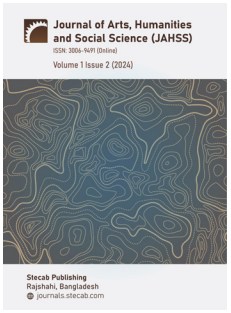

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Research Article

A Glimpse of My Progress: Exploring Reflective Journaling as an Innovation to Enhance Metacognitive Skills, Motivation, and Acceptability of Learners

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About Article

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ABSTRACT

Reflective Journals catalyze increased metacognitive awareness by prompting learners to examine their thought processes. The integration of reflective journaling enhances the clarity of goal setting, thus allowing learners to track progress and employ appropriate strategies for advancement. In this study, the researchers explored this strategy in facilitating learners' metacognitive skills, motivation in learning, and learners' acceptability of this strategy as a learning tool. The participants of the study were twenty-two learners enrolled in the Biochemistry subject at UM Digos College. A descriptive-quantitative research approach was utilized in analyzing the data from three modified and validated questionnaires that were used and analyzed: Metacognitive Awareness Inventory, Students' Motivation Towards Science Learning, and Acceptability of reflective journaling. Based on the metacognitive awareness inventory results, students' metacognitive awareness was fairly observable (%=83.63). The findings also indicated adequate and decent students' motivation toward science learning ($\bar{x}$=3.72). The result also revealed that students found reflective journaling to be moderately acceptable as a learning innovation ($\bar{x}$=3.96) and reported being very satisfied with it. This means that the metacognitive tool, such as an organized RJ, will equip science learners to become critical thinkers and goal-oriented, filled with foundational adaptiveness to new knowledge and intellectual and emotional growth.

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1. INTRODUCTION

In education, reflective journaling is viewed as an integral part of facilitating and monitoring the introspective analysis of students. Thinking about thinking, also known as metacognition, is always associated with reflection, particularly in the teaching-learning landscape as noted by Silver (2013). Metacognition comes into existence by backing up one's mental reflex that practices brain works, an essential foundation that suffices the preparedness of students to take higher education (Khosa & Volet, 2014). This encompasses the ability to track students' recent degree of understanding and to adjust individual maturation in learning as it is in demand (Bransford *et al.*, 2000). However, Cornford (2004) remarked that metacognition strategies have been disregarded in most educational environments; therefore, their efficacy in achieving satisfactory outcomes remains under examination. The lack of metacognitive strategy instruction leaves students unprepared to direct their cognitive processes. RJ helps students analyze and examine scientific issues critically, according to Wallace-Spurgin (2019). This corrects the gap and other important misconceptions, providing a methodical paradigm to clarify areas that need more work.

Reflective journaling plays a crucial role in enhancing learning experiences. This strategy encourages students to analyze their thought processes, which catalyzes heightened metacognitive awareness (Henter & Indreica, 2014). The integration of this strategy enhances the clarity of goal setting, thus allowing learners to track progress and employ appropriate strategies for advancement. In addition, this procedure also benefits students' academic performance academically, productivity, and decision-making management, encourages a developmental mindset, and facilitates measures for the effective domain. Hence, it enhances study habits and behavior (Deepa & Mansurali, 2022). Subsequently, the goals of education are to apply new knowledge in a meaningful way and to build on existing knowledge for both the teacher and the student.

Based on social cognitive theory, perceived self-efficacy affects how well people learn and integrate new information (Mueller, 2007). In addition, Jean Piaget's constructivism theory suggests that students must create their knowledge individually and collectively. Every learner has a repertoire of ideas and skills from which they must build knowledge to address issues that arise from their surroundings. The teacher and the learners are responsible for creating the environment, presenting the problems, and providing the encouragement necessary to promote cognitive building (Chaillé, 2008). Moreover, Park (2003) noted that some students noticed an increase in their self-esteem as they realized they could embrace this new learning instrument. Furthermore, utilizing metacognitive tool applications helps students become critical thinkers and goal-oriented individuals who are emotionally and intellectually mature, with a strong foundation for adaptation to new information.

Reflective journaling, also known as reflective logs or learning diaries, is acknowledged to a vast extent as an underlying tool for encouraging self-evaluation in an educational context. As Tanner (2012) pointed out, learners typically struggle to understand the concept of this strategy. Specifically, at the kickoff, learners most commonly rely on the ideal observations and discourse aiming at a pure flowery journal. Besides, as per the interdisciplinary setting, particularly in Vietnam, learners have encountered difficulty, particularly in the degree of exposure of the reflective journaling being presented to made known, and as a result, students might not have comprehended the importance of the habitual application of it immediately (Pruekpramool *et al.*, 2018). In tertiary education, there is a progressive emphasis on scrutinization and evaluation through different procedures, attaining systematic or broader techniques to a certain discipline, scaffolding it in science education courses, encompassing RJs, as suggested by Keegan (2011).

