

E-Journey: A Self-Regulation Tool for Students' Academic Achievement in Select Grade 8 Mathematics Topics

Ruffa Mae C. Ediezca¹, Mikaela Victoria P. Pascua¹, Elaine Joy E. Salen¹, Asher B. Toledo¹, Angeline D. Vales¹, Denny Vincent M. Vergel¹, Jose Mari M. Calamlam^{1*}

¹ Philippine Normal University

*Corresponding Author: calamlam.jmm@pnu.edu.ph

Abstract: Many public schools in the Philippines, particularly in low-income areas, continue to experience a persistent shortage of textbooks and educational materials, hindering effective instruction and widening the academic achievement gap. These resource limitations are further compounded by challenges in monitoring student progress in blended and online learning environments. In response, this study developed and implemented the E-Journey, an online notebook grounded in Zimmerman's Self-Regulated Learning (SRL) model, to enhance students' self-regulation, engagement, and academic performance in Grade 8 Mathematics. The intervention was conducted over two weeks and involved 35 students using the E-Journey during asynchronous learning sessions, which were supplemented by Khan Academy video lessons and quizzes. The E-Journey structured students' learning into three SRL phases: Forethought (goal setting and planning), Performance (note-taking and quiz logging), and Reflection (self-assessment and goal resetting). Paired-samples t-tests revealed consistent performance in the Forethought and Performance phases, but a significant decline in student engagement during the Reflection phase by the second week. Linear regression analysis showed a significant positive relationship between the Performance phase and academic achievement in Week 1; however, no significant correlations were found in Week 2. While quiz scores significantly improved from pre-test to post-test, the relationship between SRL phases and academic outcomes was not consistently sustained. These findings suggest that while tools like E-Journey can support self-regulated learning and enhance academic outcomes in the short term, additional strategies—such as motivational supports and structured reflection—are essential to maintain long-term student engagement and learning success in blended educational contexts.

Key Words: Self-Regulated Learning; Note-taking; Academic Achievement; Online Learning; Student Engagement

1. INTRODUCTION

1.1 Background

Many schools in the Philippines, particularly in low-income communities, continue to face significant shortages of textbooks and learning materials, which hinder the development of students' literacy and academic skills (Kilag et al., 2024). EDCOM 2 (2023) attributes this issue to delays in textbook procurement, high production costs, and limited participation from suppliers. As a result, only Grades K, 1, 4, and 7 receive printed textbooks, while

other levels rely on learning modules as temporary alternatives. Mateo (2019) also noted widespread gaps in subject coverage, especially in mathematics and science, due to the Department of Education's limited capacity to distribute instructional materials.

Despite ongoing efforts to support schools through teacher training and parental engagement, many institutions still suffer from inadequate facilities, equipment, and learning resources (Perez, 2018). Mupa and Chinooneka (2015) emphasized that textbook availability alone does not ensure learning success; effective instruction also depends on how



these materials are utilized. However, a stark disparity remains between public and private schools. According to Bukoye (2019), private institutions are often better equipped and thus able to provide more effective academic support, contributing to widening performance gaps.

The shift to blended and online learning, accelerated by the COVID-19 pandemic, introduced new challenges in instruction and student monitoring (Van Leeuwen, 2023). Teachers often struggle to track learners' progress in digital environments, where distractions and limited interaction reduce engagement (Kumar et al., 2024; Vijaya et al., 2024). Moreover, Miller (2024) observed that digital tools are often underutilized due to unclear pedagogical frameworks and varying levels of student preparedness. The digital divide further complicates matters, particularly for schools with limited access to stable internet or devices (Odunlade, 2017; English, 2023). These resource and monitoring issues can lead to missed opportunities for timely intervention, as teachers often become aware of student difficulties only after academic performance has declined significantly (Vacarro & Sabella, 2018; Lyons et al., 2019).

