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# Improving Students' Note-Taking Discipline in Chemistry Learning Through Reward and Punishment

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## Abstract

Discipline in taking notes is one of the academic behaviors that supports understanding of concepts and learning retention, especially in Chemistry learning which has the characteristics of abstract, hierarchical, and interrelated material. The results of initial observations show that most students have not completed the notes completely and have not collected them on time. This condition shows the need for a learning strategy that is able to form more disciplined learning habits. This research aims to improve students' discipline in taking notes through the application of *rewards* and *punishments* in Chemistry learning. The study employed Kemmis and McTaggart's Classroom Action Research (CAR) model, conducted in three cycles involving 32 students of Class X E1 at SMAN 1 Situjuah Limo Nagari. Data were collected using an observation sheet assessing two indicators: the completeness of students' notes in accordance with the learning material and the timeliness of note submission. The data were analyzed descriptively using the percentage of students achieving both indicators in each cycle, and the action was considered successful when at least 85% of students met the predetermined discipline criteria. The results showed that students' discipline in note-taking discipline gradually increased from 45% in the pre-cycle to 58% in the first cycle, 81% in the second cycle, and 93% in the third cycle. Improvements occurred in both observed indicators, showing that the consistent application *of rewards* and *punishments* through cycles of action and reflection effectively strengthened students' discipline in taking notes. Thus, *reward* and *punishment strategies* can be applied as an alternative to improve positive academic behavior, especially the discipline of note-taking, in Chemistry learning.

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## INTRODUCTION

Effective learning is not only determined by the teacher's ability to deliver the material, but also by the students' academic involvement during the learning process. This involvement is reflected through various academic behaviors, such as paying attention to the teacher's explanations, note-taking discipline subject matter, completing assignments, managing study time, and complying with learning rules. Academic behavior is an important indicator that shows students' readiness, responsibility, and self-regulation in achieving learning success. In the perspective of self-regulated learning, academic behavior is part of the ability of students to plan, monitor, and evaluate their learning process independently to achieve academic goals (Panadero, 2017).

One form of academic behavior that reflects the active involvement of students is the habit of note-taking. Note-taking activities are not just copying the information conveyed by the teacher, but are an active cognitive process that involves the selection of important information, the organization of ideas, and the reconstruction of knowledge. Through this process, students process information so

that it is easier to understand, remember, and integrate with the knowledge they already have. Therefore, note-taking activities are seen as one of the effective learning strategies as well as a form of self-regulation in learning (Kobayashi, 2005). In line with that, (Dunlosky et al(2013) placed note-taking activities as one of the learning strategies that support learning if it is carried out actively and accompanied by a review process of the notes that have been made.

The effectiveness of note-taking activities is influenced by the way students carry out the note-taking discipline process. Actively taking notes by selecting important information, compiling summaries, and rewriting concepts using one's own language is more likely to improve comprehension than simply copying information verbatim. Mueller, P. A., & Oppenheimer (2014) show that the note-taking discipline process that involves deep processing of information results in a better conceptual understanding because it encourages generative processing. Thus, the quality of note-taking activities is determined not only by the completeness of the notes, but also by the cognitive involvement of the students during the note-taking process.

In Chemistry learning, the habit of taking notes has an increasingly important role because the characteristics of Chemistry material are abstract, complex, and involve the relationship between macroscopic, submicroscopic, and symbolic representations. According to Johnstone (1993), difficulties in learning Chemistry often arise because students must be able to connect the three representations simultaneously. Therefore, notes that are systematically arranged can help students organize concepts, terms, reaction equations, and relationships between concepts so as to facilitate the learning process and review of material. On the other hand, low note-taking habits have the potential to cause students difficulties understanding the relationship between Chemistry concepts.

Based on the results of initial observations in Chemistry learning in class X E1 SMAN 1 Situjuah Limo Nagari, it was found that students' discipline in taking notes was still relatively low. The results of the observation showed that the discipline of classically note-taking discipline students in the pre-cycle only reached 45%, which shows that most students have not completed the notes according to the material that has been studied or collected the notes on time according to the specified limits. This condition indicates that note-taking activities have not become an academic habit that is carried out consistently. The low discipline in taking notes is allegedly influenced by low learning motivation, students' lack of awareness of the importance of notes as a learning resource, and the lack of implementation of reinforcement strategies that are able to encourage students to maintain positive academic behavior in a sustainable manner.

