

**The Effect of Self-Regulated Learning Strategy on Student Learning Outcomes
in Acid-Base Titration Material**

Marisa Salsabila

Universitas Negeri Surabaya

E-mail: marisasalsabila0106@gmail.com

Muchlis

Universitas Negeri Surabaya

E-mail: muchlis@unesa.ac.id

Submitted: 17-05-2024

Accepted: 03-06-2024

Published: 10-08-2024

Abstract

This research is based on the fact that students' learning outcomes in acid-base titration material in the low scores. The aim of this research is to investigate the effect of self-regulated learning strategies in acid-base titration material on student learning outcomes. This research was quantitative research with a pre-experimental design with a one group pretest posttest design. This research began with a pretest, then at meeting 1, posttest 1 was given. After that, the implementation of Self-Regulated Learning (SRL) continued with posttest 2. The subjects used were 34 students at one of the State High Schools in Gresik. The instruments used were pretest and posttest sheets. Data analysis used was hypothesis testing and N-gain testing. Hypothesis testing showed that there was a significant difference between pretest and posttest 1 as well as between posttest 1 and posttest 2. Meanwhile the N-gain test shows that there was an improvement in learning outcomes from pretest and posttest 1 as well as from posttest 1 and posttest 2. The percentage of students who gain N-gain with medium criteria at meetings 1 and 2 was respectively 61.76% and 23.52% and for high criteria respectively 38.23% and 76.47%. The results of the hypothesis test and N-gain test showed that there was a positive influence on student learning outcomes in the acid-base titration material. Therefore, it can be concluded that SRL strategy-oriented learning influences learning outcomes and can improve student learning outcomes in acid-base titration material.

Keywords: self-regulated learning strategy, acid base titration, learning outcomes

INTRODUCTION

One of the sciences studied at school is natural science learning. Natural science learning has been taught to students from elementary school to high school. Natural science is a science that explores orientation towards principles, facts, laws, generalizations about the universe which aims to be studied, useful and developed so that it applies globally (Jufri, 2017). One of the natural sciences studied is chemistry. Chemistry does not only discuss concepts, theories, calculations, looks or laws, but chemistry also contains experiments that aim to prove chemistry in everyday life. Most students have little awareness of the importance of chemistry in everyday life so that chemistry lessons are considered complicated and difficult to understand (Abdurrahman & Soegiarto, 2014). Scientists say that the importance of chemistry by relating phenomena to everyday life can create chemical concepts that were previously considered abstract to become real (Sevian et al., 2018).

The material that students consider difficult is acid-base titration material. In accordance with the results of the school score documents, data collection shows that the learning outcomes for acid-base titration material for the last 2 years were 53% and 55% of students got learning outcomes below the KKTP of $\delta 75$. This is because students experience difficulties. Acid-base titration material has characteristics that require understanding in selecting acid-base indicators, writing reaction equations to balance reactions, determining acid-base valence, determining the type of titration used when looking at the titration curve and determining the equivalence point (Marzuki & Astuti, 2018).

Students who do not understand the concept can be influenced by themselves or the teacher. Students tend to misunderstand learning given by poorly planned teachers (Mentari et al., 2014). Teacher failure in teaching the material can also be a problem for students in understanding the material (Djalil et al., 2023). Not only that, when learning, especially in planning activities, there are still difficulties that are influenced by the teacher's lack of knowledge about the characteristics of students so that better preparation is still needed so that learning can go according to plan (Palobo & Tembang, 2019).

If students experience difficulties in studying acid-base titration material, it will affect their chemistry learning results which are still unsatisfactory. Learning outcomes are the grades students receive after learning takes place in accordance with the students' skills which are shown in the form of numbers (Sahiu & Wijaya, 2017). The results in the form of numbers are obtained from test results aimed at determining students' abilities (Bungsu et al., 2019; Wali et al., 2020).