Given these concerns, there is a pressing need to explore tools that can enhance instructional delivery and student monitoring, especially in asynchronous or digitally mediated contexts. The development and implementation of self-regulated learning tools can serve this purpose by equipping students with the means to plan, track, and reflect on their own learning progress. Therefore, this study introduces E-Journey, an online self-regulation tool designed to improve students' academic engagement and achievement in mathematics through structured learning activities. It responds to two critical problems in the Philippine educational context: the shortage of instructional materials and the difficulty in monitoring student learning, particularly in blended learning environments.

1.2. Framework

This study is anchored on Zimmerman's Self-Regulated Learning (SRL) model, which conceptualizes learning as a cyclical process involving three interrelated phases: Forethought, Performance, and Self-Reflection (Panadero, 2017). This model provides a structured lens through which learners

actively engage in setting goals, monitoring strategies, and reflecting on outcomes to improve academic performance. Drawing from this model, the current study integrates literature-supported SRL strategies within a digital tool—the E-Journey Notebook—to foster academic achievement among Grade 8 students in a blended learning environment. Figure 1 shows a picture of the online notebook.

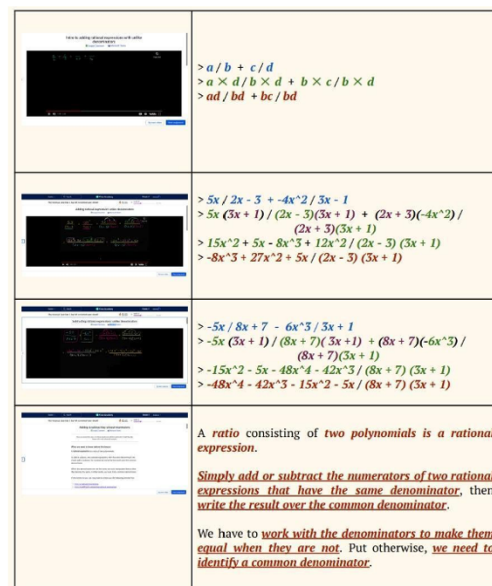


Fig. 1. Sample E-Journey Entry

The Forethought phase includes goal-setting and strategic planning, which are foundational to successful self-regulation (Taranto & Buchanan, 2020). In this study, these are operationalized through the E-Journey tasks “Listing Tasks,” “Compiling Files/Links,” and “Managing Time.” Literature shows that students who plan ahead and organize resources tend to perform better, especially in asynchronous contexts where structure is limited (Gambo & Shakir, 2021; Alabidi et al., 2022). However, the review also notes that students may deprioritize this phase due to motivational issues or cultural attitudes such as procrastination (Ribaya & De Guzman, 2021).

The Performance phase, which includes strategy implementation and real-time monitoring, is supported by tasks such as “Note It Down” and “Quiz Log.” Research emphasizes the importance of this

phase in sustaining academic engagement and enabling learners to adjust approaches based on immediate feedback (Whiteside, 2016; Augustine, 2023). In particular, tools like digital notebooks and tracking systems have shown significant positive effects on academic outcomes (Lysenko et al., 2022; Author, 2023). In Week 1 of this study, this phase demonstrated a significant positive relationship with academic achievement, underscoring its pivotal role in driving short-term learning gains.

The Self-Reflection phase, consisting of “Self-Efficacy Check,” “Reflection Prompts,” and “Goal Resetting,” is essential for evaluating performance and refining strategies (Peel, 2019). Studies affirm the value of structured reflection in deepening learning and enhancing self-awareness (Alabidi et al., 2022; Essa, 2022). However, a decline in students’ engagement during this phase, particularly in Week 2, aligns with existing findings that reflection is often undervalued in digital environments without sustained support or feedback (Hew & Cheung, 2022; Sharma & Srivastava, 2023).

Collectively, the framework positions the E-Journey Notebook as both an intervention and a measurement tool. Each SRL phase is operationalized through specific tasks and measured for its contribution to students’ academic achievement, assessed via Khan Academy quizzes. As supported by prior studies (Jansen et al., 2019; Xu et al., 2023), SRL interventions are shown to enhance learner engagement and performance, particularly when contextualized within supportive digital environments.

learner tasks aligned with each phase serve as the inputs, with Forethought (e.g., Listing Tasks), Performance (e.g., Note It Down), and Self-Reflection (e.g., Goal Resetting) influencing how students plan, engage, and evaluate their learning. These processes are hypothesized to contribute to improved academic outcomes, as reflected in quiz performance. The model also emphasizes the cyclical nature of SRL and the potential for iterative improvement across the learning process.

