

Ethnopedagogy through Project Based Learning as an Effort to Improve Students' Self-regulated Learning

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Abstract: The aim of this research is to determine the impact of applying an ethnopedagogical approach through project based learning (PjBL) on students' self-regulated learning (SRL). This research uses the quasi experimental method and pretest-posttest non-equivalent control group design. As many as 100 of 353 students class X at SMAN 3 Banda Aceh were selected through purposive sampling technique. A non-test instrument was used to measure students' SRL. Data were analyzed using descriptive statistics and an independent sample t test. The result of the hypothesis test illustrates the sig. > 0.05 (0.566 > 0.05), then H_0 accepted. The result of descriptive analysis shows that the increase of the average score in the experimental group was greater than the control group after the intervention. Thus, applying an ethnopedagogical approach through PjBL provides a positive impact on increasing the students' SRL but there is no significant influence.

Keywords: Ethnopedagogy; Project based learning; Self-regulated learning

Introduction

The students' academic and career future largely depend on their academic performance (Agrawal & Nehajul, 2017; Respati & Atun, 2023). One of the predictors of academic performance or achievement is self-regulated learning (Elesio, 2023; Kamel et al., 2023). This indicates that self-regulated learning (SRL) is crucial for students. Self-regulated learning can be defined as an active and constructive process where students are able to observe, reflect, and adjust their behavior or thinking which is characterized by the existence of a value system to set goals and standards, and to evaluate their progresses and achievements (Chen & Lin, 2018). SRL involves the regulation of cognitive, affective, metacognitive, and motivational processes that lead to their achievements and performances (Munshi et al., 2022; Pintrich, 2000). Thus, in self-regulated learning context, individuals are considered as active and constructive agents to create their own personal thoughts and meaning in which they are able to observe, reflect, adjust their own behaviors or

thoughts, have a value system to set goals and standards, and evaluate their progresses and achievements (Chen & Lin, 2018).

Based on the results of the questionnaire, students still depend on their friends to complete assignments and the tasks given are difficult to achieve show that student' self-regulated learning in Indonesia is still low (Anggraini et al., 2022). In line with Anggraini et al. (2022) and Sulisworo et al. (2020) stated that students in Indonesia still need help and assistance from teachers to improve SRL. Based on observations at SMA Negeri 3 Banda Aceh regarding self-regulated learning, students have not been able to manage the time given by the teacher in carrying out learning activities through student' worksheets so that the competencies expected to be achieved during the lesson hours are hampered and the teacher does not have the remaining time to evaluate each explanation made by the students. The inability of students to explain their understanding in written or verbal form when obtaining information also indicates that students' information organizing strategies are still limited, which is one of the aspects

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measured in self-regulated learning. Inadequate teaching methods (McInerney, 2011) and environmental factors (teaching practices and the cultural context of teaching and learning) (Lau & Ho, 2015) influence students' SRL. Therefore, effective and innovative learning practices that encourage SRL are needed.

One of innovative learnings that is in accordance with the demands of the Indonesian curriculum (Merdeka curriculum) and can be a solution for developing students' SRL is integrating an ethnopedagogical approach in Project Based Learning (PjBL). Ethnopedagogy, besides effectively connecting science with culture (Sugara & Sugito, 2022), also has the potential to influence the motivational and affective components of SRL because these are able to shape and determine the level of expectations and values attached to academic tasks and their achievements (Sappor, 2022). Ekantini's 2022 research finding show that the PjBL is effective in increasing students' SRL in science subjects during post-pandemic.

Ethnopedagogy is a learning approach that incorporates elements of local wisdom into learning process so that becomes more meaningful and contextual (Palumpun et al., 2022; Supriyadi et al., 2019). Teachers can refer to sources originating from the local wisdom of traditional communities during the learning process (Supriatna, 2016). Local wisdom is a view of life, knowledge and various life strategies that are actualized in the activities of local communities to overcome various problems in filling their needs in all aspects of life, such as religions, beliefs, sciences and technologies, social organizations, economics, languages and arts (Supriatna, 2016). Local culture-based learning can involve the use of folklore, music, dances, fine arts and other materials that have local cultural values in their practices (Hidayat et al., 2023).