The formation of note-taking habits is not only related to the cognitive aspect, but is also influenced by the behavioral aspect. In operant conditioning theory, Skinner (1953) explained that behavior can be formed and maintained through the provision of appropriate consequences. Rewards as positive reinforcement increase the likelihood of the expected behavior reappearing, while educational punishments are given to reduce the appearance of inappropriate behavior. Therefore, the consistent application of rewards and punishments has the potential to be an effective strategy in forming positive academic habits of students (Fadilah, S. N., & Nasirudin, 2021).

Various studies show that the application of rewards and punishments is an effective strategy to improve students' academic behavior. Fadilah, S. N., & Nasirudin (2021) reported that the application of rewards in the form of praise and rewards as well as punishments given gradually and educatively is able to form the discipline character of students more consistently. Quantitative research by Kurniasih, N., Arafat, Y (2021) also showed that reward and punishment simultaneously had a significant effect on student discipline with a contribution of 82.4% to the variation of learning disciplines. These findings show that reinforcement strategies through reward and punishment have the potential to form more positive academic behavior if applied consistently and proportionately.

However, these studies generally still focus on improving learning discipline in general, such as compliance with school rules, punctuality of doing assignments, and learning motivation. Studies that specifically examine the application of rewards and punishments to improve student discipline in taking notes as a form of academic behavior, especially in Chemistry learning, are still relatively limited. In fact, note-taking activities have different characteristics from other academic behaviors because they are directly related to the process of information processing, organizing concepts, and forming an understanding of chemistry material which is abstract and involves macroscopic, submicroscopic, and symbolic representations. Therefore, this research offers novelty by focusing on the application of reward and punishment on the formation of the discipline of note-taking as an academic behavior that supports the understanding of the concept of Chemistry.

Based on these gaps, this study aims to improve student discipline in note-taking discipline through the application of rewards and punishments in Chemistry learning using the Classroom Action Research (PTK) method of the Kemmis and McTaggart models. The strategy is implemented systematically through the stages of planning, action, observation, and reflection so as to allow for continuous improvement in each cycle. This research is expected to enrich the study of the formation of academic behavior through reinforcement strategies, as well as provide a practical alternative for Chemistry teachers in building disciplined note-taking habits as one of the efforts to improve the quality of student learning processes and outcomes.

## RESEARCH METHODS

This study uses the Classroom Action Research (PTK) method with a continuous improvement paradigm to improve students' discipline in taking notes in Chemistry learning. PTK was chosen because it allows teachers to take actions directly in the classroom, observe the impact of actions, reflect, and develop learning improvements in a systematic and sustainable manner (Kemmis, S., McTaggart, R., & Nixon, 2014). The PTK model used is the Kemmis and McTaggart model, which consists of four stages, namely planning, acting, observing, and reflecting. The four stages are carried out repeatedly in three cycles until the indicators of the success of the action are achieved.

This research was carried out at SMA Negeri 1 Situjuah Limo Nagari, Lima Puluh Kota Regency, West Sumatra Province, in the odd semester of the 2024/2025 school year. The subjects of the study were all students of class X E1 totaling 32 people. The selection of the research class was based on the results of initial observations which showed that the discipline of students in note-taking discipline Chemistry subject matter was still relatively low. The class was chosen as the research subject to implement actions that are expected to improve students' discipline in taking notes.

This research involves two variables, namely the action variable and the outcome variable. The action variable is in the form of the application of *reward* and *punishment rules* in the Chemistry learning process, while the outcome variable is the student's discipline in note-taking discipline Chemistry subject matter. Record-keeping discipline is measured based on two indicators, namely (1) the completeness of the notes in accordance with the learning materials delivered and (2) the timeliness of collecting notes in accordance with the predetermined time limit. Students are categorized as disciplined if they meet these two indicators.