Moreover, the study of Fullana *et al.* (2016) explored how the Spaniards view the pros and cons of implementing this strategy. Based on the result, students viewed reflective journaling as a vantage in upgrading knowledge and behavioral acquisition comprehension skills. Nevertheless, the struggles of some students arise due to challenges in understanding the objective of this strategy, and some learners find it hard to be transparent about subjective encounters and sharing personal matters in this kind of assessment. Hence, it serves as a medium of provoking inquiry, learning, and information exchange that holds notions and thoughts while simultaneously upgrading one's self-performance. Even so, as noted by Mann *et al.* (2009), there is a need to contextualize the situation coming from the multidisciplinary fields together with the capability to put things into effect for instructors and education developers to devise a strategy on how reflection must be done and to reinforce learners' behavioral competence.

Furthermore, science education in the Philippines faces several challenges as it strives to equip students with the necessary knowledge and skills. This is evident in the recent Programme for International Student Assessment (PISA) 2022 result (PISA, 2023), which indicated that the Philippines is among the bottom 10 out of 81 countries in math, reading, and science performance. In particular, science literacy in the Philippines has not improved since the 2018 PISA result (PISA, 2018). It has seen a decline in performance from a score of 357 in 2018 to 356 in the latest PISA 2022 report (PISA, 2023). In addition, only 23% of Filipino students attained Level 2 or higher in science, significantly lower than the Organization for Economic Co-operation and Development (OECD) average of 76.2% (PISA, 2023). Improving the scientific literacy of learners is the most important educational goal and challenge of the 21st century (Cheng *et al.*, 2024; Diquito *et al.*, 2022). This indicates that neighboring countries have left behind the Philippines in improving scientific literacy skills. In the long run, this may greatly impact the future of the students and the nation.

The quantitative data is evident and indicates an alarming problem in the educational system of the Philippines that must be addressed. This is one of the reasons the researchers conducted reflective journaling in learning: to make a little difference in how students learn and improve their scientific literacy. Encouraging students to be more aware of what they are learning and to examine their learning process critically can lead to an improved and greater literacy in science education (Caballes *et al.*, 2024; Diez *et al.*, 2021). With this, reflective journaling also contributes to progress in the students'

metacognitive skills, allowing students to take a more active role in the science concepts they consume. Improving students' scientific and metacognitive skills is not in the scope of attention of the education sector of the Philippines, and this hinders students from becoming self-directed learners and affects their lifelong learning and intellectual curiosity (Degorio *et al.*, 2023). The 21st century and scientific skills are essential for our information-driven society. Therefore, people need literacy to analyze information and solve problems critically. The Philippines needs a scientifically competent workforce to compete with more advanced nations as it becomes more globalized. The Philippines still favors traditional teaching and learning methods; showing reflective journaling's benefits can encourage others to adopt it. Given these conditions, the decline in science performance requires educators and politicians to adopt systemic adjustments to enhance scientific literacy among Filipino students. Thus, this study offers a new strategy to enhance learners' scientific performance through innovative reflective journaling. Moreover, to accomplish this goal, the researchers aim to address the following questions: (1) to what extent does the implementation of reflective journaling improve science education students' metacognitive skills?; (2) Does the use of reflective journaling enhance students' motivation towards science learning? and (3) How acceptable is reflective journaling as a science learning innovation among students?

2. LITERATURE REVIEW

Reflective journaling has become a prominent pedagogical instrument in the field of education, providing a systematic approach for learners to participate in reflection, improve their metacognitive abilities, and increase their motivation. Research has shown that reflective journal (RJ) writing is a valuable educational tool for fostering students' lifelong learning abilities (Alt *et al.*, 2022). Reflective journal writing has been widely employed in pedagogical practice to enhance students' learning attitudes, creativity, and academic awareness (Sudirman *et al.*, 2021). Based on the findings of Hussein *et al.* (2020), reflective journals have demonstrated positive outcomes in improving students' capacity to develop and elaborate on their ideas.

Motivation is an essential factor in education, particularly in the field of science, where students' engagement is essential for achieving success. As an educational instrument, reflective journaling (RJ) has been identified as a potential strategy to improve learner acceptability, metacognitive skills, and motivation (Horton *et al.*, 2021). In education, motivation can be either intrinsic, which is motivated by personal interest and enjoyment, or extrinsic, which is influenced by external rewards and pressures (Languita *et al.*, 2023). RJ and other reflective practices can have a substantial effect on the intrinsic motivation of students by motivating them to establish personal objectives, evaluate their progress, and assume responsibility for their educational experience (Fortus & Touitou, 2021). This process is essential for the sustained engagement of students in science learning, as it facilitates the development of a sense of self-efficacy and autonomy (Chau & Cheng, 2012).

Metacognition is the process by which an individual is cognizant of and manages their cognitive processes. It encompasses self-regulation, self-monitoring, and reflection, which are essential for effective learning (Fleur *et al.*, 2021). Students can enhance their academic performance by developing strategies to better their learning processes, identifying areas for improvement, and gaining insights into their learning processes through RJ (Ambele & Boonsuk, 2021). This process encourages continuous self-improvement and promotes a more profound understanding of scientific concepts (Căprioară & Frunză, 2019; Evagorou *et al.*, 2015).