The application of ethnopedagogy in this research uses the RTSRE stages. The RTSRE design is a science learning design based on local wisdom which consists of review (R), task (Q), solution (S), reflection (R), and evaluation (E) (Subali et al., 2015). Furthermore, Subali et al. (2015) explained that at the review stage, the teacher gives students the opportunity to study the material through problems based on local events in their environment, at the task stage, the teacher gives assignments to students to be completed, at the solution stage, students look for solutions from assignments that are given by the teacher through various activities such as field studies, experiments, analyzing reading materials and etc., at the reflection stage, students discuss findings or results in the forums with teacher monitoring, at the evaluation stage, the teacher guides students to summarize the findings of each group and evaluate them to strengthen the concepts that have been found.

Project Based Learning (PjBL) can be defined as an instructional strategy that gives students the autonomy to learn, explore, and carry out investigations during the learning process through encouragement to carry out projects (Chiu, 2020) in which students are expected to build and interpret new knowledge instead of relying on memorization (Issa & Khataibeh, 2021). Through Project Based Learning (PjBL), students can respond to concrete problems and resolve challenges through an investigation process within a specified period of time (Chiang & Lee, 2016). Gomez-del Rio et al. (2022) added that the teacher's role in Project Based Learning (PjBL) is as a supervisor or facilitator. The stages of Project Based Learning (PjBL) are starting with essential questions, designing a plan for the project, creating a schedule, monitoring the students and the progress of the project, assessing the outcome, evaluating the experience (Efliana et al., 2022).

In contrast to previous research, this research does not only pay attention to the impact of PjBL on students' self-regulated learning in general, but rather focuses on the impact of the implementation of ethnopedagogy through PjBL on students' self-regulated learning and examines to determine whether students' self-regulated learning outcomes differ between two student-centered models which are project based learning and problem based learning. The ethnopedagogy in this research refers to the use of local wisdom practices specifically Acehese culture as an effort to overcome or preserve the environment and mitigate environmental changes which are used as a medium for studying material on environmental change and conservation in high school. The results of this research will provide an overview for teachers, students and education staffs about the impact of combined learning on ethnopedagogical approach and project based learning on students' self-regulated learning in lessons related to environment.

Method

This research uses the Quasi Experimental method and Pretest-posttest Non-equivalent Control Group design. This design assigns certain subjects to two groups which are the experimental group and the control group. The experimental group was given treatment using an ethnopedagogical approach through project based learning, while the control group used an ethnopedagogical approach through problem based learning.

The research was conducted at SMA Negeri 3 Banda Aceh from January to April 2024 in the 2023/2024 academic year. As many as 100 of 353 students class X were selected through purposive sampling technique based on obtaining an average score in Biology in the previous semester that was close to (Table 1).

Table 1. Research Samples

Groups	Number of students	Biology average score
Experiment	X 1	24
	X 3	31
Control	X 2	27
	X 4	18

This research used a non-test instrument in the form of questionnaires from Chen et al. (2018) which

consists of five dimensions (Table 2) to measure students' self-regulated learning. The questionnaires used Likert scale guidelines (Table 3). The scores obtained by students are categorized using the cohesiveness score category based on Arifin (2012) and Sudjana (2010) (Table 4) with the clear analysis processes of this descriptive statistics explained in Figure 1.