There are several factors that can influence students in learning. Factors that influence students' learning processes are intrinsic factors in the form of interest, sanity and self-motivation in achieving a goal (Nabillah & Abadi, 2019). Not only that, other factors are extrinsic factors in the form of school environmental factors and the environment in society (Iswara et al., 2021). If the desire to learn is low, students will be less active in learning. Students experience difficulties in learning chemistry because they require an understanding of interconnected concepts and not just memorizing them (Genes et al., 2021). If students' interest in learning is low, it will result in them being less active in participating in learning. The active role of students is very necessary, this is also contained in Law of the Republic of Indonesia Number 20 of 2003 concerning the National Education System which explains that the aim of national education is to develop the potential of students to become human beings who believe and are devoted to God Almighty, with noble character. , healthy, knowledgeable, capable, creative, independent,

and become democratic and responsible citizens. To overcome this problem, learning must be improved so that student learning outcomes increase in acid-base titration material. Improvements that teachers can make are by using learning strategies that are appropriate to the acid-base titration material.

A learning possibility that is suitable for improving learning outcomes is SRL strategy learning. When an SRL learning strategy is implemented, students can learn independently, be active when learning takes place, have learning targets and objectives and are able to evaluate their learning outcomes (Assakinah et al., 2022). The SRL learning strategy is a learning that aims to ensure that students have the desire to create learning targets, utilize study time and be able to motivate themselves to achieve a desired target (Anisa et al., 2021). If students are able to regulate themselves well, they can regulate, guide and control themselves when learning (Yuzarion et al., 2020; Lestari et al., 2023). SRL for students is a problem-solving factor in improving learning outcomes (Rahmadhani & Budiraharjo, 2024).

Therefore, by implementing SRL learning strategies, students can increase their learning motivation so that they are able to complete learning targets so that they get good results because they have the desire or drive to learn. The SRL learning strategy has seven stages that students must carry out, namely analyze, plan, implement, comprehend, problem solving, evaluate and modify (Philip, 2005). Factors that can influence students' self-regulation are environmental factors, both at home, school and in social life (Setiani et al., 2018; Loeffler et al., 2019). Self-regulation is influenced by students' closeness to the social environment, for example relationships with family, affection, or encouragement given when students experience failure or difficulties during the learning process, whether at school or elsewhere (Putri et al., 2020; Yusutria et al., 2022).

This research uses learning tools in the form of SRL strategy-oriented *Lembar Kerja Peserta Didik (LKPD)* which have been developed and tested for feasibility (Silvia & Muchlis, 2023). This is because after conducting a limited trial of the tool developed, valid, practical and effective results were obtained, so the author adopted the LKPD that had been developed. The self-regulated learning strategy is only used as a support in improving learning outcomes, so in this research SRL was not measured and was only trained on students.

Based on the background, it shows that student learning outcomes in acid-base titration material are still relatively low. To overcome this problem, learning must be improved so that student learning outcomes increase, especially in acid-base titration material. Improvements that teachers can make are using strategies that are suitable when applied to acid-base titration material. There was a significant increase in student learning outcomes after implementing self-regulated learning strategies. This is proven by the completeness of learning outcomes from cycle 1 to cycle 2, namely in the affective domain 47.06%, psychomotor domain 38.24%, cognitive domain 38.24%, and an increase in the average learning outcomes of students from initial observation to cycle II of 32.35% (Surawan et al., 2018). Therefore, the aim of this research is to determine the effect of learning self-regulated learning strategies on acid-base titration material on student learning outcomes.

METHOD

This research is a quantitative research and pre-experimental design with a one group pretest posttest design. The quantitative method is a method based on real data to conduct research on certain samples, the data applied is in the form of numbers with

statistical data analysis which aims to test hypotheses (Sugiyono, 2022). The subjects used were 34 class XI high school students at one of the state high schools in Gresik. This research only used one class without any comparison class. The class samples used a random technique with normally distributed class selection. The data collection technique used is a test. This test aims to measure student learning outcomes before and after being taught self-regulated learning strategies.

The instrument used in collecting data in this research was a pretest and posttest question sheet consisting of 6 questions. The questions given were about acid-base titration material, where the questions in the pretest, posttest 1 and posttest 2 were different but the indicators used were still the same. Data analysis of student learning outcomes aims to determine the value of student learning outcomes during self-regulated learning strategies on acid-base titration material. This test is used to determine students' mastery by comparing the results of pretest, posttest 1 and posttest 2.

