

The Effectiveness of E-Worksheet Use in the Elementary Social Studies Teaching Course to Enhance Self-Regulated Learning among Preservice Elementary School Teachers

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Abstract:

This study aims to determine the effectiveness of using e-worksheets in elementary social studies courses to improve students' self-regulated learning (SRL). SRL is an important ability that enables students to manage, control, and evaluate their own learning processes

independently. The use of e-worksheets is considered a digital learning medium that can encourage active student engagement in the learning process while also fostering greater learning autonomy.

This research employed a quantitative approach with a pre-experimental design. The study was conducted by implementing e-worksheets as a learning intervention in elementary social studies courses. Research data were collected by measuring students' SRL abilities before and after the treatment. Furthermore, the data were analyzed using a paired sample t-test to identify differences in students' SRL abilities before and after the implementation of e-worksheets.

The findings revealed a significant difference in students' SRL abilities before and after the use of e-worksheets, with a significance value of 0.028 (<0.05). These results indicate that the use of e-worksheets is effective in improving students' self-regulated learning abilities in elementary social studies learning.

Abstrak :

Penelitian ini bertujuan untuk mengetahui efektivitas penggunaan *e-worksheet* dalam perkuliahan IPS SD terhadap peningkatan kemampuan *self-regulated learning* (SRL) mahasiswa. SRL merupakan kemampuan penting yang mendukung mahasiswa dalam mengatur, mengontrol, dan mengevaluasi proses belajarnya secara mandiri. Penggunaan *e-worksheet* dipandang sebagai salah satu media pembelajaran digital yang mampu mendorong keterlibatan aktif mahasiswa dalam proses pembelajaran sekaligus meningkatkan kemandirian belajar.

Metode penelitian yang digunakan adalah penelitian kuantitatif dengan desain pre eksperimen. Penelitian dilakukan dengan memberikan perlakuan berupa penggunaan *e-worksheet* dalam proses perkuliahan IPS

SD. Data penelitian diperoleh melalui pengukuran kemampuan SRL mahasiswa sebelum dan sesudah perlakuan. Selanjutnya, data dianalisis menggunakan uji beda sampel berpasangan (*paired sample t-test*) untuk mengetahui perbedaan kemampuan SRL mahasiswa sebelum dan setelah penggunaan *e-worksheet*.

Hasil penelitian menunjukkan bahwa terdapat perbedaan yang signifikan pada kemampuan SRL mahasiswa sebelum dan sesudah penggunaan *e-worksheet* dengan nilai signifikansi sebesar 0,028 ($<0,05$). Temuan ini menunjukkan bahwa penggunaan *e-worksheet* efektif dalam

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membantu meningkatkan kemampuan *self-regulated learning* mahasiswa pada perkuliahan IPS SD.

INTRODUCTION

Higher education learning has undergone substantial transformation in response to rapid technological advancements and the evolving demands of future-oriented education. Learning is no longer characterized by one-way knowledge transmission; instead, it increasingly emphasizes students' active engagement in constructing their own knowledge. The implementation of an Outcome-Based Education (OBE) curriculum has further promoted student participation in the learning process, shifting classroom instruction from a traditional *transfer of knowledge* approach toward a student-centered paradigm. This approach prioritizes the development of higher-order thinking skills, professional competencies, and self-directed learning abilities. Such a paradigm shift aligns educational practices with real-world competencies, thereby enhancing graduates' employability and practical skills (Handayani et al., 2024)

To address these evolving educational demands, students' self-regulated learning (SRL) plays a crucial role in ensuring successful learning outcomes. SRL refers to an individual's ability to actively regulate and manage their own learning processes. This perspective is supported by the assertion than Zimmerman, (2002b). SRL is defined as students' ability to independently regulate and manage their learning processes by employing various strategies to achieve learning goals, including setting learning objectives, managing time, organizing an appropriate learning environment, selecting effective learning resources, and engaging in self-evaluation. Furthermore, SRL is considered an essential internal attribute of both students and educators, as it contributes to the achievement of learning objectives and the enhancement of the overall quality of the teaching and learning process. (Navyola, 2022).

Nevertheless, university students' self-regulated learning (SRL) cannot yet be considered adequate. A growing body of research indicates that students' SRL remains in need of further development. For example, a study involving university students in Bandung found that only 12.3% of participants demonstrated a high level of learning motivation, highlighting the need for more targeted interventions to strengthen students' intrinsic motivation. (Polla & Rahima, 2025). Furthermore, in the context of English as a Foreign Language (EFL) learning, university students tend to rely primarily on basic learning strategies. Moreover, male students have been found to employ task-planning and self-monitoring strategies more frequently than their female counterparts (Wahyuni B et al., 2025). In the context of online learning, research has shown that university students generally demonstrate relatively high levels of self-efficacy. However, they continue to experience difficulties in help-seeking and time-management, which ultimately have a detrimental impact on their academic performance. (Santoso et al., 2022).