Table 2. Five Dimensions to Measure Students' Self-regulated Learning

Dimensions	Items
Goal attainment (7 Items)	When I'm trying to change something, I pay attention to how I'm doing. (+) I set goals for myself and keep track of my progress. (+) Once I have goal, I can usually plan how to reach it. (+) I'm able to accomplish goals I set for myself. (+) If I make resolution to change something, I pay a lot of attention to how I'm doing. (+) I usually keep track of my progress toward my goals. (+) I have personal standards, and try to live up to them. (+)
Mindfulness (7 Items)	I get easily distracted from my plans. (-) I have trouble following through with things once I've made up my mind to do something. (-) I put off making decisions. (-) I give up quickly. (-) I don't notice the effects of my actions until it's too late. (-) Most of the time I don't pay attention to what I'm doing. (-) I have trouble making up my mind about things. (-)
Adjustment (3 Items)	I don't seem to learn from my mistakes. (-) I learn from my mistakes. (+)
Pro-activeness (3 Items)	As soon as I see a problem or challenge, I start looking for possible solutions. (+) I can stick to a plan that is working well. (+) I usually only have to make a mistake one time in order to learn from it. (+)
Goal setting (2 Items)	I can usually find several different possibilities when I want to change something. (+) I have trouble making plans to help me reach goals. (-) I have a hard time setting goals for myself. (-)

Table 3. Scale Score Guidelines of Self-regulated Learning

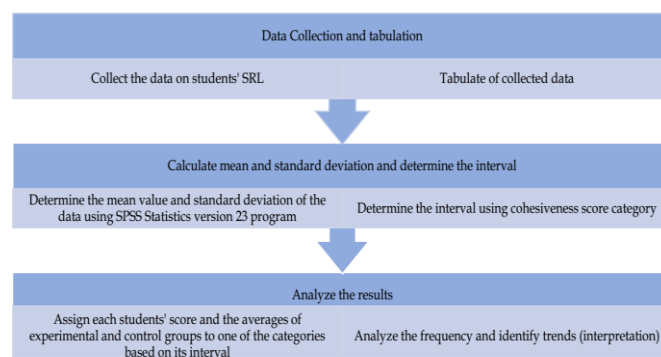
Statement	Strongly agree	Agree	Disagree	Strongly disagree
Favourable (+)	4	3	2	1
Unfavourable (-)	1	2	3	4

Table 4. Cohesiveness Score Category

Predicate/ Category	Guidelines
A (Very Good)	$\geq \text{Mean} + 1.5 \text{ SD}$
B (Good)	$\text{Mean} + 0.5 \text{ SD} \leq X < \text{Mean} + 1.5 \text{ SD}$
C (Fair)	$\text{Mean} - 0.5 \text{ SD} \leq X < \text{Mean} + 0.5 \text{ SD}$
D (Poor)	$\text{Mean} - 1.5 \text{ SD} \leq X < \text{Mean} - 0.5 \text{ SD}$
E (Very Poor)	$\leq \text{Mean} - 1.5 \text{ SD}$

Then, an independent sample t-test was used to find out whether there is a significant influence of implementing an ethnopedagogical approach through project based learning to students' self-regulated learning. If the sig value > 0.05 , H_0 is accepted, which means that there is no significant influence of implementing an ethnopedagogical approach through project based learning to students' self-regulated

learning. Conversely, if the sig value < 0.05 , H_0 is rejected, which means that there is a significant influence of implementing an ethnopedagogical approach through project based learning to students' self-regulated learning.

**Figure 1.** The analysis processes of the descriptive statistics

Result and Discussion

The results of normality, homogeneity, and hypothesis are presented in Table 5.

Table 5. The Influence Analysis

Groups	Normality test		Homogeneity test*** (Sig.)	t test****	
	Before intervention (Sig.)	After intervention (Sig.)		t	Sig. (2-tailed)
Experiment	.200*	.200*	.335	.576	.566
Control	.600**	.082**			

*) Kolmogorov-Smirnov, sig > 0.05

**) Shapiro-Wilk, sig > 0.05

***) Levene, sig > 0.05

****) Independent sample t-test, sig < 0.05

Based on hypothesis test in Table 6, the effect of implementing an ethnopedagogical approach through project based learning on students' SRL shows acceptance of H_0 , which means there is no significant influence of implementing an ethnopedagogical approach through project based learning to students' self-regulated learning. This result is thought to be caused by the two models used: project based learning/PjBL (experimental group) and problem based learning/PBL (control group) which encourage similar self-regulation, so that they do not show a significant impact on students' SRL.