2. METHODOLOGY

2.1. Research Design

This study employed a single-case research design to investigate the impact of the *E-Journey Notebook* on students’ self-regulated learning (SRL) behaviors and academic achievement in a blended learning environment. Single-case designs are widely used in educational research when detailed analysis of behavioral changes within a small, defined group is required (Perdices & Tate, 2009; Creswell, 2015). This design allowed the researchers to closely examine the variations in student performance before, during, and after the implementation of the SRL intervention. Through structured observations across two weeks, the study captured trends in the three phases of self-regulated learning—Forethought, Performance, and Reflection—as well as their relationship to academic outcomes.

2.2. Sample and Locale

The study was conducted in a laboratory school affiliated with a Teacher Education Institution (TEI) in Manila, Philippines. The participants were 35 Grade 8 students (11 males and 24 females) aged 12 to 14 years old. As the study involved minors, ethical considerations were strictly observed in compliance with the Data Privacy Act of 2012. Informed consent was obtained from parents and guardians, while verbal and written assent was secured from the students. All learners from the lone Grade 8 section were included, allowing the study to adopt a total population sampling approach. Conducting the research in a laboratory school setting ensured consistency in instructional delivery and greater accessibility for monitoring the intervention.

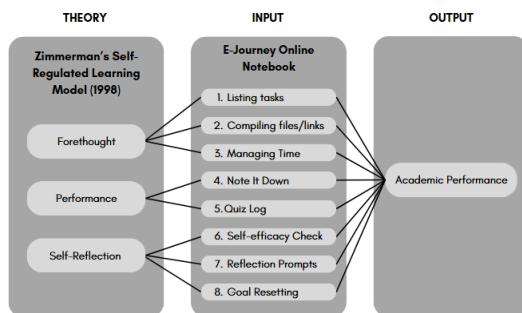


Fig 2. Framework of the Study

Figure 2 illustrates this conceptual framework, showing the relationship between the three SRL phases and academic achievement. The



2.3. Data Collection

The data collection spanned two weeks during asynchronous online classes as part of a mathematics course using Khan Academy. Students were first given a pre-test to assess prior knowledge of select Grade 8 mathematics topics. The intervention began with the implementation of the *E-Journey Notebook*, a digital tool created in Google Docs that guided students through the three SRL phases. Students were tasked to complete eight SRL-related activities: Listing Tasks, Compiling Files/Links, Managing Time (Forethought phase); Note It Down and Quiz Log (Performance phase); Self-Efficacy Check, Reflection Prompts, and Goal Resetting (Self-Reflection phase).

Each week, students independently engaged with instructional videos and practice exercises from Khan Academy. They then documented their learning activities and progress using the *E-Journey Notebook*. On the final day of each week, students completed Khan Academy quizzes and reflected on their learning. After the intervention, a post-test was administered. Data were collected from the *E-Journey* entries and quiz scores to measure SRL engagement and academic performance.

2.4. Data Analysis

To obtain the percentage score for each SRL phase — Forethought, Performance, and Reflection — the researchers used the following formula:

$$\text{Percentage Score} = \left(\frac{\text{Number of Tasks Sufficiently Completed}}{\text{Total Number of Tasks}} \right) \times 100$$

This provided a completion percentage for each phase, representing how thoroughly students engaged with each aspect of the self-regulated learning process.

The data were analyzed using JAMOVI, an open-source statistical tool. To examine changes in students' engagement across the SRL phases, paired-samples t-tests were conducted. This test was appropriate for comparing students' scores between Week 1 and Week 2 (Ross & Willson, 2017; Bobbitt, 2022). Additionally, simple and multiple linear regression analyses were performed to determine the relationship between the three SRL phases and students' academic achievement, measured through their weekly quiz scores (Younas & Ali, 2021).