By promoting self-assessment and goal-setting, RJ can also cultivate a higher level of motivation and engagement among students. Research has demonstrated that RJ assists students in gaining a more comprehensive understanding of their learning strengths and weaknesses, which in turn results in enhanced academic performance and a more focused study approach (Dumlao & Pinatacan, 2019; Huang *et al.*, 2020). Additionally, RJ has been associated with enhanced student engagement and academic success, particularly in dynamic and engaging educational environments (Barman *et al.*, 2014). Research suggests that RJ can considerably improve students' metacognitive abilities by fostering a critical evaluation of their problem-solving strategies and the identification of areas for improvement. For example, research has demonstrated that RJ can assist students in refining their procedural knowledge and enhancing their utilization of visual representations in science education, thereby facilitating a more thorough comprehension of intricate concepts (Căprioară & Frunză, 2019; Evagorou *et al.*, 2015).

The efficacy of RJ in improving learning outcomes has been demonstrated in numerous quantitative studies. For instance, Alhadabi and Karpinski (2020) discovered that students who participated in RJ demonstrated significantly higher levels of academic achievement, motivation, and self-awareness than those who did not. This discovery is consistent with social cognitive theory, which contends that the efficacy of individuals in acquiring and assimilation new information is influenced by their perceived self-efficacy (Chau & Cheng, 2012). Additionally, qualitative research has offered valuable insights into the advantages of RJ from the perspective of students. For example, Dumlao and Pinatacan (2019) conducted a case study on third-year college students, which demonstrated that RJ assisted students in developing a greater understanding of their learning processes, thereby improving their academic performance and learning methods. Furthermore, RJ has been discovered to promote intellectual development by facilitating interactive learning activities and customizing instructional demands to meet the preferences of the individual (Huang *et al.*, 2020).

The acceptance of RJ as a learning instrument is contingent upon factors such as prior experiences with reflective practices, perceived value of the process, and comfort level with self-reflection, and it varies among students. Research has demonstrated that students who perceive RJ as a meaningful activity are more inclined to participate actively and benefit from the process, whereas those who perceive it as a mere obligation may be less inclined to engage entirely (Martin, 2010; Zaidi & Zaidi, 2022). Although RJ provides a multitude of advantages, its integration into educational curricula can

pose obstacles. In order to effectively facilitate RJ, educators may face challenges such as time constraints, inadequate resources, and inadequate training (Ambele & Boonsuk, 2021). Additionally, certain students may encounter challenges during the reflective process, particularly if they are not accustomed to self-reflection or find it challenging to express their thoughts in writing. In order to confront these obstacles, educators may need to offer students explicit guidance and assistance in the development of their reflective abilities.

3. METHODOLOGY

3.1. Research Design

This study utilizes an action research approach to attain the objectives of the study. As defined by Somekh (2006), action research in education helps create a positive learning environment by identifying key issues in the classroom and creating solutions to address these issues. This method is also seen as useful specially in creating a positive atmosphere in a science class (Diquito *et al.*, 2024). Moreover, purposive sampling was utilized by the researchers since this study focuses on the effectiveness of reflective journaling in the Biochemistry class. This sampling technique was chosen based on the idea that this sampling bridges the objectives of the study and the target samples (Campbell *et al.*, 2020). Thus, in this study, the researchers aim to utilize an innovative teaching strategy using reflective journaling to address the scientific gaps mentioned in the literature. This innovative teaching strategy offers possible solutions and a unique approach to learning scientific concepts.

3.2. Participants

This study was conducted at UM Digos College, a private institution in Davao del Sur, Philippines. The participants of this study were second-year science students enrolled in a Biochemistry course for the academic year 2023-2024. Prior to the conduct of the study, a letter was sent to the program head of the department for approval to conduct the study. Another letter was sent to the college instructor handling the Biochemistry course for approval to conduct the study. After the approvals, the researchers informed the participants that they would conduct this study in their class. Orientations were conducted to the target participants, including voluntary participation, withdrawal criteria, and ethical standards to be followed by the researcher on or before the conduct of the study. After the orientation, 22 participants voluntarily participated in the study. These participants were immersed in the study for one month.

3.3. Innovation

This action research aimed to enhance students' metacognitive awareness, focusing on the regulation of planning, monitoring, and evaluating their learning, science learning motivation, and its acceptability as perceived by the participants. With this, the researchers decided to implement a one-month reflective journal writing as the primary innovation of this study.

A reflective journal in the context of science is a valuable tool for recording and processing thoughts, experiences, and insights related to scientific endeavors. Consequently, Ramadhanti *et al.* (2020) found that teachers must always encourage students to write reflective journaling to monitor metacognition growth in writing, ranging from raising awareness about knowledge and task completion efforts, monitoring the quality of the results obtained, and fostering the habit of planning, setting goals, and apply certain strategies in completing tasks. According to Ozturk (2016), metacognition includes the regulation of cognition, and it is generally categorized into three parts: planning, monitoring, and evaluation (Ozturk, 2017). In addition, according to Pintrich *et al.* (2012), planning pertains to goal-setting that guides general cognitions and monitoring. Moreover, Pintrich *et al.* (2012) stated that monitoring activities include assessing learning and performance-in-action.

Researchers innovated a one-month series of pre-designed questions to guide students' reflections to improve metacognition in the targeted areas. Three science education faculty members validated these questions to ensure their effectiveness. Following revisions to some queries and approval of the rubric, the reflective journaling intervention was implemented. Journal entries were to be done in a separate notebook. Each class discussion ended with time for reflection. Journal notebooks were analyzed after one month.

