety of academic disciplines, including Language (29.2%), Economics (13.1%), Science (10.6%), Health Sciences (16.9%), and other disciplines (30.1%). Participants also represented different stages of study, ranging from first-year to advanced-year students.

Data Analysis

Data were analyzed using IBM SPSS Statistics. Descriptive statistics, including means, standard deviations, frequencies, and percentages, were calculated to summarize participants' demographic characteristics and overall SRL scores.

To examine whether students' use of SRL strategies differed according to demographic characteristics, inferential statistical analyses were conducted. An independent-samples *t*-test was used to compare SRL strategy scores between male and female students. Prior to conducting the *t*-test, Levene's test for equality of variances was examined to determine whether the assumption of homogeneity of variance was met. When the assumption was violated, Welch's *t*-test results were reported.

ANOVA were conducted to examine differences in SRL strategies across age groups, fields of specialization, and year levels. Before interpreting the ANOVA results, Levene's test was used to assess the homogeneity of variances assumption. Where the ANOVA results were significant, Bonferroni post hoc comparisons were planned to identify specific group differences. Effect sizes were reported using Cohen's *d* for the independent-samples *t*-test and eta-squared (η^2) for ANOVA analyses. For all statistical analyses, the significance level was set at $p < .05$.

RESULTS

An independent-samples *t*-test was conducted to examine whether students' SRL strategies differed by gender. Levene's test indicated unequal variances, $F(1, 234) = 6.38$, $p = .012$; therefore, the Welch *t*-test results were reported. The analysis showed no significant difference in SRL strategies between male and female students, $t(94.41) = 0.55$, $p = .587$, 95% CI [−0.110, 0.194]. The effect size was negligible, Cohen's $d = 0.09$, 95% CI [−0.199, 0.375], indicating that gender had little influence on students' SRL strategies.

An ANOVA was conducted to examine differences in SRL strategies across four age groups (19–20, 21–22, 23–24, and 25–26 years). Levene's test indicated that the assumption of homogeneity of variances was met, $F(3, 232) = 0.54$, $p = .658$. The ANOVA revealed no statistically significant differences in SRL strategies among the age groups, $F(3, 232) = 2.36$, $p = .073$, $\eta^2 = .030$. Bonferroni post hoc comparisons indicated that none of the pairwise differences between age groups were statistically

significant (all *p*s > .05). These findings suggest that age was not a significant factor affecting students' SRL strategies.

Table 2

Inferential Statistics for Demographic Differences in SRL Strategies

Variable	Levene's Test	Main Analysis	p	Effect Size	Interpretation
Gender	$F(1, 234) = 6.38$, $p = .012$	$t(94.41) = 0.55$	.587	$d = 0.09$	Not significant
Age Group	$F(3, 232) = 0.54$, $p = .658$	$F(3, 232) = 2.36$	.073	$\eta^2 = .030$	Not significant
Field of Specialization	$F(4, 231) = 0.99$, $p = .414$	$F(4, 231) = 1.11$	.352	$\eta^2 = .019$	Not significant
Year Level	$F(2, 233) = 0.76$, $p = .469$	$F(2, 233) = 2.63$	.075	$\eta^2 = .022$	Not significant

Note. SRL = SRL. Statistical significance was evaluated at α = .05. Cohen's *d* was reported for the independent-samples *t*-test, whereas eta-squared (η^2) was reported for ANOVA analyses. All effect sizes were small, indicating that demographic characteristics explained little variation in students' SRL strategies.

A one-way ANOVA was also conducted to examine differences in SRL strategies across five fields of specialization (Language, Economics, Science, Health, and other majors). Levene's test indicated that the assumption of homogeneity of variances was met, $F(4, 231) = 0.99$, $p = .414$. The ANOVA revealed no significant differences in SRL strategies among the different majors, $F(4, 231) = 1.11$, $p = .352$, $\eta^2 = .019$. Bonferroni post hoc comparisons showed that none of the pairwise differences between majors were statistically significant (all *p*s > .05). These findings suggest that students' field of specialization was not significantly associated with their use of SRL strategies.

Another one-way ANOVA was performed to examine differences in SRL strategies across year levels (first year, second year, and third year). Levene's test indicated that the assumption of homogeneity of variances was met, $F(2, 233) = 0.76$, $p = .469$. The ANOVA revealed no statistically significant differences in SRL strategies among year levels, $F(2, 233) = 2.63$, $p = .075$, $\eta^2 = .022$. Bonferroni post hoc comparisons showed no significant pairwise differences between first-year, second-year, and third-year students (all *p*s > .05). These findings suggest that year level was not significantly associated with students' use of SRL strategies.

DISCUSSION

The purpose of this study was to examine whether students' use of SRL strategies differed according to selected demographic factors, namely gender, age, field of specialization, and year level. The findings revealed that none of these demographic variables had a statistically significant effect on students' overall SRL

strategies. Specifically, no significant differences were found between male and female students, among different age groups, across fields of specialization, or between year levels. These findings suggest that students' engagement in SRL may be relatively independent of demographic characteristics and may instead be influenced by other factors, such as motivation, learning environment, technological readiness, and personal learning experiences.