Regression analysis allowed the researchers to assess the predictive power of each SRL phase, both individually and collectively, in explaining variance in student performance. The results provided insights into the relative influence of planning, engagement, and reflection on students' learning outcomes over the two-week intervention.

3. RESULTS AND DISCUSSION

This section presents the findings of the two-week intervention, focusing on students' engagement in the three phases of self-regulated learning (SRL)—forethought, performance, and reflection—and their relationship to academic achievement. Analyses were conducted using JAMOVI, an open-source statistical tool.

3.1. Results

To examine changes in SRL engagement, paired-samples t-tests were performed (see Table 1). No significant differences were found between Week 1 and Week 2 in the Forethought ($p = 0.090$) and Performance ($p = 0.960$) phases. However, a significant decrease was observed in the Reflection phase ($p = 0.031$), indicating a drop in students' engagement with reflective activities over time.

Table 1. Paired sample t-test – Week 1 and 2

	t	df	p	Mean diff	SE diff
Forethought	1.75	33.0	0.09	6.59	3.77
Performance	0.05	33.0	0.96	0.29	5.84
Reflection	2.26	33.0	0.03	10.77	4.76

Descriptive statistics (Table 2 and Figure 3) show an increase in post-test scores ($M = 8.06$, $SD = 6.27$) compared to pre-test scores ($M = 3.79$, $SD = 1.25$), suggesting overall academic improvement. The highest possible score for both the pre-test and post-test was 20 points. This maximum score was used to calculate percentage gains and to interpret students' progress in the study. However, the larger standard deviation in the post-test reflects wide variation in performance gains among students.

Table 2. Descriptive statistics of pre-test and post-test

	N	Mean	Median	SD	SE
Post-Test	34	8.06	6.00	6.27	1.076
Pre-Test	34	3.79	4.00	1.25	0.214

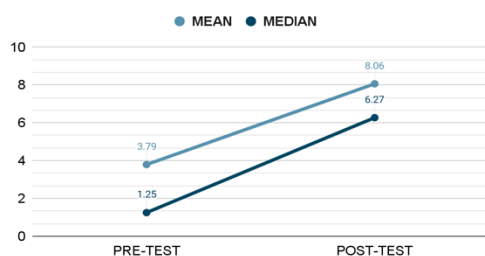


Fig. 3. Pre-test and post-test mean and median scores

Completion rates for each SRL phase are detailed in Table 3. While Forethought declined slightly from 68.9% to 62.4%, and Performance remained stable (52.1% to 51.8%), Reflection dropped notably from 75.0% to 64.2%. This trend is visualized in Figure 4.

Table 3. Descriptives for three phases of SRL

	N	Mean	Median	SD	SE
Fore 2	34	62.4	80.0	45.1	7.73
Fore 1	34	68.9	86.0	40.2	6.89
Perform 2	34	51.8	70.0	43.0	7.37
Perform1	34	52.1	45.0	38.6	6.62
Reflect 2	34	64.2	100.0	45.9	7.87
Reflect1	34	75.0	100.0	41.3	7.08

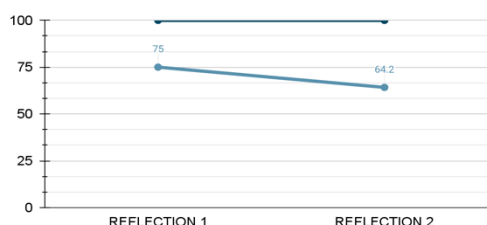
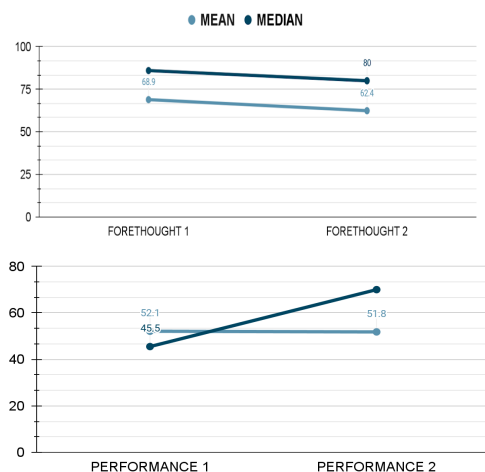


Fig. 4. Trends in three phases of SRL

These results suggest that students maintained consistent engagement in planning and task execution, but experienced a decline in reflective practices, potentially due to decreased motivation or task fatigue as the course progressed.