**Table 1.** Discipline Indicators Record

| Indicator | Description |
|---|---|
| Complete notes according to the material | Students complete notes according to the material learned during the learning process. |
| Collect records on time | Students collect notes according to the deadline set by the teacher. |

The research was carried out for three cycles. Each cycle follows the stages of PTK according to Kemmis and McTaggart which consists of planning, implementation of actions, observation, and reflection. In the planning stage, the researcher compiles learning tools, establishes reward and punishment rules, compiles observation sheets, and determines indicators of action success. At the stage of implementing actions, teachers apply reward and punishment rules consistently during the Chemistry learning process. Rewards are given to students who meet the discipline indicators of note-taking, while punishments of an educational nature are given to students who do not meet the agreed conditions. At the observation stage, the observer observes the implementation of the action and records the development of student discipline using the observation sheet that has been prepared. Furthermore, reflection is carried out on the results of each cycle to identify the advantages and weaknesses of the implementation of the action. The results of the reflection are used as the basis for refining actions in the next cycle.

In the first cycle, reflection was focused on the effectiveness of the implementation of reward rules so that the form of reward was strengthened in the second cycle. Furthermore, the results of the reflection of cycle II were used to emphasize the application of punishment in the form of not giving an assessment of the records collected beyond the predetermined time limit. Reflection in cycle III is used as a final evaluation of all actions that have been implemented.

The research instrument used in this class action research is a discipline observation sheet note-taking discipline students. The observation sheet is used to assess the achievement of the indicators of note-taking discipline based on two aspects that have been determined. Data were collected through direct classroom observations, examination of students' notebooks, documentation of learning activities, and recording of students' achievement on the predetermined note-taking discipline indicators. Classroom observations were conducted collaboratively by the Chemistry teacher, who acted as the practitioner-researcher, and one colleague serving as an independent observer. The observer used a standardized observation sheet to assess students' note-taking discipline, while the teacher implemented the learning activities and the reward and punishment procedures. To minimize observer expectancy bias, both observers used the same observation instrument and assessment rubric, and the observation results were discussed after each learning session to reach agreement on students' performance before the data were analyzed.

The reward and punishment intervention was implemented consistently throughout each research cycle. Rewards consisted of verbal praise and additional classroom participation points awarded immediately to students who completed their notes according to the learning material and submitted them on time. Punishments were educational in nature and applied progressively. Students who failed to meet the discipline criteria received reminders during the first cycle, while in the subsequent cycles late submissions resulted in reduced scores and, for notebooks submitted more than seven days after the deadline, no score was awarded. The implementation procedures, timing, assessment rubric, learning time allocation, and reward and punishment criteria were kept consistent across all cycles to ensure the reliability and replicability of the intervention.

Data were analyzed using quantitative descriptive techniques by calculating the percentage of achievement of recorded disciplines in each cycle using the formula:

$$\text{Class Discipline Percentage (\%)} = \frac{\text{Number of students who met both indicators}}{\text{Total number of students present}} \text{X } 100\%$$

Where, the number of students who met both indicators is equal to the number of students who completed their notes according to the learning material and submitted them on time. Total number of students present is the total number of students attending the lesson. The percentage obtained was

compared between cycles to determine the increase in student discipline in note-taking discipline as the impact of the implementation of rewards and punishments. In addition, the results of observations and field notes were analyzed descriptively as reflection material to determine action improvements in the next cycle.

The action was considered successful when at least 85% of students achieved the predetermined note-taking discipline criteria. This threshold was adopted because Classroom Action Research (CAR) emphasizes improvements in learning quality at the class level rather than individual achievement. Therefore, a minimum of 85% class mastery has been widely used as an indicator of successful classroom intervention in CAR studies. The criterion is consistent with the concept of classical completeness proposed by Trianto (2010) and remains consistent with contemporary Classroom Action Research practices that evaluate intervention effectiveness based on the proportion of students achieving predetermined performance indicators. If the percentage of students meeting the discipline criteria did not reach 85% at the end of a cycle, the intervention was revised based on the reflection results and continued in the subsequent cycle.

## RESULTS AND DISCUSSION

The application of rewards and punishments in Chemistry learning shows an increase in student discipline in taking notes in each research cycle. Record-keeping discipline is measured based on two indicators, namely (1) the suitability of notes with learning materials and (2) the timeliness of record collection. The results of observations at each stage of the research are presented in Table 2.