This research uses hypothesis testing and N-gain testing. Before testing the hypothesis, start with a normality test. The normality test aims to see whether the collected samples have normal or abnormal data distribution. There are 2 results of the normality test, namely the Kolmogorov Smirnov and Shapiro Wilk normality tests. Kolmogorov Smirnov uses samples of 20-1000 while the Shapiro Wilk test uses samples of <50. Furthermore, if the significance result is >0.05 then the distribution data used is normal data, whereas if the significance result is <0.05 then the distribution data used is non-normal data. If the sample data used is normal distribution data then the paired sample t-test is then carried out, but if the data used is non-normal distribution data then the Wilcoxon test is then carried out. The paired sample t-test was used for the pretest and posttest results. This hypothesis states that H_0 indicates that there is no difference in the average of the pretest and posttest results, while H_a indicates that there is an average difference in the results of the pretest and posttest. If $\text{sig} < 0.05$ then H_0 is rejected, whereas if $\text{sig} > 0.05$ then H_0 is accepted.

FINDINGS AND DISCUSSION

Findings

Learning outcomes are obtained from the results of the pretest and posttest that have been carried out by students. The pretest and posttest were given before and after being taught self-regulated learning strategies. Posttests 1 and 2 have differences in the questions and sub-materials used. Posttest 1 uses the strong acid and strong base titration sub-material, while posttest 2 uses the weak base and strong acid titration sub-material. This aims to determine the effect of self-regulated learning strategy-oriented learning on student learning outcomes.

The questions contained in the pretest, posttest 1 and posttest 2 contain 6 essay questions, where each question is different but the indicators are the same. The indicators used are calculating the concentration of a solution, analyzing the indicator curve and acid-base titration experiment data and concluding the titration experiment data. Before testing the hypothesis, a normality test must be carried out. The normality test can be carried out using the SPSS 25 application. The normality test results are shown in Diagram 1.

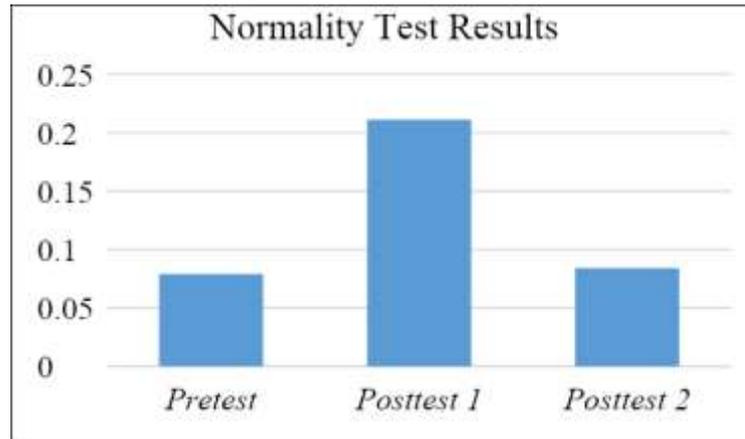


Diagram 1. Normality Test Results

Diagram 1 shows that the pretest, posttest 1 and posttest 2 data have Sig Shapiro Wilk results >0.05 so the data is normally distributed. After the normality of the data is known, the hypothesis test is then carried out using the paired sample t-test. The results of the paired sample t-test are shown in Table 2.

Table 2. Paired Sample t-Test Results

Statistics	Assymp.Sig.(2-tailed)
Pretest - Posttest 1	0.000
Posttest 1 - Posttest 2	0.000

Based on Table 2, it is known that Assymp.Sig.(2-tailed) <0.05 , which means H_0 is rejected. This shows that there is a significant difference between pretest and posttest 1 as well as between posttest 1 and posttest 2.

To determine the increase in student learning outcomes between pretest and posttest 1 and between posttest 1 and posttest 2, an N-gain test can be carried out. The N-gain test results can be seen in Table 3.

