

The Effect of the Spontaneous Group Discussion (SGD) Learning Model on Students' Learning Outcomes in the Excretory System Topic

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ABSTRACT

This study aims to analyze the effect of the Spontaneous Group Discussion (SGD) learning model on students' learning outcomes in the topic of the excretory system. A quantitative approach was employed using a quasi-experimental design with a nonequivalent control group. The research sample consisted of two eighth-grade classes at SMPN 1 Batang, Jeneponto Regency, selected through purposive sampling. Each class comprised 35 students, assigned as the experimental and control groups. Data were collected using a learning outcomes test and analyzed using an independent samples t-test. The results showed that the mean posttest score of the experimental class was 76.14, which was higher than that of the control class, which obtained a mean score of 67.57. The statistical analysis yielded a Sig. (2-tailed) value of $0.000 < 0.05$, indicating that the Spontaneous Group Discussion (SGD) learning model had a significant effect on improving students' learning outcomes in the topic of the excretory system.

ABSTRAK: Penelitian ini bertujuan menganalisis pengaruh model pembelajaran Spontaneous Group Discussion (SGD) terhadap hasil belajar siswa pada materi Sistem Ekskresi. Penelitian menggunakan pendekatan kuantitatif dengan desain quasi-experimental tipe nonequivalent control group. Sampel penelitian terdiri atas dua kelas VIII SMPN 1 Batang, Kabupaten Jeneponto, yang dipilih melalui purposive sampling, masing-masing berjumlah 35 siswa sebagai kelas eksperimen dan kelas kontrol. Data dikumpulkan menggunakan tes hasil belajar dan dianalisis dengan uji independent sample t-test. Hasil penelitian menunjukkan bahwa rata-rata nilai posttest kelas eksperimen sebesar 76,14 lebih tinggi dibandingkan kelas kontrol sebesar 67,57. Hasil uji statistik memperoleh nilai Sig. (2-tailed) = $0,000 < 0,05$, yang menunjukkan bahwa model pembelajaran Spontaneous Group Discussion (SGD) berpengaruh signifikan terhadap peningkatan hasil belajar siswa pada materi Sistem Ekskresi.

Keywords: *learning outcomes, instructional model, excretory system, Spontaneous Group Discussion*

INTRODUCTION

Education is a consciously planned and systematically organized process that is grounded in responsibility and intended to foster the optimal development of students' potential. Through education, individuals are expected to become competent, holistic, and competitive members of society. Achieving this objective requires a learning process that is implemented in a purposeful, structured, and continuous manner, enabling students to



develop from their initial level of ability toward the targeted learning outcomes (Kerimbayev et al., 2023). This view is consistent with Law of the Republic of Indonesia Number 20 of 2003 concerning the National Education System, which defines education as a conscious and planned effort to create a learning environment and learning process that encourage students to participate actively in their own development (Republic of Indonesia, 2003). Therefore, education serves a fundamental function in supporting the growth of students' abilities and potential (Cui & Wang, 2024).

Learning is a dynamic process that involves various activities within learners. Through this process, learners attempt to acquire, process, and understand new knowledge and skills. In learning activities, learners occupy a central position because they directly experience, engage in, and construct meaning from each stage of the learning process (Faizah & Kamal, 2024). Learning occurs when learners actively interact with their surrounding environment and develop meaningful experiences. The outcomes of this process can be observed through measurable behavioural changes, which serve as tangible evidence of successful learning (Xu et al., 2023).

Observations of Grade VIII students at SMPN 1 Batang showed that their participation in the learning process was still relatively limited. The Biology teacher reported that students tended to be passive during lessons, as they primarily listened to the teacher's explanations and recorded notes rather than engaging actively in classroom activities. This condition limited their active involvement in asking questions, participating in discussions, expressing opinions, and collaborating with peers. Therefore, the Spontaneous Group Discussion (SGD) model may serve as an alternative instructional approach that encourages students to be more actively engaged, respect others' opinions, and understand the learning material more effectively (Saputra & Harjono, 2024).