3.4. Research Instrument

Researchers utilized three questionnaires to measure students' metacognitive awareness, motivation to learn science using reflective journals, and acceptability of reflective journaling as a learning innovation to gather data for the study. The first questionnaire that was employed in this study is the Metacognitive Awareness Inventory (MAI) Questionnaire developed by Schraw & Dennison (1994). The questionnaire divided into two (2) dimensions: Knowledge of Cognition and Regulation of Cognition. The questionnaire utilized a true/false format for each item. Each statement awards one point for a "True" response and zero points for a "False" response. Furthermore, to assess the Students' Motivation Towards Science Learning (SMTSL), a questionnaire developed by Tuan *et al.* (2005) was utilized. The SMTSL questionnaire incorporates a 5-point Likert scale, ranging from (5) Strongly Agree (SA), (4), Agree (A), (3), Neutral (N), (2) Disagree (D), and (1) Strongly Disagree (SD). Moreover, the Acceptability of Reflective Journal Writing Questionnaire developed by Farrah (2012) was utilizedThe reflective journaling acceptability questionnaire also involves a 5-point Likert scale: (5) Strongly Agree (SA), (4), Agree (A), (3), Neutral (N), (2) Disagree (D), and (1) Strongly Disagree (SD).

3.5. Data Analysis

The researchers used mean and percentage to analyze the gathered data. The percentage was used to interpret the result for metacognitive awareness inventory while the mean was used to analyze motivation towards learning science and acceptability of the innovation. Moreover, in interpreting the students' motivation towards science learning (SMTSL) and acceptability of reflective journaling, the researchers adapted the scale of Salac (2018) (Table 2).

Table 1. Range of Means

Average Weighted Mean Range	Level of Motivation	Level of Acceptability	Verbal Interpretation
4.21-5.00	Strongly Agree	Highly Acceptable	Extremely Satisfied
3.41-4.20	Agree	Moderately Acceptable	Very Satisfied
2.61-3.40	Neutral	Acceptable	Satisfied
1.80-2.60	Disagree	Fairly Acceptable	Slightly Satisfied
1.00-1.79	Strongly Disagree	Poorly Acceptable	Not Satisfied

4. RESULTS AND DISCUSSION

4.1. Metacognition Skills of Learners

Table 2 shows the students' Average Metacognitive Awareness Inventory (MAI) (Schraw & Dennison, 1994) which includes two indicators: Knowledge of Cognition and Regulation of Cognition. The overall MAI result of 84.11% suggests that students possess a high level of metacognitive awareness, effectively understanding, applying, and regulating their cognition. In terms of the Knowledge of Cognition, Declarative Knowledge (78.97%) shows that the participants seem to have an adequate grasp of factual knowledge about learning strategies. On the other hand, Procedural Knowledge (87.50%), which obtains the highest result, emphasizes that the participants know how to use different learning approaches. This aligns with findings from Schraw and Moshman (1995), who emphasize that knowledge of how to apply learning strategies is crucial for effective self-regulation and academic success. Their research demonstrates that students who effectively use different learning approaches tend to achieve better educational outcomes. Moreover, students' Conditional Knowledge (87.27%) indicates that they easily understand when to use specific strategies based on the situation. It suggests that students' ability to judge the appropriateness of different strategies enhances their learning effectiveness (Veenman *et al.*, 2006).

Table 2. Average Metacognitive Awareness Inventory

Indicators	True (%)	False (%)
A. Knowledge of Cognition	84.58	15.42
1. Declarative Knowledge	78.97	21.03
2. Procedural Knowledge	87.50	12.50
3. Conditional Knowledge	87.27	12.73
B. Regulation of Cognition	83.63	16.37
1. Planning	85.71	14.29
2. Monitoring	83.11	16.89
3. Information Management Strategies	78.18	21.82
4. Debugging Strategies	91.81	8.19
5. Evaluation	76.51	23.49
Overall	**84.11**	**15.89**

In terms of regulating their learning, the participants seem adept at setting goals and plans (Planning= 85.71%), keeping track of their progress and adjusting strategies as needed (Monitoring= 83.11%), developing skill for managing information (Information Management Strategies=78.18%), and identifying and fixing gaps in knowledge (Debugging Strategies= 91.81%). While scores for information management and evaluation strategies are still moderately high, this suggests that there might be some room for improvement in those areas. With these results, Reflective Journaling (RJ) has been shown to improve metacognitive skills (Kallio *et al.*, 2018), highlighting the significance of metacognitive awareness in successful learning. Furthermore, Zulkiply (2006) pointed out that creating a metacognitive atmosphere is essential for students' growth. Thus, using RJ as a teaching tool in science classes can help educators establish successful metacognitive learning environments, ultimately enabling students to take charge of their education.