PjBL and PBL have similarities in terms of their instructional structure, which emphasizes student responsibility, goal setting, progress monitoring, and

reflection in the process, thus encouraging SRL. As mentioned by Stefanou et al. (2013) that PjBL and PBL have similar structures and both have more similarities than differences especially the level of guidance and support provided to students which is comparable. Thus, the level of guidance and support is comparable in these models, causing the result to show that there is no significant influence on students' self-regulated learning. These results are in line with research by Stefanou et al. (2013) who compared the influence of PjBL and PBL on students' self-regulated learning (SRL), that PjBL and PBL support self-regulation but no statistically significant differences were seen in students' regulation of behavior between the two environments.

Table 6. Descriptive Statistics

Groups		N	Mean	Std. deviation
Experiment	Before intervention (Pre)	55	76.21	8.68
	After intervention (Post)	55	77.99	9.53
Control	Before intervention (Pre)	45	76.51	9.36
	After intervention (Post)	45	76.86	9.98

Table 7. The Interval Obtained Using Cohesiveness Score Category Guidelines of Arifin (2012) and Sudjana (2010)

Criteria	Intervals			
	Experiment (pre/ before intervention)	Experiment (post/ after intervention)	Control (pre/ before intervention)	Control (post/ after intervention)
Very good	≥ 89.23	≥ 92.28	≥ 90.55	≥ 91.83
Good	$80.55 \leq X < 89.23$	$82.75 \leq X < 92.28$	$81.19 \leq X < 90.55$	$81.85 \leq X < 91.83$
Fair	$71.87 \leq X < 80.55$	$73.23 \leq X < 82.75$	$71.83 \leq X < 81.19$	$71.87 \leq X < 81.85$
Poor	$63.19 \leq X < 71.87$	$63.70 \leq X < 73.23$	$62.47 \leq X < 71.83$	$61.89 \leq X < 71.87$
Very poor	≤ 63.19	≤ 63.70	≤ 62.47	≤ 61.89

Although the result did not show a significant influence on students' self-regulated learning, descriptive analysis of this study showed an increase in the average scores of the experimental and control groups after the intervention. Average scores of students' self-regulated learning were categorized based on the intervals obtained using cohesiveness score category guidelines of Arifin (2012) and Sudjana (2010) after obtaining the results of descriptive statistics (the mean and standard deviation) from the SPSS Statistics 23 program (Table 6 and 7). The data of score categorization before and after research in the control and experimental classes are presented in Table 8 and 9.

Based on Table 8 and 9, the increase of the average score in the experimental group was greater than in the control group, although the increase did not indicate a change in the criteria when interpreted. These results are supported by empirical evidence during field research, where the quantity of involvement, autonomy, and enthusiasm of students during the learning process is better in the experimental group than in the control group. This is in line with several previous studies that the better the involvement (An et al., 2024), autonomy (Reeve et al., 2008; Sholihah & Firdaus, 2023), and enthusiasm (Uppal & Kumar, 2020) of students, the more self-regulated learning is encouraged for students.

Table 8. The Interpretation of Students' Self-regulated Learning Scores before Intervention

Criteria	Experiment (%)	Control (%)
Very good	7	9
Good	18	20
Fair	36	38
Poor	33	27
Very poor	5	7
Average score	76.22 (Fair)	76.52 (Fair)

Table 9. The Interpretation of Students' Self-regulated Learning Scores after Intervention

Criteria	Experiment (%)	Control (%)
Very good	11	9
Good	14	24
Fair	44	29
Poor	24	33
Very poor	7	4
Average score	78.00 (Fair)	76.87 (Fair)

Involvement, autonomy and enthusiasm of students certainly influence every dimension of self-regulated learning as measured in this study. The great opportunities given to students through a learning process that actively involves students, provides great learning autonomy, and fosters enthusiasm plays an important role in shaping students' personalities to become more independent students.