Table 3. N-gain Test Results with Low, Medium and High Criteria

Learning Outcomes	Percentage Number of Learners (%)	Criteria
Pretest - Posttest 1	0	Low
	61,76	Medium
	38,23	High
Posttest 1- Posttest 2	0	Low
	23,52	Medium
	76,47	High

Table 3 shows that the medium and high N-gain criteria experience an increase in learning outcomes. Therefore, there is an increase from pretest to posttest 1 and posttest 1 to posttest 2.

Discussion

This research has a purpose to determine the effect of SRL strategy learning on students learning outcomes. This research was conducted in 2 meetings with a time allocation of 2 x 45 minutes per meeting. The number of subjects used in this study were

34 high school students in grade XI. The material used is acid-base titration with the sub-materials of strong acid-strong base and weak base-strong acid titrations. The teacher gave the same treatment in the 2 meetings, but the difference was that in meeting 1 the material taught was acid-base titration with the strong acid-strong base titration sub-material, whereas in meeting 2 the material was taught using the weak base-strong acid titration sub-material. The stages of SRL strategy learning include (1. Analyse, 2. Plan, 3. Implement, 4. Comprehend, 5. Problem Solving, 6. Evaluate, and 7. Modify) (Philip, 2005).

The activity in the first stage of self-regulated learning is the analyzing stage. Where students carry out analysis by writing down the learning objectives contained in the LKPD and then using them as learning targets that must be achieved that day. If students have carried out the analysis stage, students are motivated to achieve their learning targets. One example of analysis activity is students writing "Calculating the concentration of acidic or basic solutions based on data from strong acid and strong base titration experiments, analyzing data from strong acid and strong base titration experiments, and concluding data from strong acid and strong base titration experiments". This stage is important because students have a targeted plan to achieve higher learning outcomes (Banarjee & Kumar, 2014). Learning outcomes are a fundamental value standard where the better the learning outcomes obtained in the learning process, the higher the achievement of learning objectives (Simarmata, 2017).

The second stage of SRL is the planning stage, students answer investigative questions and create hypotheses based on investigative questions. One example at this stage, students are given a bathroom floor cleaning phenomenon. Students can answer investigative questions by writing the answer "Acid-base titration experiments can be used to determine the concentration of a solution." Then, when making a hypothesis, students can write "The way to determine the concentration of the HCl solution in the bathroom floor cleaner is by carrying out an acid-base titration experiment." In general, planning aims to increase influence and achieve learning targets. Activities carried out by teachers and students in a learning activity aim to achieve learning targets or objectives (Jaya, 2019).

The third stage of self-regulated learning is the implementing stage. At this stage, students carry out acid-base titration experiments, analyze data and make conclusions based on the phenomena presented and the results of the experiment. When conducting an experiment, each group of students is divided into tasks and must carry out activities together so that each student knows the process of acid-base titration experiments. One example at this stage is that students write "The results of the experiment followed by answering data analysis which consists of 4 questions including the function of adding indicators, calculating the average volume of the NaOH solution used, calculating the concentration volume of the HCl solution, and writing the chemical reaction equation. . Then students conclude the results of the experiment that acid-base titration experiments can be used to determine the concentration of a solution." Experimentation is a method that can be used specifically with the aim of developing students' skills, solving a problem or phenomenon and can train students' communication (Asmaningrum et al., 2018).

The fourth stage of SRL is the understanding stage. Students make presentations where only one group presents and the other group asks questions that are still not understood. Furthermore, questions can be answered by peers or teachers. One of the questions asked by students was "How to find out when the equivalence point occurs." Presentations can train students in expressing opinions. Speaking in public places not only

conveys a message, but you can also observe whether the message expressed is understandable or not (Asriandhini et al., 2020). The understanding stage is very important, because it will have an impact on the next stage.

The fifth stage of self-regulated learning is the problem solving stage, students solve problems by answering several questions based on the phenomena provided, but the phenomena are different from the initial ones. The aim at this stage is to train students to improve learning outcomes in cognitive aspects and to assess whether students have been able to achieve the learning targets that have been designed or not. The questions contained in the problem solving stage relate to indicators that must be achieved so that they aim to train and be used as a reference for students in achieving their learning targets. One example at this stage is that students can answer "Calculate the concentration of hydrochloric acid contained in bathroom floor cleaners, estimate indicators that can be used and make conclusions regarding acid-base titration experiments." Problem solving is a place for students to be able to find out, make plans, solve a problem, and find a solution (Nur & Palobo, 2018).