The Excretory System is one of the biology topics that requires strong conceptual understanding because it deals with the structure, function, and working processes of human excretory organs. This topic cannot be adequately learned solely through teacher explanation; rather, it requires students' active engagement in asking questions, participating in discussions, connecting concepts, and solving simple problems. Accordingly, a learning model is required that enables students to engage actively in the learning process. Such active participation allows students to build conceptual understanding, articulate their ideas, and work collaboratively with their peers, thus fostering a more meaningful learning experience (Utami, Kadir, & Herlanti, 2021).

Biology instruction often involves abstract concepts; therefore, it requires learning strategies that engage students cognitively, socially, and communicatively, ensuring that conceptual understanding extends beyond mere memorization. Active learning in science education has been reported to increase student participation, deepen understanding, and promote equity in learning outcomes (Theobald et al., 2020). Consistent with this perspective, research on active learning strategies in biology suggests that the extensive and conceptual characteristics of biological content necessitate students' direct involvement in interactive, collaborative, and student-centered learning activities (Pratiwi, Masykuri, & Ramli, 2021).

One instructional model that may be employed to improve students' limited classroom engagement is Spontaneous Group Discussion (SGD). This model focuses on spontaneous discussion activities conducted in small groups, allowing students to share opinions, articulate ideas, appreciate their peers' perspectives, and develop a collective understanding of the learning material. The implementation of SGD shifts the learning process from a predominantly teacher-centered approach toward a more participatory learning environment in which students are directly involved. Moreover, discussion-based group learning can encourage students to engage more actively in comprehending the material and collaboratively addressing learning problems (Suandi, 2022).

Several prior studies have indicated that discussion-based learning models positively influence students' learning outcomes. Rahayu and Widayati (2019) reported that the Spontaneous Group Discussion model can be applied in classroom learning to enhance students' problem-solving skills. Similarly, Asriani, Rohmah, and Priyono (2020) found that the implementation of the Spontaneous Group Discussion method affected students' learning outcomes. Nevertheless, the application of the SGD model to the Excretory System topic in Grade VIII at SMPN 1 Batang requires further investigation, particularly to examine its effect on students' learning outcomes in Biology learning.

Based on the preceding discussion, this study seeks to evaluate the effectiveness of the Spontaneous Group Discussion (SGD) learning model in teaching the Excretory System topic. Specifically, it compares the learning outcomes of students taught using the SGD model with those of students who receive conventional instruction. In addition, this study examines the extent to which the SGD model contributes to improving the learning outcomes of Grade VIII students at SMPN 1 Batang.

RESEARCH METHOD

Several earlier studies have shown that discussion-based learning models may positively influence students' learning outcomes. Rahayu and Widayati (2019) found that the Spontaneous Group Discussion model can be implemented effectively in classroom instruction and may facilitate the development of students' problem-solving abilities. Similarly, Asriani, Rohmah, and Priyono (2020) revealed that the application of the Spontaneous Group Discussion method had an effect on students' learning outcomes. Nevertheless, further investigation is required regarding the implementation of the SGD model in the Excretory System topic among Grade VIII students at SMPN 1 Batang, particularly in relation to its impact on students' learning outcomes in Biology.

Based on the foregoing discussion, this study aims to investigate the effectiveness of the Spontaneous Group Discussion (SGD) learning model in teaching the Excretory System topic. It also seeks to compare the learning outcomes of students taught using the SGD model with those of students who experience conventional instruction. In addition, this study examines the extent to which the implementation of the SGD model contributes to improving the learning outcomes of Grade VIII students at SMPN 1 Batang.

Table 1. Classification of Students' Learning Outcomes

Score Interval	Classification
90 – 100	Excellent
80 – 89	Good
70 – 79	Moderate
40 – 69	Low
0 – 39	Very Low

RESULTS AND DISCUSSION

The study findings were derived from an analysis of students' pretest and posttest scores in both the experimental and control groups. The pretest was administered to measure students' initial abilities before the learning intervention, while the posttest was used to evaluate their learning outcomes after the instructional process had been completed. The data were analyzed using descriptive and inferential statistics to determine differences in learning outcomes between students taught using the Spontaneous Group Discussion (SGD) model and those who received conventional instruction.