**Table 2.** Percentage of Students Achieving Note-Taking Discipline per Cycle

| Research Stage | Percentage of Discipline (%) |
|---|---|
| Pre-cycle | 45 |
| Cycle I | 58 |
| Cycle II | 81 |
| Cycle III | 93 |

Based on Table 2, it can be seen that students' discipline in note-taking discipline has gradually increased in each cycle. In the pre-cycle stage, the percentage of discipline recorded classically was 45%, which shows that most students have not completed notes according to the learning material or collected notes on time according to the stipulations that have been set. After the implementation of the action in the first cycle, the percentage of discipline increased to 58% or an increase of 13 percentage points compared to the pre-cycle condition. Although it shows a change for the better, the results have not reached the indicator of research success, which is classical completeness of at least 85%. At this stage, there are still some students who have not completed their notes completely and have not consistently collected notes according to the specified time limit. An even greater increase occurred in cycle II, which reached 81%, or an increase of 23 percentage points compared to cycle I. Observation results showed that more and more students completed complete notes and collected notes on time. In addition, the neatness and completeness of the contents of the notes also showed better development compared to the previous cycle. In cycle III, the percentage of discipline recorded again increased to 93%, or an increase of 12 percentage points compared to cycle II. This percentage has exceeded the established research success indicators. Most students have been able to complete the notes according to the learning material and collect them on time consistently. During the implementation of cycle III, it was also seen that the delay in collecting records was decreasing compared to the previous cycle. To provide a clearer picture of the development of students' discipline

in taking notes in each cycle, the results of the research are presented again in the form of a graph as shown in Figure 1.

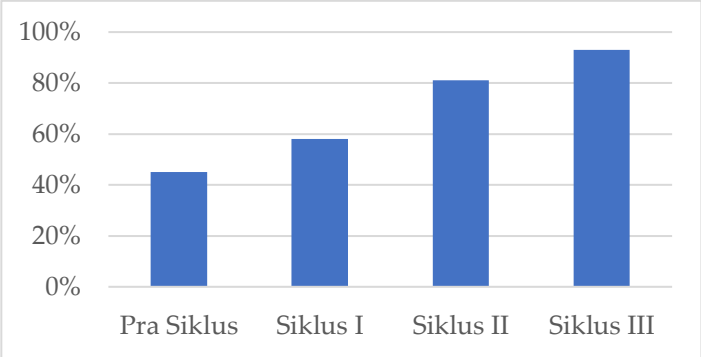


**Figure 1.** Percentage of Student Discipline in Taking Notes in Each Cycle

Overall, the results of the study showed an increase in student discipline in taking notes in each action cycle. The percentage of discipline increased from 45% in the pre-cycle to 93% in the third cycle, resulting in an increase of 48 percentage points during the study. These results show that the actions implemented are able to increase students' discipline in taking notes gradually until they reach the success indicators that have been set.

The results showed that the implementation of reward and punishment was associated with an improvement in students' note-taking discipline during Chemistry learning. The percentage of students meeting the predetermined discipline criteria increased progressively from 45% in the pre-cycle to 58% in Cycle I, 81% in Cycle II, and 93% in Cycle III. These improvements are consistent with Skinner (1953), *Operant Conditioning theory*, which suggests that individual behavior is influenced by the consequences that follow it. Behaviors receiving positive reinforcement are more likely to be repeated, whereas behaviors followed by corrective consequences tend to change in the expected direction. In this study, rewards in the form of verbal praise and classroom participation points served as positive reinforcement to encourage students to maintain disciplined note-taking behavior. Meanwhile, educational punishments, including score reductions for late submissions and no score for notebooks submitted more than seven days after the deadline, provided clear consequences intended to promote greater compliance with the established note-taking discipline criteria.

The increase that occurs in each cycle reflects the process of student adaptation to the rules applied. In the first cycle, the improvement in discipline was still relatively low (from 45% to 58%) because students were still in the stage of adapting to the new rules, and *the reward* given in the form of affirmative sentences was not strong enough to encourage all students to change their learning habits. The results of reflection in cycle I became the basis for improving actions in cycle II through the addition of *rewards* in the form of activity points, which were proven to have a greater impact so that discipline increased to 81%. These findings are in line with the research of Fadilah, S. N., & Nasirudin (2021) which shows that *the rewards* given consistently are able to shape the discipline character of students, as well as the research of (Anggraini, S., Siswanto, J., 2019) and Rosanna, D. L et al (2022) on stoichiometry learning which shows that the application of *rewards* and *punishments* increase student motivation and engagement during Chemistry learning. In cycle III, the affirmation *of punishment* — in the form of not assigning a score to records collected late — pushed discipline to increase to 93% and surpassed the research success indicator. Interestingly, the frequency of *punishment* in this cycle actually decreased because students were more aware to record and collect notes on time without having to be reminded by the teacher, which shows that *punishment* in this study functions as an educational consequence, not just a punishment. This finding is in line with the results

of Elindasari (2021) research which shows that *rewards* and *punishments* simultaneously have a positive and significant influence on student learning discipline.