4.2. Students' Motivation Towards Science Learning After the Implementation of Reflective Journaling

Table 3 presents the result of students' motivation towards science learning with six (6) indicators: self-efficacy, active learning strategies, science learning value, performance goal, achievement goal, and learning environment stimulation. Data shows that the overall level of students' motivation in learning science after the implementation of reflective journal was verbally interpreted as "Agree" ($\bar{x}$ =3.72, SD=0.76). This means that the implementation of reflective journals had a positive impact on students' motivation towards learning science. This suggests that Reflective Journal Writing (RJW) can be considered a crucial component of motivational strategies, as it enables students to connect their learning with practical applications and personal growth (Amirkhanova *et al.*, 2016). Specifically, the Science Learning Value indicator receives the highest mean score ($\bar{x}$ =4.35, SD=0.78) among all indicators, which is interpreted as Strongly Agree (SA). This signifies that respondents learn science lessons adeptly by acknowledging its practical essence in everyday life, the role that challenges their critical abilities, enhancing the problem-solving skills, also more on facilitated learning thus making students discover and experience learning first-hand, to deepen their skills personally and even socially and propelling science literacy. Contextualizing science education by connecting it to real-world applications significantly enhances student engagement and motivation (Norris and Phillips, 2003). Meanwhile, the indicators Active learning Strategies ($\bar{x}$ =4.18, SD=0.71), Achievement Goal ($\bar{x}$ =4.08, SD=0.87), and the Learning Environment Stimulation ($\bar{x}$ =4.02, SD=0.72) are all interpreted as "Agree", wherein the students exhibit progressive approach to respond in biochemistry learning concepts rather than being passive learners, making association with prior knowledge and engaging in real-life challenges.

Table 3. Students' Motivation Towards Science Learning

Indicators	$\bar{x}$	SD	Verbal Interpretation
1. Self-efficacy	2.90	0.69	Neutral
2. Active Learning Strategies	4.18	0.71	Agree
3. Science Learning Value	4.35	0.78	Strongly Agree
4. Performance Goal	2.82	0.81	Neutral
5. Achievement Goal	4.08	0.87	Agree
6. Learning Environment Stimulation	4.02	0.72	Agree
Overall	**3.72**	**0.76**	**Agree**

Notably, the results relate to the study of Chen *et al.* (2014), who found that the use of more challenging tasks motivated students to engage more deeply with the contextual and learning content. As asserted, respondents presumably have both impulses to master content knowledge and prioritize others' praise, resulting in a sense of fulfillment from science courses. Good grades motivate learning, and completing difficult tasks boosts confidence. The findings support Ghafar (2023) who found that positive reinforcement can boost students' accountability and motivate them to work more. In terms of the LES indicator, learners are driven to participate in learning biochemistry subjects best by different factors that contribute to stimulating the learning context. This is consistent with the findings of Cardino and Ortega-Dela Cruz (2020), who discovered that knowing students' learning styles enables teachers to modify their approaches, possibly creating a more engaging learning environment and inspiring students to work harder.

4.3. Students' Acceptability of Reflective Journaling

Table 4 shows the results of the acceptability of reflective journaling (RJ) in biochemistry learning and presents how students perceive the use of RJ as a science learning innovation. As shown in the following table, items were structured according to three (3) indicators: Motivation and Self-confidence, Improving Learning, and Value and Convenience. The overall acceptability result ($\bar{x}$ =3.96, SD=0.51) is interpreted as "Moderately Acceptable." This means that students generally view reflective journaling as a beneficial tool for their biochemistry learning, though there are areas where its acceptability could be improved.

Notably, participants appear to have high acceptability and extreme satisfaction for reflective journalling in terms of Motivation and Self-confidence ($\bar{x}$=4.37, SD=0.50) and Improving Learning ($\bar{x}$=4.50, SD=0.51) indicators. The high mean scores indicate that reflective journaling effectively enhances students' motivation and self-confidence in their academic pursuits. Further, this process can foster a greater sense of self-efficacy and motivation, as students become more aware of their strengths and areas where they can grow. Meanwhile, the Value and Convenience ($\bar{x}$=3.01, SD=0.52) is interpreted as only "Acceptable" and "Satisfied." This result indicates that students had a positive perception towards Reflective Journalling. Korstange (2016) asserted that RJs have been shown to benefit learners in higher education. Additionally, Cathro *et al.* (2017) noted that keeping RJs improves learning since it helps students close the gap between what they are doing and what they should be doing. Moreover, the results are also in agreement with the study conducted by Hussein (2018), who firmly believed that keeping an RJ was essential to realizing their growth potential.

Table 4. Overall Students' Acceptability of Reflective Journaling in Biochemistry Learning

Dimension	$\bar{x}$	SD	Verbal Interpretation (Level of Acceptability)
1. Motivation and Self-confidence	4.37	0.50	Highly Acceptable
2. Improving Learning	4.50	0.51	Highly Acceptable
3. Value and Convenience	3.01	0.52	Acceptable
Overall Average	**3.96**	**0.51**	**Moderately Acceptable**

5. CONCLUSION

Based on the findings presented, several conclusions can be drawn regarding the effectiveness and acceptability of reflective journaling (RJ) in science education, particularly in the context of biochemistry learning among second-year student. As indicated in the result, the high scores in both Procedural Knowledge and Conditional Knowledge suggest that RJ helps students effectively apply and judge learning strategies. The use of RJ in promoting a better awareness of one's own learning processes are further demonstrated by the observed improvements in goal setting, monitoring, and debugging techniques. Additionally, the implementation of reflective journaling positively impacts students' motivation towards science learning. Students' overall motivation, as reflected in the high mean scores across various motivational indicators, shows that RJ enhances their engagement and perceived value of science education. Furthermore, reflective journaling is viewed as a moderately acceptable innovation in science education. While students report high satisfaction in areas related to motivation, self-confidence, and learning improvement, there is still room for enhancement regarding the perceived value and convenience of RJ. The positive feedback on RJ's ability to motivate students and promote learning emphasizes its potential as a useful teaching tool, though ongoing efforts to improve its perceived value and ease of use could further increase its overall acceptability.