Quiz scores from Weeks 1 and 2 were used to evaluate how SRL phases predicted academic performance. Table 4 and Figure 5 describes the academic achievement for week 1 and 2.

Table 4. Descriptives for academic achievement

	N	Mean	Median	SD	SE
Week 1	34	38.3	0.00	45.7	7.85
Week 2	34	31.5	0.00	41.8	7.17

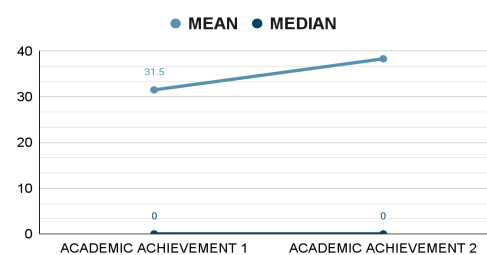


Fig. 5. Trends in academic achievement

In Week 1, regression analysis revealed that the model significantly accounted for 34.2% of the variance in achievement scores ($R^2 = 0.342$, $p = 0.005$). As shown in Table 5, among the three SRL phases, only Performance significantly predicted academic achievement ($p = 0.019$), suggesting that active engagement with the “Learning in Action” tasks contributed to better outcomes.

Table 5. Coefficients – Week 1

	Estimate	SE	t	p
Intercept	-1.75	12.79	-0.14	0.89
Forethought	-0.06	0.48	-0.13	0.90
Performance	0.64	0.26	2.48	0.02
Reflection	0.06	0.44	0.14	0.89

In contrast, Week 2 results showed that although the model remained significant ($R^2 = 0.315$, $p = 0.009$), none of the SRL phases individually predicted academic achievement (Table 6).

Table 6. Coefficients – Week 2

	Estimate	SE	t	p
Intercept	10.60	11.87	0.89	0.38
Forethought	1.40	0.77	1.82	0.08
Performance	0.46	0.37	1.22	0.23
Reflection	-1.30	0.78	-1.66	0.11

These findings indicate that the Performance phase was positively associated with academic performance early in the intervention, but this effect diminished over time. The Forethought and Reflection phases did not show consistent or significant effects across either week.

3.2. Discussion

In the Philippines, many public schools—especially in low-income areas—face shortages of educational resources, contributing to persistent learning gaps (Kilag et al., 2024; EDCOM 2, 2023). Although the Department of Education has provided some support, challenges such as limited access to digital tools and difficulties in monitoring student progress remain prevalent in blended learning contexts (Van Leeuwen, 2023; Kumar et al., 2024). This study evaluated the effectiveness of *E-Journey*, an online platform designed to promote self-regulated learning (SRL), in enhancing student engagement and academic performance.

Student engagement trends across the SRL phases revealed challenges typical in online settings. The Forethought phase, which involves planning and goal-setting, showed a slight decline in task completion. This may be attributed to cultural attitudes toward procrastination or reliance on fate (Ribaya & De Guzman, 2021), as well as task-avoidance behaviors common in digital learning (He et al., 2022). Students appeared to deprioritize planning,

which may have affected their preparedness for subsequent learning tasks.

In the Performance phase, engagement remained low and stable throughout the two weeks. Despite this, Week 1 showed a significant positive relationship between performance-phase engagement and academic achievement. This aligns with existing research highlighting how active engagement—note-taking, monitoring, and strategy use—supports academic success (Zimmerman, 2000; Alabidi et al., 2022; Taranto & Buchanan, 2020; Whiteside, 2016). However, this relationship weakened in Week 2, echoing findings from Cohen et al. (2022) that motivation tends to decline over time in online learning environments.