In addition to the form of reinforcement given, the effectiveness of the action in this study is also determined by the reflection process which is the main characteristic of Class Action Research. Reflection in each cycle allows teachers to evaluate the weaknesses of previous actions, identify obstacles faced by students, and refine strategies in the next cycle so that actions become more appropriate to the needs of the class. Thus, the improvement in discipline obtained is not solely due to the provision of *rewards* and *punishments*, but also the result of a systematic, sustainable, and reflection-based learning improvement process. These findings reinforce the results of previous research that showed that *reward* and *punishment strategies* are effective in improving students' learning discipline (Purba, O. S., & Purba, 2023), as well as expanding the scope of its application to the discipline of note-taking as a form of *academic behavior* in Chemistry learning (Zimmerman, 2002).

The improvement in note-taking discipline obtained was reflected not only in the percentage data, but also in the change in students' academic behavior: at the beginning of the study most students still relied on the teacher's reminders, while in cycles II and III fewer and fewer students needed to be reminded to complete and collect notes on time. This change indicates that *reward* and *punishment* serve as the initial stimulus for shaping behavior, while the consistency of actions and reflections in each cycle encourages these behaviors to develop into habits that are carried out on the student's own consciousness. This development can be explained through the concept *of self-regulated learning*, which is the ability of students to plan, monitor, and evaluate their learning behavior independently (Panadero, 2017). This is supported by the results of *a meta-analysis* of Arshad et al. (2021) which showed that the implementation of *self-regulated learning strategies* has a positive effect on science learning achievement through improving students' metacognitive abilities, motivation, and involvement, as well as a systematic study by Edisherashvili et al. (2022) which emphasized that the development of self-regulation requires teacher support through the provision *of feedback*) and *reinforcement* that is applied consistently. These findings are in line with the results of *the systematic literature review* by Munawwarah, M., & Agussalim (2026) who concluded that the Chemistry learning approach that develops *self-regulated learning* encourages students to be more active in planning, monitoring, and evaluating their learning process so as to contribute to the understanding of sustainable learning concepts and habits.

In the context of Chemistry learning, discipline notes has a broader role than just a form of compliance with class rules. According to Johnstone (1993), the main difficulty in studying Chemistry lies in the ability of students to connect three levels of representation, namely macroscopic, submicroscopic, and symbolic, so that complete and systematically arranged records help students organize relationships between concepts and reduce the risk of misconceptions. Note-taking itself is an active cognitive process that involves selecting important information, organizing ideas, and rearranging concepts into more meaningful structures (Kobayashi, 2005), thus allowing for deeper information processing. Mueller, P. A., & Oppenheimer (2014) reinforce this finding by showing that record-keeping that involves information processing provides better conceptual understanding than record-keeping that only copies verbatim. In line with this, Morehead et al. (2019) stated that note-taking activities reflect the active involvement of learners in the learning process and contribute to better learning readiness. Thus, the increase in the discipline of note-taking discipline in this study has the potential to have a positive impact on the process of building chemistry knowledge, not only on compliance with learning rules.

These findings provide practical implications that the formation of learning habits does not necessarily require the addition of material or assignments, but can be started from strengthening simple academic behaviors such as note-taking disciplines. In this study, *rewards* and *punishments* were applied as part of a classroom *management strategy* that was carried out consistently, transparently, and agreed with students from the beginning of learning, thereby creating clarity about the expected academic behavior. The habit of taking notes formed through this strategy is the foundation for the development of other learning skills, such as the ability to organize information, independent learning, and readiness to face learning evaluations.

Nevertheless, the results of this research need to be interpreted critically. A number of studies show that excessive use *of rewards* has the potential to make students more oriented towards external rewards than awareness of learning from within, while *punishment* that is too harsh or inconsistent can cause anxiety, reduce learning motivation, and even disrupt teacher-student relationships. Therefore, *rewards* and *punishments* in this study are positioned as supporting strategies in classroom management, not as learning objectives themselves, and still need to be balanced with teachers' efforts to foster students' intrinsic motivation through meaningful learning, constructive feedback, and opportunities for students to reflect on their own learning process.