These findings are consistent with the results of our preliminary study. Based on questionnaire responses from 27 second-year students at Universitas PGRI Kediri, the average SRL score was 2.45 out of a maximum possible score of 4, indicating a moderate level of self-regulated learning. Among the SRL dimensions, task strategy exhibited the lowest mean score ($M = 1.87$), suggesting that students experienced the greatest difficulty in planning and implementing effective strategies for completing learning tasks. These findings underscore the need for instructional interventions that effectively foster students' self-regulated learning.

The integration of technology into teaching and learning has become increasingly essential in contemporary higher education. Indeed, the effective incorporation of technology into education is now recognized as a critical component of educational development in the twenty-first century. (Geoffrey F. C. Lim et al., 2025). The use of technology in education is widely regarded as more efficient and accessible (Kuncahyono, 2020; Widiyanti & Mizan, 2020). Technology enhances the learning process by making it more interactive and flexible, thereby enabling instruction to be adapted to diverse learning needs (Daulay, 2026). Moreover, the integration of technology in higher education offers numerous advantages, including expanded access to learning resources, support for more personalized learning experiences, and improved quality of students' practical training (Mamadaliyeva Lola Kamildjanovna, 2024). Consequently, the effective integration of technology into learning particularly in learning management plays a meaningful role in fostering students' self-regulated learning.

One form of technology-enhanced learning is the use of electronic worksheets (e-worksheets). In the present study, e-worksheets refer to a feature integrated within the university's Learning Management System (LMS) that enables students to access learning materials, engage in discussions with peers, complete quizzes, and consult with lecturers regarding their learning projects. Beyond providing broader access to learning resources, LMSs facilitate meaningful interactions among students, learning materials, lecturers, and peers, thereby contributing to improved learning outcomes (Costley et al., 2022). Furthermore, worksheets can provide structured learning tasks that enhance students' mastery of course content, promote independent learning, and facilitate more effective task management (Dek Ngurah Laba Laksana, Yosefina Uge Lawe, Frumensia Ripo, Maria Oliva Bolo, 2020)

The integration of Learning Management Systems (LMSs) with hypermedia technologies and personalized feedback systems has been shown to enhance students' motivation and self-regulated learning (SRL), both of which are critical determinants of academic success (Sáiz-Manzanares et al., 2019). These findings are consistent with those of (Sarapin & Morris, 2015), who reported that students with higher levels of SRL are more likely to utilize LMSs effectively, particularly in terms of time management and the regulation of learning strategies. In the Indonesian context, the use of LMSs has likewise

been found to promote students' independent learning and strengthen their self-regulation through more structured and reflective learning activities (Novitasari et al., 2024).

While previous studies have highlighted the advantages of e-worksheets in various contexts, such as facilitating monitoring and assessment in online learning and enabling more efficient content delivery, the present study focuses on investigating the use of e-worksheets as a tool to guide students' learning activities both inside and outside the classroom. The *Elementary Social Studies Teaching* course is designed to develop preservice teachers' competencies in planning Social Studies instruction for elementary schools and is therefore predominantly project-based. Consequently, students' ability to self-regulate their learning is essential for successfully completing course requirements. Accordingly, this study aims to examine the effectiveness of e-worksheets in enhancing students' self-regulated learning (SRL)

METHOD

This study employed a quantitative research approach. Quantitative research aims to test objective theories by measuring variables and examining the relationships among them using statistical procedures. This approach emphasizes the collection of numerical data to generate objective and generalizable findings (Creswell, 2012). The study adopted a pre-experimental one-group pretest–posttest design to examine changes in students' self-regulated learning (SRL) before and after the instructional intervention. The participants consisted of 35 undergraduate students enrolled in the *Elementary Social Studies Teaching* course.

Participants were selected using purposive sampling on the basis that the chosen class demonstrated challenges related to self-regulated learning (SRL), making it appropriate for addressing the objectives of the study. Data were collected using a questionnaire developed from the SRL framework proposed by Zimmerman (2002). The instrument assessed five dimensions of SRL: goal setting, learning environment structuring, task strategies, help-seeking, and time management. Responses were measured using a four-point Likert scale consisting of *strongly disagree*, *disagree*, *agree*, and *strongly agree*.