The sixth stage of SRL is the evaluating stage. Students evaluate the learning achievement targets that have been designed based on what has been done. One example of an answer related to student strengths is "I like reading so I can achieve the target of analyzing and concluding data from acid-base titration experiments." Learning evaluation really supports students to be more enthusiastic in learning so that they can achieve learning goals and helps teachers to improve the quality of learning outcomes obtained by students (Idrus, 2019). The student evaluation stage also describes the deficiencies that cause students not to achieve targets. An example of an answer is "I am weak at arithmetic so I cannot achieve the target of calculating the concentration of a solution based on data from acid-base titration experiments." The evaluation stage is very useful because at this stage students know their strengths and weaknesses after learning. The SRL possessed by students will result in achieving learning targets due to having confidence in themselves which arises from their motivation, how to set targets that must be achieved and the metacognitive potential possessed by students (Alfaiz et al., 2019; Kim et al., 2021).

The seventh stage of SRL is the modifying stage. Students modify learning targets based on evaluation results. Where at this stage, students make improvements to their learning plan targets for subsequent learning. One example of a student's answer in answering this stage is "I will practice more questions either from school books or other sources so that I am trained in solving questions." The modifications made by students are adjusted to the strengths and weaknesses after the learning is carried out. This is very useful for planning subsequent learning activities. The importance of learning SRL strategies is to train students in self-regulation. Students will be aware of their strengths and weaknesses based on what they have done previously. It is hoped that re-planning modification activities can improve subsequent learning outcomes. Someone who has self-regulation will know how to make target plans, control, have motivation, control themselves, and create individuals who can make changes to their learning outcomes (Putrie, 2021). Some learners have been given modifications to the learning target plan by the teacher, but there is also a mismatch between the learners and the modifications given by the teacher so that it is less effective when applied. Behavior modification is a person's desire to make changes in behavior by using learning principles that have been proven to change behavior for the better (Asri & Suharni, 2021).

When students want to improve learning outcomes, students must have the ability to self-regulate (Mutawah et al., 2017). Students really need the role of self-

regulation. This is because self-regulation can evaluate and improve study plans in order to get satisfactory results. The SRL learning strategy is a learning strategy that goes through a self-regulation process, where students will carry out metacognitive processing, motivate and create appropriate learning strategies in order to complete the targets they want to achieve (Srifianti et al., 2023). Students who implement SRL are often successful in reaching the desired school or college because they have high motivation. Therefore, students with high motivation are influenced by internal factors. Self-motivation does not come from other people, but from oneself, so that a person is able to understand the strengths and weaknesses in achieving targets (Granberg et al., 2021).

The strength of this research is that it can train students to regulate themselves so that they get maximum learning results. When students can self-regulate, they will know their strengths and weaknesses so that they can be used as evaluation material so that their learning targets can be achieved according to plan. Not only that, students who have implemented self-regulation will become individuals who are more confident, disciplined, know how to manage time, have a high desire to learn and are able to control themselves.

Then, this research has a weakness, namely the lack of guidance on strengths, weaknesses and planning that suits each individual, so additional guidance or advice from the right teacher is still needed. The weaknesses of this research can be corrected in order to improve the learning outcomes obtained by students. Not only that, the choice of suggestions also has a big influence on further learning, so it is important to pay attention to each individual when learning takes place.

The results of this research show that self-regulated learning strategies have an effect on learning outcomes and can increase student learning outcomes. This research strengthens previous research that SRL learning strategies can improve student learning outcomes (Silvia & Muchlis, 2023).

CONCLUSION

Based on the results of research that has been carried out, self-regulated learning strategies influence learning outcomes and can improve student learning outcomes. This is proven by the results of the paired sample t-test which shows that there are significant differences from the data used in this research. Then, from the results of the N-gain test, it was found that there was an increase from posttest 1 and posttest 2.