REFERENCES

Alhadabi, A., & Karpinski, A. C. (2020). Grit, self-efficacy, achievement orientation goals, and academic performance in University students. *International Journal of Adolescence and Youth, 25*(1), 519–535. https://doi.org/10.1080/02673843.2019.1679202

Alt, D., Raichel, N., & Naamati-Schneider, L. (2022). Higher education students' reflective journal writing and lifelong learning skills: Insights from an exploratory sequential study. *Frontiers in Psychology, 12*. https://doi.org/10.3389/fpsyg.2021.707168

Ambele, E. A., & Boonsuk, Y. (2021). Voices of learners in Thai ELT classrooms: a wake up call towards teaching English as a lingua franca. *Asian Englishes, 23*(2), 201–217. https://doi.org/10.1080/13488678.2020.1759248

Amirkhanova, K. M., Ageeva, A. V., & Fakhretdinov, R. M. (2016). Enhancing Students' Learning Motivation through Reflective Journal Writing. *Proceedings of IFTE 2016: 2nd International Forum on Teacher Education.*

Bailes, C. N., Hulsebosch, P., & Martin, D. S. (2010). Reflective journal writing: Deaf pre-service teachers with hearing children. *Teacher Education and Special Education, 33*(3), 234–247. https://doi.org/10.1177/0888406409356763

Barman, A., Aziz, R. A., & Yusoff, Y. M. (2014). Learning style awareness and academic performance of students. *South-East Asian Journal of Medical Education, 8*(1), 47. https://doi.org/10.4038/seajme.v8i1.124

Bransford, J. D., Brown, A. L., & Cocking, R. R. (2000). *How People Learn: Brain, Mind, Experience, and School.* Expanded Edition. https://api.semanticscholar.org/CorpusID:261241482

Caballes, M. E. J., Pedrita, N. J. C., Villaren, J. M., & Diquito, T. J. A. (2024). Status of Science Laboratories in Secondary Basic Education Public Schools in the Division of Davao Del Sur, Philippines. *American Journal of Interdisciplinary Research and Innovation, 3*(1), 45–54. https://doi.org/10.54536/ajiri.v3i1.2495

Campbell, S., Greenwood, M., Prior, S., Shearer, T., Walkem, K., Young, S., Bywaters, D., & Walker, K. (2020). Purposive sampling: complex or simple? Research case examples. *Journal of Research in Nursing, 25*(8), 652–661. https://doi.org/10.1177/1744987120927206

Căprioară, D., & Frunză, V. (2019). Effective strategies to improve student motivation for school learning. The European Proceedings of Social and Behavioural Sciences. https://doi.org/10.15405/epsbs.2019.08.03.183

Cardino, J. M., & Ortega-Dela Cruz, R. A. (2020). Understanding of learning styles and teaching strategies towards improving the teaching and learning of mathematics. LUMAT: *International Journal on Math, Science and Technology Education, 8*(1). https://doi.org/10.31129/LUMAT.8.1.1348

Cathro, V., O'Kane, P., & Gilbertson, D. (2017). Assessing reflection. *Education + Training, 59*(4), 427–442. https://doi.org/10.1108/ET-01-2017-0008

Chaillé, C. (2008). Constructivism across the curriculum in early childhood classrooms: big ideas as inspiration. Boston: Allyn & Bacon.

Chau, J., & Cheng, G. (2016). Developing Chinese students' reflective second language learning skills in higher education. *The Journal of Language Learning and Teaching, 2*(1), 15–32.

Chen, C. H., Hwang, G. J., & Tsai, C. H. (2014). A Progressive Prompting Approach to Conducting Context-Aware Learning Activities for Natural Science Courses. *Interacting with Computers, 26*(4), 348–359. https://doi.org/10.1093/iwc/iwu004

Cheng, S. C., Hwang, G. J., & Chen, C. H. (2024). Fostering students' scientific literacy by reflective questioning: An identification, summarization, self-reflective questioning, and application (ISSA)-based flipped learning approach. *Education and Information Technologies, 29*(6), 7081–7104. https://doi.org/10.1007/s10639-023-12121-9

Cornford, I. R. (2004). Cognitive and metacognitive strategies as a basis for effective lifelong learning: how far have we progressed? https://api.semanticscholar.org/CorpusID:204394214

Deepa, R., & Mansurali, A. (2022). Reflective Journaling to Assure Learning in the Affective Domain. *South Asian Journal of Business and Management Cases, 11*(2), 148–166. https://doi.org/10.1177/22779779221104148