Based on empirical evidence during field research, it found that in the experimental group, all students appeared to have active involvement in the tasks given compared to students in the control group where only a few students felt responsible for completing the task so that not all students were actively involved in the learning process. The experimental group given the PjBL intervention also gave students more autonomy compared to students in the control group given the PBL intervention. In line with field observations, Stefanou et al. (2013) stated that students who take part in project-based learning have higher autonomy support than students who take part in PBL learning.

In addition, the greater the enthusiasm of the students, the more enthusiastic the students will be in carrying out their tasks with determination, thereby increasing their resilience in facing challenges and encouraging them to achieve the goals they have set. Using ethnopedagogy makes students enthusiastic in participating in the learning process. This is in line with Yuberti et al. (2022) that an ethnopedagogical module make students enthusiastic. Furthermore, Palumpun et al. (2022) also mentioned that the learning process using local potentials will be more interesting and meaningful.

Related to students' enthusiasm, it found that in the experimental group, students had the opportunity to explore culturally relevant topics and issues in the context of their project. This relevance can increase

students' enthusiasm for the project by connecting learning with culturally relevant contents, examples, and problems (context that can be linked to cultural experiences in the students' environment). However, in the control group, even though the problems raised were as relevant as those in the experimental group (increasing students' enthusiasm), the strong encouragement to be involved in learning was limited by learning time so that students only looked for answers to the problems without delving into the intricacies (only gave simple answers) (apparent from the presentation and students' worksheets). Short learning periods put greater pressure on students to complete assignments (it could be seen from students' complaints that time was very short in completing worksheets). This pressure has a negative impact on students' enthusiasm for learning, resulting in reduced enthusiasm. Chen et al. (2021) strengthen this empirical evidence where they explain that when students feel nervous, anxious or depressed, their learning motivation can be low. In line with Chen et al. (2021), Johnsen et al. (2017) also found that pressure is negatively correlated with learning motivation, meaning that the greater the pressure, the lower the learning motivation.

Finally, beside of learning support, there are other factors such as the school environment and the environment where students live that need to be considered in optimally improving SRL. According to Zumbrunn et al. (2011), the factors outside the teacher's control can have a major impact on the development of students' SRL. Further, Alvi et al. (2020) stated that an integrative ecological model (inspired by Bronfenbrenner's perspective) is needed to support students' SRL which offers a system-ecological view to conceptualize the evolving interaction between a person's development and the environment, with the main focus on phenomenon development which are not only consisting of microsystems (supporting students' SRL in the classroom), but also mesosystems, exosystems, and macrosystems (the systems outside the classroom that support individual SRL).

In addition, regardless of the existence of other factors that influence students' SRL development, the use of certain learning practices (certain approaches, models or methods) which have a process framework to improve students' SRL in the classroom that are applied persistently will be able to help students become more independent individuals. This is supported by the statement that SRL can be taught through formal intervention (Cleary et al., 2017; Dignath & Büttner (2008) and classroom rules Callan et al. (2021) in which Callan et al. (2022) stated that SRL is described as a process that takes place over time.

Conclusion

Implementation of an ethnopedagogical approach through project based learning provide positive impacts on students' self-regulated learning at SMA Negeri 3 Banda Aceh in lessons related to environment, but there is no significant influence. Then, although the ethnopedagogical approach through Project Based Learning did not show a significant influence on students' SRL, persistent implementation of this learning practice will help students become more independent individual.