It is worth reviewing that there were still some students who had difficulty in evaluating and modifying their learning strategies. Therefore, it is recommended to give more attention or time to students who experience difficulties in carrying out the evaluation and modification stages in more depth so that students know the advantages and disadvantages of learning targets and get more alternative learning strategies that are chosen according to their abilities.

REFERENCES

- Abdurrahman, I. A., & Soegiarto, B. (2014). Melatihkan Keterampilan Metakognitif Menggunakan Model Pembelajaran Langsung (Direct Instruction) pada Materi Reaksi Oksidasi Reduksi Kelas X SMA. *Unesa Journal of Chemical*, 3(3), 112–118. <https://doi.org/10.26740/ujced.v3n3.p%25p>
- Alfaiz, A., Hidayah, N., Hambali, I. M., & Radjah, C. L. (2019). Human agency as a self-cognition of human autonomous learning: A synthesized practical of agentic approach. *Journal of Social Studies Education Research*, 10(4), 370–391.

- Anisa, A., Magfirah, N., & Thahir, R. (2021). Peranan Self Efficacy dan Self-Regulated Learning Terhadap Prestasi Akademik Mahasiswa. *BIODIK: Jurnal Ilmiah Pendidikan Biologi*, 7(2), 63–70.
- Asmaningrum, H. P., Koirudin, I., & Kamariah, K. (2018). Pengembangan Panduan Praktikum Kimia Dasar Terintegrasi Etnokimia Untuk Mahasiswa. *JTK (Jurnal Tadris Kimiya)*, 3(2), 125–134. <https://doi.org/10.15575/jtk.v3i2.3205>
- Asri, D. N., & Suharni, S. (2021). *Modifikasi Perilaku: Teori dan Penerapannya*. UNIPMA PRESS.
- Asriandhini, B., Khasidah, M. N., & Adi Kristika, P. N. (2020). Pelatihan Dasar Public Speaking Untuk Mengembangkan Keterampilan Penyampaian Informasi dan Kepercayaan Diri Bagi Siswa Tunarungu. *Jurnal Loyalitas Sosial: Journal of Community Service in Humanities and Social Sciences*, 2(2), 71. <https://doi.org/10.32493/jls.v2i2.p71-84>
- Assakinah, N. F., Maulana, M. I., & Latipah, E. (2022). Pentingnya Self-Regulation Dalam Meningkatkan Prestasi Belajar Siswa. *Edukasi Nonformal*, 3(2), 616–624.
- Banarjee, P., & Kumar, K. (2014). A Study on Self-Regulated Learning and Academic Achievement among the Science Graduate Students. *International Journal of Multidisciplinary Approach and Studies*, 01(6), 329–342.
- Bungsu, T. K., Vilardi, M., Akbar, P., & Bernard, M. (2019). Pengaruh Kemandirian Belajar Terhadap Hasil Belajar Matematika Di SMKN 1 Cihampelas. *Journal on Education*, 1(2), 382–389.
- Djalil, M. R., Bialangi, N., & Laliyo, L. A. R. (2023). Identifikasi Kesulitan Belajar Siswa dalam Memahami Konsep Kimia Koloid di Kelas XI SMA Negeri 4 Gorontalo. *Jurnal Riset Pendidikan Kimia*, 13(1), 31. <https://doi.org/10.21009/JRPK.131.05>
- Genes, A. J., Lukum, A., & Laliyo, L. A. R. (2021). Identifikasi Kesulitan Pemahaman Konsep Larutan Penyangga Siswa Di Gorontalo. *Jambura Journal of Educational Chemistry*, 3(2), 61–65. <https://doi.org/10.34312/jjec.v3i2.11911>
- Granberg, C., Palm, T., & Palmberg, B. (2021). A case study of a formative assessment practice and the effects on students' self-regulated learning. *Studies in Educational Evaluation*, 68(4), 119–134. <https://doi.org/10.1016/j.stueduc.2020.100955>
- Idrus, L. (2019). Evaluasi Dalam Proses Pembelajaran. *Jurnal Manajemen Pendidikan Islam*, 9(2), 920–935.
- Iswara, W. H., Muntari, M., Rahmawati, R., & Loka, I. N. (2021). Identifikasi Kesulitan Belajar Kimia Siswa SMA Negeri 1 Narmada Selama Pandemi Covid-19. *Chemistry Education Practice*, 4(3), 242–249. <https://doi.org/10.29303/cep.v4i3.2694>
- Jaya, F. (2019). *Perencanaan Pembelajaran*. Fakultas Ilmu Tarbiyah dan Keguruan UIN Sumatera Utara. <http://repository.uinsu.ac.id/id/eprint/8483>
- Jufri, W. A. (2017). *Belajar dan Pembelajaran Sains: Modal Dasar Menjadi Guru Profesional* (Edisi Pert). Pustaka Reka Cipta.
- Kim, N. H., So, H. J., & Joo, Y. J. (2021). Flipped learning design fidelity, self-regulated learning, satisfaction, and continuance intention in a university flipped learning course. *Australasian Journal of Educational Technology*, 37(4), 1–19. <https://doi.org/10.14742/ajet.6046>
- Lestari, E., Yuzarion, Y., & Hidayah, N. (2023). Self-Regulated Learning of Senior High School Students Reviewed from Emotional Maturity and Social Parental Support. *Jurnal Pendidikan Dan Konseling (JPDK)*, 5(2), 1490–1497. <https://doi.org/10.31004/jpdk.v5i2.13121>