Degorio, N. J. D., Diaz, P. A. N. E., Ando, C. V., Diquito, T. J. A., & Panerio, C. J. (2023). Exploring Science Learning Anxiety in the New Normal - An Exploratory Factor Analysis. *American Journal of Human Psychology, 1*(1), 39–49. https://doi.org/10.54536/ajhp.v1i1.2128

Diez, J., Ebro, E., Dequito, R., & Diquito, T. (2021). Uncovering Learners' Experiences to New Normal Education: Implications of Asynchronous Instruction in GE 5: Science, Technology, and Society Course Teaching. *European Journal of Education Studies, 8*(10). http://dx.doi.org/10.46827/ejes.v8i10.3937

Diquito, T., Anter, M., & Bulonos, N. (2022). A Survey Of 21st Century Skills Acquisition Among the Preservice Teachers of Teacher Education Programs. *European Journal of Open Education and E-learning Studies, 7*(2). http://dx.doi.org/10.46827/ejoe.v7i2.4368

Diquito, T. J., Franco, A. S., & Caballes, M. E. (2024). Problem-based Learning (PBL) Using Resource Mining as a Teaching Approach: An Action Research. *Journal of Arts, Humanities and Social Science, 1*(2), 10-18. https://doi.org/10.69739/jahss.v1i2.74

Dumlao, R. P., & Pinatacan, J. R. (2019). From Practice to Writing: Using Reflective Journal Instruction in Enhancing Pre-Service Teachers' Professional Development. *International Journal of Instruction, 12*(4), 459–478. https://doi.org/10.29333/iji.2019.12430a

Evagorou, M., Erduran, S., & Mäntylä, T. (2015). The role

of visual representations in scientific practices: from conceptual understanding and knowledge generation to 'seeing' how science works. *International Journal of STEM Education, 2*(1). https://doi.org/10.1186/s40594-015-0024-x

Farrah, M. (2012). Reflective journal writing as an effective technique in the writing process. *An-Najah University Journal for Research-B (Humanities), 26*(4), 997-1025. https://doi.org/10.35552/0247-026-004-008

Fleur, D. S., Bredeweg, B., & van den Bos, W. (2021). Metacognition: ideas and insights from neuro- and educational sciences. *Npj Science of Learning, 6*(1). https://doi.org/10.1038/s41539-021-00089-5

Fullana, J., Pallisera, M., Colomer, J., Fernández Peña, R., & Pérez-Burriel, M. (2016). Reflective learning in higher education: a qualitative study on students' perceptions. *Studies in Higher Education, 41*(6), 1008–1022. https://doi.org/10.1080/03075079.2014.950563

Ghafar, Z. N. (2023). Positive reinforcement: An approach to enhancing accountability and drive among students. *International Journal of Applied Educational Research, 1*(1), 11-20. https://doi.org/10.59890/ijaer.v1i1.442

Henter, R., & Indreica, S. (2014, April). Reflective Journal Writing as a Metacognitve Tool. In *AFASES International Conference*.https://www.researchgate.net/profile/Simona-Indreica/Publication/266319213_REFLECTIVE_JOURNAL_WRITING_AS_A_METACOGNITVE_TOOL/Links/57e3df9408ae62ccfdd63f83/REFLECTIVE-JOURNAL-WRITING-AS-A-METACOGNITVE-TOOL.Pdf

Horton, A. G., Gibson, K. B., & Curington, A. M. (2021). Exploring reflective journaling as a learning tool: An interdisciplinary approach. *Archives of Psychiatric Nursing, 35*(2), 195–199. https://doi.org/10.1016/j.apnu.2020.09.009

Huang, S. Y., Kuo, Y. H., & Chen, H. C. (2020). Applying digital escape rooms infused with science teaching in elementary school: Learning performance, learning motivation, and problem-solving ability. *Thinking Skills and Creativity, 37*, 100681. https://doi.org/10.1016/j.tsc.2020.100681

Hussein, H. (2018). Examining the Effects of Reflective Journals on Students' Growth Mindset: A Case Study of Tertiary Level EFL Students in the United Arab Emirates. *IAFOR Journal of Education, 6*(2). https://doi.org/10.22492/ije.6.2.03

Hussein, H. A. R. A., Jamal, D. A. H. A., & Sadi, I. (2020). Students' reflective journals and creative writing in EFL. *Universal Journal of Educational Research, 8*(8), 3484–3495. https://doi.org/10.13189/ujer.2020.080823

Languita, J. M. S., Ligtas, J. B., Baron, D. C., & Diquito, T. J. A. (2023). Preferred Style of Teaching and Learning by College Students in the New Normal. *American Journal of Multidisciplinary Research and Innovation, 2*(1), 74–82. https://doi.org/10.54536/ajmri.v2i1.1209

Kallio, H., Virta, K., & Kallio, M. (2018). Modelling the Components of Metacognitive Awareness. *International Journal of Educational Psychology, 7*(2), 94. https://doi.org/10.17583/ijep.2018.2789

Keegan, P. (2011). Transformative e-Learning and Teaching in Mandatory Tertiary Education. *Asian Social Science, 7*(11). https://doi.org/10.5539/ass.v7n11p66

Khosa, D. K., & Volet, S. E. (2014). Productive group engagement in cognitive activity and metacognitive regulation during collaborative learning: can it explain differences in students' conceptual understanding? *Metacognition and Learning, 9*(3), 287–307. https://doi.org/10.1007/s11409-014-9117-z