Students Learning Outcomes in the Experimental Class

Table 1. Analysis of Learning Outcomes in the Experimental Class

Parameter	Experiment	
	Pretest	Posttest
Sample Size	35	35
Maximum Score	65	90
Minimum Score	30	55
Mean Score	47,57	76,14
Standard Deviation	10,804	8,496

Based on Table 2, students in the experimental class showed an increase in learning outcomes after the Spontaneous Group Discussion (SGD) learning model was implemented in the Excretory System topic. Prior to the intervention, the pretest results indicated a mean score of 47.57, with scores ranging from 30 to 65. Following the implementation of learning activities using the SGD model, the mean posttest score rose to 76.14, with the highest score reaching 90 and the lowest score being 55. The difference between the pretest and posttest mean scores was 28.57, suggesting that the application of the SGD learning model contributed to an improvement in students' learning outcomes.

This improvement suggests that the Spontaneous Group Discussion (SGD) model fosters a more active and interactive learning environment. Through group discussion, students are provided with opportunities to share opinions, articulate ideas, respond to their peers' viewpoints, and collaboratively construct understanding of the Excretory System topic. Such activities encourage students not only to receive information from the teacher but also to participate actively in the process of conceptual understanding. This finding aligns with the view that cooperative learning can enhance student engagement and positively influence biology learning (Utami, Kadir, & Herlanti, 2021).

The excretory system topic requires conceptual understanding because it is related to the structure, function, and working processes of human excretory organs. Therefore, discussion activities in the Spontaneous Group Discussion (SGD) model help students connect the information they obtain with their own understanding. Through group interaction, students can support one another in understanding the material, clarify concepts that remain unclear, and solve learning problems collaboratively. Discussion-based learning can also encourage students to become more active in the learning process, as it provides opportunities for them to exchange ideas and solve problems together (Cirkony, 2023).

The results of this study align with the findings of Rahayu and Widayati (2019), who stated that the Spontaneous Group Discussion model facilitates the enhancement of students' problem-

solving skills. Similarly, Asriani, Rohmah, and Priyono (2020) demonstrated that the implementation of the Spontaneous Group Discussion method influenced students' learning outcomes. Accordingly, the use of the SGD model in the experimental class can be interpreted as providing a positive contribution to the improvement of students' learning outcomes.

Students' Learning Outcomes in the Control Class

Table 3. Analysis of Learning Outcomes in the Control Class

Parameter	Control	
	<i>Pretest</i>	<i>Posttest</i>
Sample Size	35	35
Maximum Score	65	85
Minimum Score	30	50
Mean Score	44,71	67,57
Standard Deviation	10,498	8,942

Based on Table 3, the control class also demonstrated an increase in students' learning outcomes following the instructional intervention. The pretest results indicated a mean score of 44.71, with scores ranging from 30 to 65. After the learning process, the mean posttest score rose to 67.57, with scores ranging from 50 to 85. The mean gain of 22.86 indicates that conventional instruction also contributed to the enhancement of students' learning outcomes.

Although improvement was observed, the learning outcomes of the control class remained lower than those of the experimental class. This condition may be attributed to conventional instruction, which generally tends to be teacher-centered. In this type of learning, students primarily listen to the teacher's explanations and record the material presented. Consequently, students' opportunities to ask questions, participate in discussions, express ideas, and collaborate with peers remain limited. These conditions may restrict students' optimal engagement in the learning process. Learning approaches that provide broader opportunities for interaction and collaboration among students are considered more effective in promoting active student participation than instruction that relies solely on teacher-centered practices (Suandi, 2022).