The Reflection phase experienced the sharpest drop in engagement. Students often undervalue reflection in online settings due to limited feedback and reduced peer interaction (Hew & Cheung, 2022; Moon, 2004; Sharma & Srivastava, 2023). Despite its theoretical benefits in deepening learning (Essa, 2022), no significant link was found between reflection and academic achievement, likely due to inconsistent engagement or shallow responses.

Overall, the data showed that while SRL phases are theoretically linked to academic success (Li et al., 2018; Xiao et al., 2019), this relationship was not consistently evident across the two-week intervention. Only the Performance phase significantly influenced achievement in Week 1. The Forethought and Reflection phases showed no significant impact, suggesting that motivation, structure, and time-on-task may moderate their effects (Mwangi et al., 2023; Alotaibi et al., 2017). Students' limited participation in these phases likely obscured their potential influence on learning outcomes.

The online format may also have influenced results. Learning from home can present distractions, reduce accountability, and lower students' perceived task value (Granic et al., 2022; Ellis & Bliuc, 2019). Furthermore, students may have completed assigned quizzes without fully mastering the content, reducing the impact of SRL behaviors on their scores (El-Adl & Alkharusi, 2020). The study suggests that while SRL tools like *E-Journey* can support learning, their success depends on sustained engagement, motivation, and instructional design. Future research should explore how SRL phases function over longer

periods and in more structured environments to better understand their role in academic achievement.

4. CONCLUSIONS

This study addressed the persistent shortage of instructional resources in Philippine schools and explored how self-regulated learning (SRL) strategies, supported by a digital tool called *E-Journey*, could enhance student engagement and academic achievement in an asynchronous blended learning environment. *E-Journey* was designed to guide students through planning, task execution, and reflection using structured prompts and performance-tracking features.

Findings revealed stable student engagement in the forethought and performance phases, but a significant decline in the reflection phase during the two-week intervention. While the performance phase initially showed a positive association with academic achievement, this effect did not persist into the second week. Neither the forethought nor reflection phases demonstrated a consistent relationship with academic performance, highlighting the complex nature of SRL and the influence of external factors such as motivation, time management, and the home learning environment.

Despite the lack of consistent correlations, the overall increase in post-test scores suggests that the *E-Journey* intervention contributed positively to learning outcomes. However, the study's limited scope—due to small sample size, short duration, and reliance on self-reported data—calls for cautious interpretation.

To strengthen the impact of SRL tools like *E-Journey*, students should be encouraged to engage actively in planning, monitoring, and reflecting on their learning. Teachers are encouraged to support this process through feedback, structured goal-setting, and collaborative activities. Future research should involve larger samples, extended implementation, and deeper examination of environmental factors to better understand how SRL supports long-term academic success in diverse learning contexts. In addition, future research should consider incorporating qualitative methods to better understand students' experiences, perceptions, and challenges in using self-regulated learning tools.

5. REFERENCES

- Alabidi, A., Ismail, H., & Ali, M. (2022). Self-regulated learning strategies and academic achievement in online environments. *International Journal of Instruction*, *15*(4), 1–20. <https://doi.org/10.29333/iji.2022.1541a>
- Augustine, M. E. (2023). Digital notebooks in hybrid learning: A study of tracking tools and learner engagement. *Journal of Online Learning Research*, *9*(1), 35–52.
- Bobbitt, B. (2022). *Applied statistics in education: Using Jamovi for social science research*. Sage Publications.
- Bukoye, R. O. (2019). Impact of instructional materials on student academic performance in Nigerian public and private schools. *African Journal of Educational Studies*, *11*(2), 45–61.
- Creswell, J. W. (2015). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (5th ed.). Pearson Education.
- EDCOM 2. (2023). *Philippine Education Sector Study: Year 1 Report*. Senate of the Philippines and House of Representatives.
- English, R. (2023). The digital divide and educational inequality: Impacts on student achievement in Southeast Asia. *Asian Journal of Education Policy*, *10*(2), 101–118.
- Gambo, Y., & Shakir, M. (2021). The role of goal-setting in self-regulated learning among secondary school learners. *Journal of Learning and Development*, *6*(3), 22–35.
- Hew, K. F., & Cheung, W. S. (2022). How can reflection be effectively fostered in online settings? *Educational Technology & Society*, *25*(1), 75–88.
- Jansen, R. S., van Leeuwen, A., Janssen, J., Conijn, R., & Kester, L. (2019). Supporting learners' self-regulated learning in Massive Open Online