The results of this study also need to be understood according to their scope. The research was carried out in only one class with a limited number of students so that it could not be generalized in all Chemistry learning contexts, and only measured changes in note-taking discipline without directly examining their influence on learning outcomes, concept mastery, critical thinking skills, and metacognitive skills. Therefore, further research is recommended to examine the relationship between the discipline of note-taking and these variables through experimental design or *mixed methods* in different materials and educational levels, so as to obtain a more comprehensive picture of the contribution of note-taking habits to the success of Chemistry learning.

Overall, the results of this study show that the success of the application of *rewards* and *punishments* in improving the discipline of note-taking discipline students is not solely determined by the form of reward or consequences given, but by the balance between positive reinforcement, educational academic consequences, consistency in the implementation of rules, and continuous reflection carried out by teachers in each cycle. The combination of these four aspects creates a learning environment that not only increases adherence to classroom rules, but also supports the formation of responsibility, learning independence, and a positive academic culture in Chemistry learning.

## CONCLUSION

The implementation of reward and punishment during Chemistry learning was associated with improvements in students' note-taking discipline throughout the Classroom Action Research process. The percentage of students who met the predetermined note-taking discipline criteria increased from 45% in the pre-cycle to 58% in Cycle I, 81% in Cycle II, and 93% in Cycle III, thereby exceeding the predetermined success criterion of 85% classical completeness. These findings suggest that the consistent implementation of reward and punishment, accompanied by reflective improvements in each action cycle, contributed to improving students' note-taking discipline during the study and may serve as a practical strategy for supporting classroom management and learning activities in Chemistry. Although the findings indicate positive changes in students' note-taking discipline, this study did not directly measure broader outcomes such as learning responsibility, independent learning, or other positive academic behaviours. Therefore, these aspects should be examined in future studies. Furthermore, the findings should be interpreted within the limitations of this study, which involved a single class of 32 students, did not include a comparison group, and focused solely

on students' note-taking discipline. Future research is recommended to examine the implementation of reward and punishment in different educational contexts and to investigate its association with learning outcomes, conceptual understanding, and higher-order thinking skills.

## BIBLIOGRAPHY

Anggraini, S., Siswanto, J., & S. (2019). Analisis dampak pemberian reward and punishment bagi siswa SD Negeri Kaliwiru Semarang 7(3), 221–229. https://doi.org/10.23887/jjpgsd.v7i3.19393. *MIMBAR PGSD Undiksha*, *7(3)*, 221–229.

Arshad, A. M., Halim, L., & Nasri, N. M. (2021). Effect of self-regulated learning strategies on students' achievement in science: A meta-analysis. *Asia-Pacific Forum on Science Learning and Teaching*, *21(1)*.

Dunlosky, J., Rawson, K. A., Marsh, E. J., Nathan, M. J., & Willingham, D. T. (2013). Improving students' learning with effective learning techniques: Promising directions from cognitive and educational psychology. *Psychological Science in the Public Interest, 14(1),* 4–58. https://doi.org/https://doi.org/10.1177/1529100612453266

Edisherashvili, N., Saks, K., Pedaste, M., & Leijen, Ä. (2022). Supporting self-regulated learning in distance learning contexts at higher education level: Systematic literature review. *Frontiers in Psychology*, *12 792422*. https://doi.org/https://doi.org/10.3389/fpsyg.2021.792422

Elindasari, D. A. (2021). *Pengaruh Reward dan Punishment terhadap Kedisiplinan Belajar Siswa.*

Fadilah, S. N., & Nasirudin, F. (2021). Implementasi reward dan punishment dalam membentuk karakter disiplin peserta didik di Madrasah Ibtidaiyah Al-Hidayah Jember. *EDUCARE: Journal of Primary Education*, *2(1),* 87–100. https://doi.org/https://doi.org/10.35719/educare.v2i1.51

Fajra, A. E., Ysh, A. Y. S., & Ardiyanto, A. (2025). *The influence of reward and punishment on the IPAS learning outcomes of fourth-grade students at SD Al Khotimah, Semarang City*. IQRO: Journal of Islamic Education, 7(2). https://doi.org/10.24256/iqro.v7i2.8589