Teacher-centered instruction can support students in developing a basic understanding of the subject matter. However, this approach may not consistently provide adequate opportunities for students to actively construct knowledge. Consequently, although students in the control class showed improvement in their learning outcomes, the extent of this improvement was lower

than that observed in the experimental class. This finding suggests that instructional models that promote interaction and active student engagement are more effective in enhancing students' learning outcomes.

Categorization of Students' Learning Outcomes

Table 4. Categorization of Students Learning Outcomes

Score Range	Experiment		Control		Category
	<i>Pretest</i>	<i>Posttest</i>	<i>Pretest</i>	<i>Posttest</i>	
90 — 100	0	4	0	0	Very Good
80 — 89	0	14	0	4	Good
70 — 79	0	12	0	14	Fair
40 — 69	28	5	24	17	Poor
0 — 39	7	0	11	0	Very Poor

Based on Table 4, students' learning outcomes in both the experimental and control classes showed changes after the instructional intervention. In the experimental class, the pretest results indicated that 28 students were in the low category, while 7 students were classified in the very low category. After the implementation of the Spontaneous Group Discussion (SGD) model, the posttest results demonstrated a substantial improvement. Four students achieved the very good category, 14 students were categorized as good, 12 students were placed in the moderate category, and only 5 students remained in the low category.

In the control class, the pretest results showed that 24 students were in the low category, while 11 students were classified as very low. Following the instructional treatment, the posttest results indicated that 4 students reached the good category, 14 students were placed in the moderate category, and 17 students remained in the low category. Overall, these findings suggest that the experimental class achieved better posttest outcomes than the control class, as a larger proportion of students in the experimental group attained the very good and good categories.

The distribution of learning outcome categories shows that the implementation of the SGD model encouraged students to move toward higher levels of achievement. In the experimental class, no students were categorized as very poor after the intervention, while the majority were placed in the fair, good, and very good categories. Conversely, several students in the control class remained in the poor category after instruction. These results indicate that learning activities centered on active student participation, discussion, and collaboration are more

effective in improving learning outcomes than instruction that is largely teacher-centered (Lestari, 2021).

Normality and Homogeneity Tests

Prior to testing the hypotheses, prerequisite analyses were conducted using normality and homogeneity tests. The normality test aimed to assess whether the students' learning outcome scores were normally distributed. In contrast, the homogeneity test was performed to determine whether the two groups had equivalent variances.

Table 5. Results of the Normality Test

Class	<i>Shapiro-Wilk</i>		
	<i>Statistic</i>	<i>Df</i>	<i>Sig.</i>
Experiment	.930	35	.156
Control	.893	35	.056

Based on the data presented in Table 5, the Shapiro–Wilk normality test produced significance values of 0.156 for the experimental class and 0.056 for the control class. Both values were greater than the 0.05 significance level, indicating that the data in both groups followed a normal distribution. Therefore, the learning outcome data met the normality assumption and were suitable for further analysis using parametric statistical procedures.

Table 6. Results of the Homogeneity Test

Levene Statistic	df1	df2	Sig.
0.078	1	68	0,781

Based on Table 6, the homogeneity test produced a significance value of 0.781. Since this value exceeded the 0.05 significance threshold, the variances of the data were considered homogeneous. After the assumptions of normality and homogeneity were met, hypothesis testing was performed using an independent samples t-test as a parametric statistical procedure.

Hypothesis Testing

Table 7. Independent Samples t-Test Results for the Experimental and Control Groups

	<i>Levene's Test For Equality of Variances</i>		<i>t-test for Equality of Means</i>		
	F	Sig.	T	Df	Sig. (2-tailed)
<i>Equal Variances assumed</i>	0.078	0.781	-4,110	68	.000
<i>Equal variances not assumed</i>			-4,110	67,645	.000

Based on Table 7, Levene's Test produced a significance value of 0.781, exceeding the 0.05 threshold. This result confirms that the variances were homogeneous; therefore, the hypothesis test was interpreted using the equal variances assumed row. The independent samples t-test yielded a t-value of -4.110 and a Sig. (2-tailed) value of 0.000. Because the significance value was below 0.05, H_0 was rejected and H_1 was accepted. These findings indicate a statistically significant difference in students' learning outcomes between the experimental and control groups.