- Courses. *Computers & Education*, 128, 120–136.
<https://doi.org/10.1016/j.compedu.2018.09.005>
- Kilag, C. R., del Rosario, L., & Reyes, D. J. (2024). Textbook shortages in Philippine public schools: Causes and consequences. *Philippine Journal of Basic Education*, 56(1), 12–28.
- Kumar, R., Singh, A., & Sharma, P. (2024). Blended learning in secondary schools: Barriers and strategies in post-pandemic contexts. *Asia-Pacific Journal of Educational Research*, 14(1), 45–61.
- Lyons, A. C., Brown, S. A., & Green, M. D. (2019). Monitoring student progress: Challenges in low-resource learning environments. *Journal of Educational Measurement and Evaluation*, 19(4), 56–69.
- Mateo, J. C. (2019, August 26). DepEd criticized for lack of learning modules. *Philippine Star*.
<https://www.philstar.com/headlines/2019/08/26/1946497/dep-ed-criticized-lack-learning-modules>
- Miller, L. A. (2024). Bridging the gap: Digital resources and student motivation in hybrid learning. *Technology in Education Review*, 8(1), 34–48.
- Mupa, P., & Chinooneka, T. I. (2015). Factors contributing to ineffective teaching and learning in primary schools. *International Journal of Academic Research in Education and Review*, 3(3), 104–111.
- Odunlade, R. O. (2017). Utilization of electronic resources by teachers in developing nations. *International Journal of Educational Technology*, 4(2), 19–27.
- Panadero, E. (2017). A review of self-regulated learning: Six models and four directions for research. *Frontiers in Psychology*, 8, 422.
<https://doi.org/10.3389/fpsyg.2017.00422>
- Peel, D. (2019). Reflection for learning in higher education. *Active Learning in Higher Education*, 20(2), 135–147.
<https://doi.org/10.1177/1469787417731200>
- Perdices, M., & Tate, R. (2009). Single-subject designs as a tool for evidence-based clinical practice. *American Journal of Speech-Language Pathology*, 18(2), 133–145.
[https://doi.org/10.1044/1058-0360\(2008/07-0084\)](https://doi.org/10.1044/1058-0360(2008/07-0084))
- Ribaya, M. A., & De Guzman, A. (2021). Cultural influences on procrastination among Filipino adolescents. *Philippine Journal of Psychology*, 54(2), 23–41.
- Taranto, G., & Buchanan, J. (2020). Promoting student agency through self-regulated learning strategies. *The Australian Educational Researcher*, 47, 823–839.
<https://doi.org/10.1007/s13384-019-00379-z>
- Van Leeuwen, C. A. (2023). Post-pandemic digital shifts in Southeast Asian classrooms. *Educational Technology Research and Development*, 71(2), 215–233.
- Vijaya, R., Santos, E. D., & Ramirez, M. F. (2024). Online learning fatigue: Mental health impacts on Filipino students. *Philippine Journal of Psychology*, 58(1), 12–29.
- Whiteside, A. (2016). The social presence model: Theoretical foundations and ongoing research. *Online Learning Journal*, 20(3), 119–134.
<https://doi.org/10.24059/olj.v20i3.1234>
- Xu, B., Zheng, Y., & Wang, Y. (2023). A meta-analysis of the effectiveness of self-regulated learning interventions in digital education. *Computers in Human Behavior*, 139, 107535.
<https://doi.org/10.1016/j.chb.2022.107535>
- Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of Self-Regulation* (pp. 13–39). Academic Press.