Ghrinsky, R. H., Syarif, M. Z. H., & Alfaien, N. I. (2025). *Penerapan sanksi dan reward dalam meningkatkan kedisiplinan siswa di Madrasah Tsanawiyah*. Idarah Tarbawiyah: Journal of Management in Islamic Education, 6(4), 445–458. https://doi.org/10.32832/itjmie.v6i4.19988

Indrawati, I., Marzuki, M., Syafi'urrohman, S., & Malik, A. R. (2020). *Investigating the effect of reward and punishment on the students' learning achievement and discipline*. Linguistic, English Education and Art (LEEA) Journal, 4(1), 337–350

Johnstone, A. H. (1993). The development of chemistry teaching: A changing response to changing demand. *Journal of Chemical Education*, *70(9)*, 701–705. https://doi.org/https://doi.org/10.1021/ed070p701

Kadioglu-Akbulut, C., & Uzuntiryaki-Kondakci, E. (2021). *Implementation of self-regulatory instruction to promote students' achievement and learning strategies in the high school chemistry classroom*. *Chemistry Education Research and Practice, 22*(1), 12–29. https://doi.org/10.1039/C9RP00297A

Kemmis, S., McTaggart, R., & Nixon, R. (2014). *The action research planner: Doing critical participatory action research. Springer*. https://doi.org/10.1007/978-981-4560-67-2

Kobayashi, K. (2005). What limits the encoding effect of note-taking? A meta-analytic examination. *Contemporary Educational Psychology, 30(2),* 242–262. https://doi.org/https://doi.org/10.1016/j.cedpsych.2004.10.001

Kurniasih, N., Arafat, Y., & M. (2021). Pengaruh reward dan punishment terhadap kedisiplinan siswa. *Indonesian Journal of Education, Innovation and Technology*, *2(2),* 136–143.

Morehead, K., Dunlosky, J., & Rawson, K. A. (2019). How much mightier is the pen than the keyboard for note-taking? A replication and extension of Mueller and Oppenheimer. *Educational Psychology Review*, *31(3)*, 753–780. https://doi.org/https://doi.org/10.1007/s10648-019-09468-2

Mueller, P. A., & Oppenheimer, D. M. (2014). The pen is mightier than the keyboard: Advantages of longhand over laptop note taking. *Psychological Science*, *25(6)*, 1159–1168.

https://doi.org/https://doi.org/10.1177/0956797614524581

Munawwarah, M., & Agussalim, H. (2026). Instructional Approaches for Fostering Self-Regulated Learning in Chemistry Education: A Systematic Literature Review. *Jurnal Pendidikan Dan Pembelajaran Kimia*, *15(1)*, *20–*, 20–36.

Muthia, dkk. (2025). *Application of problem based learning assisted by reward and punishment to improve self-regulation of junior high school students*. *Jurnal IPA & Pembelajaran IPA*.

Nuraisah, S., Yeni, R., & Rizqa, M. (2023). *Effectiveness of reward and punishment on student learning discipline*. LITERACY: International Scientific Journals of Social, Education, Humanities, 2(2). https://doi.org/10.56910/literacy.v2i2.1064

Panadero, E. (2017). A review of self-regulated learning: Six models and four directions for research. *Frontiers in Psychology*, *8*, 422. https://doi.org/https://doi.org/10.3389/fpsyg.2017.00422

Purba, O. S., & Purba, F. J. (2023). Penerapan reward and consequences sebagai upaya untuk melatih kedisiplinan siswa di dalam kelas. *Journal of Chemistry and Education Research, ChemER*, *7(1)*.

Rosanna, D. L., & Hajijah, A.Rosanna, D. L., & Hajijah, A. (2022). The effect of rewards and punishment on student learning motivation on stoichiometry material. *Lavoisier: Chemistry Education Journal*.

Skinner, B. F. (1953). *Science and human behavior*. Macmillan.

Trianto. (2010). *Mendesain model pembelajaran inovatif-progresif: Konsep, landasan, dan implementasinya pada Kurikulum Tingkat Satuan Pendidikan (KTSP)*. Kencana.

Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. ,. *Theory Into Practice*, *41(2)*, 64–70. https://doi.org/https://doi.org/10.1207/S15430421TIP4102_2