The research instrument consisted of a self-regulated learning (SRL) questionnaire developed by the researchers based on Zimmerman's (2002) theoretical framework. Prior to its administration in the main study, the instrument was validated using responses from 180 participants who were not included in the research sample. Construct validity was examined through Exploratory Factor Analysis (EFA) to determine whether the questionnaire items adequately represented the underlying dimensions of self-regulated learning. The suitability of the data for factor analysis was evaluated using the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and the Anti-Image Measure of Sampling Adequacy. Factor analysis was considered appropriate when the KMO value was ≥ 0.50 and the Anti-Image value for each item was ≥ 0.50 .

Items with factor loadings of at least 0.40 on their respective factors were considered valid.

The initial instrument comprised 28 items representing six dimensions of SRL: goal setting, learning environment structuring, task strategies, help-seeking strategies, self-evaluation, and time management. The validity analysis indicated that 10 items did not meet the established criteria and were therefore excluded, resulting in a final instrument consisting of 18 items.

The reliability of the final instrument was subsequently evaluated using Cronbach's alpha to assess its internal consistency. The analysis yielded a Cronbach's alpha coefficient of 0.813 for the 18-item instrument, exceeding the recommended minimum threshold of 0.60. Therefore, the questionnaire was considered to have satisfactory internal consistency and was deemed reliable for use in this study.

Data were analyzed using a paired-samples *t*-test to examine differences in students' self-regulated learning (SRL) before and after the instructional intervention. Prior to hypothesis testing, the normality of the data was assessed to determine whether the assumptions for parametric analysis were satisfied. If the data were normally distributed, a paired-samples *t*-test was employed. Otherwise, the nonparametric Wilcoxon signed-rank test was used as an alternative. All statistical analyses were performed using IBM SPSS Statistics.

RESULT

The study was conducted by first introducing the research objectives and providing students with access to the e-worksheets prepared for the course. Prior to the instructional intervention, participants completed the self-regulated learning (SRL) questionnaire as a pretest. Students then accessed and studied the learning materials available in the e-worksheets, while the lecturer provided an introductory explanation of the topic during class. Throughout the learning process, students were encouraged to consult the lecturer regarding any concepts they did not understand. They subsequently discussed the problems presented in the e-worksheets and documented the outcomes of their discussions within the platform, where the lecturer provided feedback.

In the following stage, students examined the project requirements, completed the assigned tasks, and submitted their work through the e-worksheet platform. After two instructional sessions, participants completed the SRL questionnaire again as the posttest to assess changes in their self-regulated learning following the intervention.

The descriptive statistics of students' self-regulated learning (SRL) scores before and after the intervention are presented in Table 1.

Table 1. Descriptive Statistics of the Research Data

Variable	N	Min	Max	Mean	Deviation Standart
<i>pretest</i>	35	57.41	94.44	74.7623	8.89344
<i>posttest</i>	35	57.41	100.00	76.8254	9.84339

The descriptive statistics indicate that the mean SRL score increased modestly from 74.76 at the pretest to 76.83 at the posttest. Although the magnitude of the increase was relatively small, it suggests a positive trend in students' self-regulated learning following the intervention. Furthermore, the comparable standard deviations observed at the pretest (SD = 8.89) and posttest (SD = 9.84) indicate that the variability of students' scores remained relatively stable across the two measurement occasions. The slightly higher standard deviation observed in the posttest suggests greater variability in students' SRL scores following the intervention. This finding indicates that although the intervention was associated with an overall improvement in SRL, the magnitude of improvement varied across participants.

Before testing the research hypothesis, a normality test was conducted to determine whether the data satisfied the assumptions required for parametric statistical analysis. The results of the normality test are presented in Table 2.

Table 2. Results of the Normality Test

	Kolmogorov-Smirnov ^a		
	Statistic	df	Sig.
Pretest	.082	35	.200*
Posttest	.147	35	.054

The normality of the pretest and posttest scores was assessed using the Kolmogorov–Smirnov test. As presented in Table 2, the pretest scores yielded a significance value of 0.200, while the posttest scores yielded a significance value of 0.054. Since both significance values exceeded the threshold of 0.05, (Ghasemi, A., & Zahediasl, 2012) the data were considered to be normally distributed. Therefore, the assumption of normality was satisfied, indicating that a paired-samples *t*-test was appropriate for testing the research hypothesis.

Therefore, the subsequent analysis was conducted using the parametric paired-samples *t*-test to examine whether there was a significant difference in students' self-regulated learning (SRL) before and after the intervention. The results of the paired-samples *t*-test are presented in Table 3.