- Loeffler, S. N., Bohner, A., Stumpp, J., Limberger, M. F., & Gidion, G. (2019). Investigating and Fostering Self-Regulated Learning in Higher Education Using Interactive Ambulatory Assessment. *Learning and Individual Differences*, 71, 43–57.
- Marzuki, H., & Astuti, R. T. (2018). Analisis Kesulitan Pemahaman Konsep Pada Materi Titration Asam Basa Siswa SMA. *Orbital: Jurnal Pendidikan Kimia*, 1(1), 22–27. <https://doi.org/10.19109/ojpk.v1i1.1862>
- Mentari, L., Suardana, I. N., & Subagia, I. W. (2014). Analisis Miskonsepsi Siswa SMA pada Pembelajaran Kimia untuk Materi Larutan Penyangga. *E-Journal Kimia Visvitalis*, 2(1), 76–87.
- Mutawah, M. A. A., Thomas, R., & Khine, M. S. (2017). Investigation into Self-regulation, Engagement in Learning Mathematics and Science and Achievement among Bahrain Secondary School Students. *International Electronic Journal of Mathematics Education*, 12(3), 633–653.
- Nabillah, T., & Abadi, A. P. (2019). Faktor Penyebab Rendahnya Hasil Belajar Siswa. *Prosiding Seminar Nasional Matematika dan Pendidikan Matematika Sesiomadika 2019*, 2(1c), 659–663. <https://journal.unsika.ac.id/index.php/sesiomadika/article/view/2685>
- Nur, A. S., & Palobo, M. (2018). Profil Kemampuan Pemecahan Masalah Matematika Siswa Ditinjau dari Perbedaan Gaya Kognitif dan Gender. *Kreano, Jurnal Matematika Kreatif-Inovatif*, 9(2), 139–148. <http://dx.doi.org/10.15294/kreano.v9i2.15067>
- Palobo, M., & Tembang, Y. (2019). Analisis Kesulitan Guru Dalam Implementasi Kurikulum 2013 di Kota Merauke. *Sebatik*, 23(2), 307–316. <https://doi.org/10.46984/sebatik.v23i2.775>
- Philip, B. (2005). Self-Regulated Approach to Strategic Learning (SRSL): A Socio-Cognitive Perspective. *Language, Linguistics and Literature, the Southeast Asian Journal of English Language Studies*, 10, 8–21.
- Putri, H. E., Muqodas, I., Sasqia, A. S., Abdulloh, A., & Yuliyanto, A. (2020). Increasing Self-Regulated Learning of Elementary School Students through the Concrete-Pictorial-Abstract Approach during the COVID-19 Pandemic. *Premiere Educandum: Jurnal Pendidikan Dasar Dan Pembelajaran*, 10(2), 187. <https://doi.org/10.25273/pe.v10i2.7534>
- Putrie, C. A. R. (2021). Pengaruh Regulasi Diri Siswa Terhadap Prestasi Belajar Siswa Kelas VIII Pada Mata Pelajaran IPS. *Research and Development Journal of Education*, 7(1), 136. <https://doi.org/10.30998/rdje.v7i1.8105>
- Rahmadhani, D. Y., & Budiraharjo, M. (2024). *Lectura : Jurnal Pendidikan*. 15, 83–94.
- Sahiu, S., & Wijaya, H. (2017). Hubungan Motivasi Belajar Ekstrinsik Terhadap Hasil Belajar Psikomotorik Pada Mata Pelajaran Agama Kristen Kelas V Di SD Zion Makassar. *Jurnal Jaffray*, 15(2), 231. <https://doi.org/10.25278/jj71.v15i2.262>
- Setiani, N., Santoso, B., & Kurjono, K. (2018). Self-Regulated Learning and Achievement Motivation to Student Academic Procrastination. *Jurnal MANAJERIAL*, 17(1), 17. <https://doi.org/10.17509/manajerial.v17i1.9759>
- Sevian, H., Dori, Y. J., & Parchmann, I. (2018). How Does STEM Context-Based Learning Work: What We Know and What We Still Do Not Know. *International Journal of Science Education*, 40(10), 1095–1107. <https://doi.org/https://doi.org/10.1080/09500693.2018.1470346>