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Author Contributions

Conceptualization, L. R., A. U. T. P., and S.; methodology, L. R., and A. U. T. P.; validation, A. U. T. P., and H. R.; investigation, L. R.; resources, L. R.; data curation, L. R.; writing-original draft preparation, L. R.; writing-review and editing, L. R., A. U. T. P., S., H. R., and S. All authors have read and agreed to the published version of manuscript.

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Conflicts of Interest

No conflict interest.

References

- Agrawal, M., & Nehajul, M. S. K. (2017). Predictors of academic performance: emotional intelligence and stream among graduate students. *Educational Quest*, 8(3), 743-750. <https://doi.org/10.24832/jpnk.v7i2.2888>
- Alvi, E., & Gillies, R. (2020). Teachers and the teaching of self-regulated learning (SRL): The emergence of an integrative, ecological model of SRL-in-context. *Education Sciences*, 10(4), 98. <https://doi.org/10.3390/educsci10040098>
- An, F., Xi, L., & Yu, J. (2024). The relationship between technology acceptance and self-regulated learning: The mediation roles of intrinsic motivation and learning engagement. *Education and Information Technologies*, 29(3), 2605-2623. <https://doi.org/10.1007/s10639-023-11959-3>
- Anggraini, K. N., Sukmaningthias, N., Sari, N., & Nuraeni, Z. (2022). Self-regulated learning of junior high school students through blended learning based on indonesian realistic mathematics education approach. *Advances in Social Science, Education and Humanities Research*, 656, 124-134. <https://doi.org/10.2991/assehr.k.220403.017>
- Arifin, Z. (2012). *Evaluasi Pembelajaran*. Bandung: Rosdakarya.
- Callan, G. L., Longhurst, D., Ariotti, A., & Bundock, K. (2021). Settings, exchanges, and events: The SEE framework of self-regulated learning supportive practices. *Psycho Schs*, 58(5), 773-788. <https://doi.org/10.1002/pits.22468>
- Callan, G., Longhurst, D., Shim, S., & Ariotti, A. (2022). Identifying and predicting teachers' use of practices that support SRL. *Psychology in the Schools*, 59(11), 2327-2344. <https://doi.org/10.1002/pits.22712>
- Chen, C. C., & Tu, H. Y. (2021). The effect of digital game-based learning on learning motivation and performance under social cognitive theory and entrepreneurial thinking. *Frontiers in Psychology*, 12(750711), 1-16. <https://doi.org/10.3389/fpsyg.2021.750711>
- Chen, Y. H., & Lin, Y. J. (2018). Validation of the short self-regulation questionnaire for Taiwanese College Students (TSSRQ). *Frontiers in Psychology*, 9, 259. <https://doi.org/10.3389/fpsyg.2018.00259>
- Chiang, C. L., & Lee, H. (2016). The effect of project-based learning on learning motivation and problem-solving ability of vocational high school students. *International Journal of Information and Education Technology*, 6(9), 709-712. <https://doi.org/10.7763/ijiet.2016.v6.779>
- Chiu, C. F. (2020). Facilitating K-12 teachers in creating apps by visual programming and project-based learning. *International Journal of Emerging Technologies in Learning (iJET)*, 15(01), 103-118. <https://doi.org/10.3991/ijet.v15i01.11013>
- Cleary, T. J., Velardi, B., & Schnaidman, B. (2017). Effects of the Self-Regulation Empowerment Program (SREP) on middle school students' strategic skills, self-efficacy, and mathematics achievement. *Journal of School Psychology*, 64, 28-42. <https://doi.org/10.1016/j.jsp.2017.04.004>
- Dignath, C., & Büttner, G. (2008). Components of fostering self-regulated learning among students. A meta-analysis on intervention studies at primary and secondary school level. *Metacognition and Learning*, 3(3), 231-264. <https://doi.org/10.1007/s11409-008-9029-x>
- Efliana, R., Hardeli, H., Alizar, A., & Yerimadesi, Y. (2022). Development of electronic student worksheets (e-SW) electrolyte and nonelectrolyte solutions based on project based learning (PjBL) on the learning outcomes. *Jurnal Penelitian Pendidikan IPA*, 8(3), 1267-1272. <https://doi.org/10.29303/jppipa.v8i3.1629>