Korstange, R. (2016). Developing Growth Mindset Through Reflective Writing. *Journal of Student Success and Retention, 3*(1). https://www.jossr.org/wp-content/uploads/2014/04/KostangeArticle-3.pdf

Mann, K., Gordon, J., & MacLeod, A. (2009). Reflection and reflective practice in health professions education: a systematic review. *Advances in Health Sciences Education, 14*(4), 595–621. https://doi.org/10.1007/s10459-007-9090-2

Mueller, B. M. (2007). *The impact of academic reflective journaling on the self-efficacy of reluctant learners.* https://api.semanticscholar.org/CorpusID:147427956

Ozturk, N. (2016). An Analysis of Pre-service Elementary Teachers' Understanding of Metacognition and Pedagogies of Metacognition. *Journal of Teacher Education and Educators, 5*(1), 47-68.

Ozturk, N. (2017). Assessing metacognition: Theory and practices. *International Journal of Assessment Tools in Education, 4*(2), 134-148. https://doi.org/10.21449/ijate.298299

Park, C. (2003). Engaging Students in the Learning Process: The learning journal. *Journal of Geography in Higher Education, 27*, 183–199. https://doi.org/10.1080/03098260305675

Pintrich, P. R., Wolters, C. A., & Baxter, G. P. (2012). Assessing Metacognition and Self-Regulated Learning 2. Assessing Metacognition and Self-Regulated Learning. *University of Nebraska Lincoln.* https://digitalcommons.unl.edu/burosmetacognition/3

PISA. (2018). *PISA 2028 Results.* Programme for International Student Assessment.

PISA. (2023). *PISA 2022 Results (Volume I).* OECD. https://doi.org/10.1787/53f23881-en

Pruekpramool, C., Kanyaprasith, K., Phonphok, N., & Diem, H. T. T. (2018). Exploring science and mathematics teaching experiences in Thailand using reflective journals of an internship program between Vietnamese and Thai students. *AIP Conference Proceedings, 1923*(1), 030040. https://doi.org/10.1063/1.5019531

Ramadhanti, D., Ghazali, A. S., Hasanah, M., Harsiati, T., & Yanda, D. P. (2020). The use of reflective journal as a tool for monitoring of metacognition growth in writing. *International Journal of Emerging Technologies in Learning, 15*(11), 162–187. https://doi.org/10.3991/IJET.V15I11.11939

Salac, D. M. V. (2018). PRESENT: An Android-Based Class Attendance Monitoring System Using Face Recognition Technology. *International Journal of Computing Sciences Research, 2*(3), 102–115. https://doi.org/10.25147/ijcsr.2017.001.1.28

Schraw, G., & Dennison, R. S. (1994). Assessing Metacognitive Awareness. *Contemporary Educational Psychology, 19*(4), 460–475. https://doi.org/10.1006/ceps.1994.1033

Schraw, G., & Moshman, D. (1995). Metacognitive theories. *Educational Psychology Review, 7*(4), 351–371. https://doi.org/10.1007/BF02212307

Silver, N. (2013). Reflective Pedagogies and the Metacognitive Turn in College Teaching. *Using Reflection and Metacognition to Improve Student Learning* (1st ed., pp. 17). Routledge. https://www.taylorfrancis.com/chapters/edit/10.4324/9781003448570-1/reflective-pedagogies-metacognitive-turn-college-teaching-naomi-silver

Somekh, B. (2006). *Action Research: A Methodology for Change and Development.* Maidenhead: Open University Pres.

Sudirman, A., Gemilang, A. V., & Kristanto, T. M. A. (2021). The power of reflective journal writing for university students from the EFL perspective. *Studies in English Language and Education, 8*(3), 1061–1079. https://doi.org/10.24815/siele.v8i3.19105

Tanner, K. D. (2012). Promoting Student Metacognition. *CBE—Life Sciences Education, 11*(2), 113–120. https://doi.org/10.1187/cbe.12-03-0033

Tuan, H. L, Chin, C., & Shieh, S. (2005). The development of a questionnaire to measure students' motivation towards science learning. *International Journal of Science Education, 27*(6),639–654.https://doi.org/10.1080/0950069042000323737

Veenman, M. V. J., Van Hout-Wolters, B. H. A. M., & Afflerbach, P. (2006). Metacognition and learning: conceptual and methodological considerations. *Metacognition Learning 1*, 3–14. https://doi.org/10.1007/s11409-006-6893-0

Wallace-Spurgin, M. (2019). Implementation of the Instructional Practices Inventory-Technology Process with Fidelity: The Impact on Technology Use and Student Cognitive Engagement. *ISTES Organization.* www.iconses.net

Zaidi, F. Z., & Zaidi, A. R. Z. (2022). Strategies for improving memory in students. *Journal of Shalamar Medical & Dental College - JSHMDC, 3*(2), 197–200. https://doi.org/10.53685/jshmdc.v3i2.130

Zulkiply, N. (2006). Metacognition and its Relationship with Students' Academic Performance. https://core.ac.uk/display/11777326?utm_source=pdf&utm_medium=banner&utm_campaign=pdf-decoration-v1