The first finding showed that gender did not significantly influence students' use of SRL strategies. Although previous studies have occasionally reported that female students tend to demonstrate higher levels of self-regulation than male students, the present findings align with research suggesting that gender differences in SRL are often small or inconsistent across contexts (Wang et al., 2013; Lin et al., 2021). The negligible effect size found in this study further indicates that male and female students possess similar capacities for planning, monitoring, and regulating their learning activities. This result may reflect the increasingly equal access to educational resources, digital technologies, and learning opportunities available to university students regardless of gender. In contemporary higher education environments, students are often exposed to similar academic expectations and technological learning platforms, which may reduce traditional gender-based differences in learning behaviors. Consequently, the findings support the view that SRL is primarily a learned competence rather than an inherent characteristic associated with gender (Zimmerman, 2002).

The second major finding was that age did not significantly affect students' use of SRL strategies. Although older students are frequently assumed to possess greater maturity and academic experience, the present study found that students across all age groups demonstrated comparable levels of SRL. This finding is consistent with research suggesting that age alone is not a strong predictor of self-regulatory behavior in higher education settings (Jansen et al., 2020; Ucar, 2023). One possible explanation is that the age range represented in this study was relatively narrow, with the majority of respondents falling between 19 and 22 years old. Consequently, students may have shared similar educational experiences and academic demands regardless of age. Furthermore, self-regulation is often viewed as a skill developed through engagement with learning activities rather than through age-related maturation alone (Zimmerman & Martinez-Pons, 1986). Therefore, differences in learning experiences, motivation, and learning environments may be more important determinants of SRL than chronological age.

Similarly, the findings revealed no significant differences in SRL strategies across fields of specialization. Students from language, economics, science, health sciences, and other academic disciplines reported comparable levels of SRL. This finding contrasts with assumptions that disciplinary differences may encourage distinct learning approaches and study habits (Yot-Dominguez & Marcelo, 2017; Lilian et al., 2021). However, the results may reflect the increasingly standardized nature of higher education learning environments, particularly during and after the widespread adoption of online and blended learning approaches. Regardless of

academic discipline, students today often rely on similar digital learning management systems, communication tools, and online resources. As a result, they may be required to employ similar self-regulatory behaviors, such as managing time, organizing learning environments, seeking help online, and monitoring academic progress. The findings therefore suggest that SRL competencies may transcend disciplinary boundaries and function as general academic skills applicable across fields of study.

Another important finding was that year level did not significantly influence students' SRL strategies. Although one might expect students to develop stronger self-regulatory skills as they progress through university, the results showed no significant differences between students at different stages of their studies. This finding aligns with previous research indicating that self-regulation does not necessarily improve automatically with academic progression (Santoso et al., 2022). Rather, the development of SRL may depend on intentional instructional practices, opportunities for reflection, and exposure to learning experiences that promote autonomy and metacognitive awareness. If such opportunities are not systematically integrated into university curricula, students may not substantially improve their self-regulation skills over time despite accumulating academic experience. This interpretation is supported by Brenner (2022), who argued that self-regulation develops most effectively when learners are actively supported through instructional designs that encourage self-monitoring, goal setting, and reflection.

Taken together, the findings contribute to the growing body of evidence suggesting that demographic characteristics may play a relatively minor role in explaining students' SRL behaviors. Instead, contemporary theories of SRL emphasize the importance of motivational, cognitive, emotional, and environmental factors (Boekaerts, 2011; Efklides, 2011). For example, students' self-efficacy, goal orientation, emotional regulation, and learning engagement have been identified as key determinants of SRL (Deasyanti & Yudhistira, 2021; Cabrera & Distor, 2022). Similarly, the quality of the learning environment and the availability of technological support have been shown to influence students' ability to regulate their learning effectively (Delen & Liew, 2016; Ucar, 2023).

The findings are particularly relevant in the context of digital and online learning. Previous studies have demonstrated that successful participation in online learning requires students to independently manage their learning activities and employ a wide range of SRL strategies (Barnard et al., 2009; Samruayruen et al., 2013). During the COVID-19 pandemic, researchers found that students with stronger self-regulatory skills were better able to adapt to remote learning conditions and maintain academic performance (Berger et al., 2021; Meshram et al., 2022). The absence of demographic differences in the present study may indicate that the challenges and demands of online learning affect students similarly regardless of their gender, age, major, or year level. Consequently, SRL may function as a universal competency that is important for all students rather than a characteristic associated with specific demographic groups.

IMPLICATIONS AND LIMITATIONS

The findings also have important practical implications for higher education institutions. Since demographic variables were not found to significantly influence SRL strategies, universities may benefit from implementing institution-wide interventions aimed at strengthening self-regulation among all students. Such interventions could include workshops on time management, goal setting, metacognitive reflection, and digital learning skills. Research has shown that SRL can be developed through appropriate instructional support and learning design (Fischer, 2023; Hemmler & Ifenthaler, 2024). Therefore, rather than targeting specific demographic groups, educators may focus on creating learning environments that encourage self-regulatory behaviors across the entire student population.

Several limitations should be considered when interpreting the findings. First, the study relied on self-reported questionnaire data, which may be subject to response bias and social desirability effects. Second, the sample was drawn from universities located on Lombok Island, which may limit the generalizability of the findings to other regions or educational contexts. Third, the study focused exclusively on demographic variables and did not examine other potentially important predictors of SRL, such as motivation, self-efficacy, academic achievement, technological readiness, or learning engagement. Future research should investigate these variables using larger and more diverse samples and may benefit from employing mixed-method approaches to obtain a deeper understanding of students' SRL processes.

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