- Ekantini, A. (2022). The effectiveness of project based learning model for self regulated learning: A case study of post-pandemic elementary school science learning. *Al-Bidayah : Jurnal Pendidikan Dasar Islam*, 14(1), 95–114. <https://doi.org/10.14421/albidayah.v14i1.889>
- Elesio, J. M. (2023). The influence of self-regulated learning strategies towards academic performance of college students. *East Asian Journal of Multidisciplinary Research*, 2(2), 823–838. <https://doi.org/10.55927/eajmr.v2i2.3029>
- Gomez-del Rio, T., & Rodriguez, J. (2022). Design and assessment of a project-based learning in a laboratory for integrating knowledge and improving engineering design skills. *Education for Chemical Engineers*, 40, 17–28. <https://doi.org/10.1016/j.ece.2022.04.002>
- Hidayat, S., Leksono, S. M., Jamaludin, U., & Shintawati. (2023). Ethno pedagogy approach in preparing science learning in the society 5.0 era. *Jurnal Penelitian Pendidikan IPA*, 9(7), 309–314. <https://doi.org/10.29303/jppipa.v9i7.4154>
- Issa, H. B., & Khataibeh, A. (2021). The Effect of using project based learning on improving the critical thinking among upper basic students from teachers' perspectives. *Pegem Journal of Education and Instruction*, 11(2), 52–57. <https://doi.org/10.14527/pegegog.2021.00>
- Johnsen, B. H., Espevik, R., Saus, E. R., Sanden, S., Olsen, O. K., & Hystad, S. W. (2017). Hardiness as a moderator and motivation for operational duties as mediator: The relationship between operational self-efficacy, performance satisfaction, and perceived strain in a simulated police training scenario. *J Police Crime Psychol.*, 32, 331–339. <https://doi.org/10.1007/s11896-017-9225-1>
- Kamel, S. I. M., Abdeen, M. A., & Mohamed, H. M. (2023). Self-regulated learning as a predictor of academic achievement among students at nursing schools. *Zagazig Nursing Journal*, 19(2), 57–72. <https://doi.org/10.21608/znj.2023.309235>
- Lau, K., & Ho, E. S. (2015). Reading Performance and self-regulated learning of Hong Kong students: what we learnt from PISA 2009. *The Asia-Pacific Education Researcher*, 25(1), 159–171. <https://doi.org/10.1007/s40299-015-0246-1>
- McInerney, D. M. (2011). Culture and self-regulation in educational context: Assessing the relationship of cultural group to self-regulation. In *Handbook of Self-regulation of Learning and Performance* (pp. 442–464). New York: Routledge.
- Munshi, A., Biswas, G., Baker, R., Ocumpaugh, J., Hutt, S., & Paquette, L. (2022). Analysing adaptive scaffolds that help students develop self-regulated learning behaviours. *Journal of Computer Assisted Learning*, 39(2), 351–368. <https://doi.org/10.1111/jcal.12761>
- Palumpun, N. S., Wilujeng, I., Suryadarma, I. G. P., Suyanta, S., & Syaukani, M. H. (2022). Identifikasi kemandirian belajar peserta didik menggunakan e-modul berbantuan liveworksheet terintegrasi potensi lokal Toraja. *Jurnal Penelitian Pendidikan IPA*, 8(2), 558–565. <https://doi.org/10.29303/jppipa.v8i2.1245>
- Pintrich, P. R. (2000). The role of goal orientation in self-regulated learning. In *Handbook of Self-regulation* (pp. 451–502). Academic Press.
- Reeve, J., Ryan, R., Deci, E., & Jang, H. (2008). Understanding and promoting autonomous self-regulation: A self-determined theory perspective. In *Motivation and Self-regulated Learning: Theory, Research, and Applications* (pp. 223–244). Mahwah, NJ: Erlbaum Associates.
- Respati, A. A., & Atun, S. (2023). Effect of electronic modules on self-regulated learning and cognitive learning outcomes on chemical bonding material. *Jurnal Penelitian Pendidikan IPA*, 9(5), 2489–2496. <https://doi.org/10.29303/jppipa.v9i5.2430>
- Sappor, G. (2022). The influence of culture on the development and organisation of self-regulated learning skills. *Journal of Psychology & Behavior Research*, 4(2), 1–24. <https://doi.org/10.22158/jpbr.v4n2p1>
- Sholihah, U., & Firdaus, A. I. (2023). Student's Computational Thinking Ability in Solving Trigonometry Problems in the Review of Self-Regulated Learning. *Jurnal Penelitian Pendidikan IPA*, 9(2), 626–633. <https://doi.org/10.29303/jppipa.v9i2.2821>
- Stefanou, C., Stolk, J. D., Prince, M., Chen, J. C., & Lord, S. M. (2013). Self-regulation and autonomy in problem- and project-based learning environments. *Active Learning in Higher Education*, 14(2), 109–122. <https://doi.org/10.1177/1469787413481132>
- Subali, P., Sopyan, A., & Ellianawati. (2015). Developing local wisdom based science learning design to establish positive character in elementary school. *Jurnal Pendidikan Fisika Indonesia*, 11(1), 1–7. <https://doi.org/10.15294/jpfi.v11i1.3998>
- Sudjana, N. (2010). *Penilaian Hasil Proses Belajar Mengajar Cetakan XV*. Bandung: Ramaja Rosdakarya.
- Sugara, U. & Sugito. (2022). Etnopedagogi: Gagasan dan peluang penerapannya di Indonesia. *Jurnal Pendidikan dan Kebudayaan*, 7(2), 93–104. <https://doi.org/10.24832/jpnk.v7i2.2888>
- Sulisworo, D., Fatimah, N., Sunaryati, S. S., & Sanidi, S. (2020). A quick study on SRL profiles of online learning participants during the anticipation of the spread of COVID-19. *International Journal of*