Table 3. Results of the Paired-Samples *t*-Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	pretest - posttest	-2.06314	5.31022	.89759	-3.88727	-.23902	-2.299	34	.028

The results of the paired-samples *t*-test revealed a statistically significant difference between the pretest and posttest SRL scores. This finding is supported by the two-tailed significance value ($p = .028$), which was below the significance threshold of .05 (Wass & Golding, 2014). Therefore, the null hypothesis was rejected, indicating that students' self-regulated learning (SRL) significantly improved following the instructional intervention.

More specifically, the mean difference between the pretest and posttest scores was -2.06 , indicating that the posttest scores were higher than the pretest scores. Furthermore, the analysis yielded a *t* value of -2.299 with 34 degrees of freedom ($df = 34$), providing additional evidence of a statistically significant difference between the two measurement occasions.

These findings indicate that the use of the e-worksheet was associated with a significant improvement in students' self-regulated learning. Accordingly, the intervention can be considered effective in enhancing students' SRL.

DISCUSSION

The findings of this study reinforce the important role of technology in supporting teaching and learning. The results demonstrated a significant improvement in students' self-regulated learning (SRL) following the implementation of e-worksheets. These findings suggest that integrating e-worksheets into classroom instruction can provide a structured learning environment that supports students in regulating their own learning processes.

The use of e-worksheets enabled students to clearly identify the learning materials that needed to be studied independently, participate in collaborative discussions with their peers, and document the outcomes of those discussions within the learning platform. In addition, the management of assignments and project submissions through the e-worksheet enhanced the efficiency of the learning process. The platform also facilitated continuous feedback, as both lecturers and peers were able to provide written comments on students' work. Because this feedback was recorded digitally, students could revisit the comments throughout the learning process, thereby supporting reflection, revision, and continuous improvement. (Nuraeni & Irawati, 2022) research on the use of similar technologies has shown that learning designs utilizing e-learning can enhance students' learning motivation.

This instructional setting enables students to regulate their own learning. Students are informed in advance about the learning materials to be covered, thereby encouraging them to establish learning goals from the outset. This finding is supported by the study conducted by (Kieft et al., 2008) which demonstrated that technology-based learning environments can enhance students' self-regulation, particularly in the areas of planning and goal setting. Students who engage in computer-based learning environments are more likely to establish specific learning goals than those participating in conventional instruction.

Furthermore, students are provided with clear information regarding the tasks they are expected to complete and discuss. This allows them to organize their learning environment, determine appropriate help-seeking strategies, and manage their time more effectively. At the end of each learning session, students complete a self-reflection activity within the e-worksheet, enabling them to evaluate their own learning process. Self-evaluation plays a crucial role in learning, as it reflects students' high level of attentiveness to preparing for and engaging in the learning process (Hidayat, 2018).

The findings of the present study are consistent with previous research. A study conducted by (Harini et al., 2023) demonstrated that the use of electronic worksheets can enhance students' problem-solving skills while simultaneously promoting independent learning. These findings suggest a close relationship between the use of digital learning media and the development of self-regulated learning (SRL).

Similarly, the study by (Umamah et al., 2023) on the implementation of SRL-based e-modules in history instruction reported a significant improvement in students' learning independence, further confirming that digital technologies can support more autonomous learning processes. Consistent with these findings, (Dabbagh & Kitsantas, 2005) reported that digital e-worksheets, referred to as web-based pedagogical tools (WBPT), effectively support key components of self-regulated learning, including goal setting, self-monitoring, time management, and help-seeking. Their qualitative and quantitative analyses further demonstrated that WBPT facilitate strategic learning and effectively promote the development of students' self-regulated learning.

CONCLUSION

The findings of this study indicate that the use of e-worksheets was associated with a significant improvement in students' self-regulated learning (SRL). By providing structured learning activities, opportunities for independent study, collaborative discussion, project-based assignments, and continuous feedback, the e-worksheets supported students in regulating their learning through goal setting, time management, learning environment structuring, help-seeking, and self-evaluation. These findings suggest that integrating digital technologies into higher education instruction can create a more student-centered learning environment that fosters self-regulated learning.

Nevertheless, this study examined the overall effect of the intervention on students' SRL and did not investigate its impact on each SRL dimension individually. In addition, the use of a one-group pretest–posttest design limits the ability to draw causal inferences. Therefore, future research should employ a more rigorous experimental design by incorporating a control group and examining the effects of e-worksheets on each dimension of self-regulated learning separately to provide a more comprehensive understanding of their educational effectiveness.

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