- Silvia, D. M., & Muchlis, M. (2023). Student Worksheet Oriented on Self-Regulated Learning (SRL) Strategy to Improve Student Learning Outcomes on Acid-Base Titration. *Jurnal Pendidikan Dan Pembelajaran Kimia*, 12(2), 45–55. <https://doi.org/10.23960/jppk.v12.i2.2023.05>
- Simarmata, E. J. (2017). Upaya Meningkatkan Aktifitas Dan Hasil Belajar Siswa Pada Mata Pelajaran Matematika Dengan Pendekatan Kontekstual (CTL) Di Kelas V SDN 060959 Belawan. *Elementary School Journal Pgsd Fip Unimed*, 7(3), 357–365. <https://doi.org/10.24114/esjpgsd.v7i3.8171>
- Srifianti, S., Lunanta, L. P., & Kristiyani, V. (2023). Hubungan antara Self-Regulated Learning (SRL) dengan Stres Akademik pada Mahasiswa. *TALENTA: Jurnal Psikologi*, 9(1), 12–20. <https://doi.org/10.26858/talenta.v9i1.48092>
- Sugiyono, S. (2022). *Metode Penelitian Kuantitatif*. Alfabeta.
- Surawan, K., Nurhayata, I. G., & Sutaya, I. W. (2018). Penerapan Model Self-Regulated Learning untuk Pekerjaan Dasar Elektromekanik pada Siswa Kelas X. *Jurnal Pendidikan Teknik Elektro Undiksha*, 7(3), 113–122.
- Wali, M., Mbabho, F., & Pali, A. (2020). Pembelajaran Terpadu Tipe Webbed untuk Meningkatkan Hasil Belajar Siswa. *Jurnal Mimbar PGSD Undiksha*, 8(3), 404–411. <https://ejournal.undiksha.ac.id/index.php/JJPGSD/article/view/29060>
- Yusutria, Y., Yuzarion, Y., Charles, C., Nurhasnawati, N., & Yuherman, Y. (2022). Teacher Professionalism of Al-Islam and Kemuhammadiyah (AIK) in Implementing Religious Values for Students at Muhammadiyah Nitikan SD Yogyakarta during the COVID-19 Pandemic. *Primary: Jurnal Pendidikan Guru Sekolah Dasar*, 11(4), 1–13.
- Yuzarion, Y., Agustiana, A. K., Alfaiz, A., Yandri, H., Musdizal, M., & Aulia, R. (2020). Learning Achievement Reviewed from Self-Regulated Learning, Future Orientation, and Parental Support. *COUNS-EDU: The International Journal of Counseling and Education*, 5(2), 71–80. <https://doi.org/10.23916/0020200526820>