- Evaluation and Research in Education (IJERE)*, 9(3), 723-730.
<https://doi.org/10.11591/ijere.v9i3.20642>
- Supriatna, N. (2016). Local wisdom in constructing students' ecoliteracy through ethnopedagogy and ecopedagogy. In *International Conference on Sociology Education*. Atlantis Press.
<https://doi.org/10.2991/icse-15.2016.28>
- Supriyadi, Waremra, R. S., & Betaubun, P. (2019). Papua contextual science curriculum contains with indigenous science (ethnopedagogy study at Malind Tribe Merauke). *International Journal of Civil Engineering and Technology (IJCIET)*, 10(02), 1994–2000. Retrieved from <http://www.iaeme.com/ijciet/issues.asp?JType=IJCIET&VType=10&IType=02>
- Uppal, N., & Kumar, A. (2020). Metacognition: A key determinant of self-regulated learning. *An International Bilingual Peer Reviewed Refereed Research Journal*, 10(40), 101–105. Retrieved from <https://www.researchgate.net/publication/348525585>
- Yuberti, Y., Komikesari, H., Asyhari, A., & Octana, I. N. (2022). Ethnopedagogy: Traditional games in senior high school physics enrichment module. *Jurnal Ilmiah Pendidikan Fisika Al-Biruni*, 11(1), 91–101.
<https://doi.org/10.24042/jipfalbiruni.v11i1.8541>
- Zumbrunn, S., Tadlock, J., & Roberts, E. D. (2011). *Encourage self regulated learning in the classroom*. MERC Publications.
<https://doi.org/10.13140/RG.2.1.3358.6084>