The observed difference in students' learning outcomes suggests that the implementation of the Spontaneous Group Discussion (SGD) learning model contributed positively to students' achievement in the topic of the Excretory System. This model encouraged students to engage more actively in group discussions, share ideas, search for relevant information, and develop their understanding collaboratively with peers. As a result, SGD created a more interactive learning environment by positioning students as active participants in the learning process. This finding aligns with the study conducted by Asriani, Rohmah, and Priyono (2020), which reported that the Spontaneous Group Discussion method influenced students' learning outcomes.

The application of SGD provided students with meaningful opportunities to develop their thinking skills, express their viewpoints, and appreciate their peers' perspectives. During the discussion activities, students could clarify concepts they had not yet fully understood and strengthen their understanding through explanations shared by other group members. Consequently, the learning process was not conducted in a one-way manner but was characterized by active interaction among students. The Spontaneous Group Discussion model has also been examined by Rahayu and Widayati (2019), who found that it contributes to the development of students' problem-solving skills.

Conversely, conventional instruction often positions students as passive recipients of knowledge, as classroom activities are largely dominated by teacher explanations. In such learning settings, students primarily receive information, whereas opportunities to engage in discussion, collaborative work, and active information processing are relatively limited. As a result, the increase in learning outcomes observed in the control class was lower than that achieved by students in the experimental class.

Overall, the findings of this study suggest that the Spontaneous Group Discussion (SGD) model may be considered an effective alternative instructional approach for enhancing students' learning outcomes. This model is especially appropriate for teaching the Excretory System topic

because the material requires a strong conceptual understanding and active student participation throughout the learning process. The results are consistent with previous studies indicating that cooperative and discussion-based learning approaches can promote student engagement and improve academic achievement (Murniati et al., 2020).

CONCLUSION

Based on the findings, the application of the Spontaneous Group Discussion (SGD) learning model significantly improved the learning outcomes of Grade VIII students at SMPN 1 Batang on the topic of the excretory system. This improvement was reflected in the mean posttest score of the experimental class, which was 76.14, exceeding that of the control class at 67.57. The independent samples t-test yielded a Sig. (2-tailed) value of 0.000, which was lower than the 0.05 significance level. Consequently, H_0 was rejected and H_1 was accepted. These results suggest that the Spontaneous Group Discussion (SGD) learning model is an effective alternative instructional approach for enhancing students' learning outcomes in learning the excretory system.

REFERENCES

- Asriani, A., Rohmah, M., & Priyono, S. (2020). Pengaruh penerapan metode *Spontaneous Group Discussion* (SGD) terhadap hasil belajar mata pelajaran ekonomi bisnis pada peserta didik kelas X tingkat SMK di Buay Pemuka Bangsa Raja. *UTILITY: Jurnal Ilmiah Pendidikan dan Ekonomi*, 4(1), 44–55. <https://doi.org/10.30599/utility.v4i1.628>
- Cirkony, C. (2023). Flexible, creative, constructive, and collaborative: The makings of an authentic science inquiry task. *International Journal of Science Education*, 45(17), 1440–1462. <https://doi.org/10.1080/09500693.2023.2213384>
- Cui, T., & Wang, J. (2024). Empowering active learning: A social annotation tool for improving student engagement. *British Journal of Educational Technology*, 55(2), 712–730. <https://doi.org/10.1111/bjet.13403>
- Faizah, H., & Kamal, R. (2024). Belajar dan pembelajaran. *Jurnal Basicedu*, 8(1), 466–476. <https://doi.org/10.31004/basicedu.v8i1.6735>
- Kerimbayev, N., Umirzakova, Z., Shadiev, R., & Jotsov, V. (2023). A student-centered approach using modern technologies in distance learning: A systematic review of the literature. *Smart Learning Environments*, 10, Article 61. <https://doi.org/10.1186/s40561-023-00280-8>
- Lestari, S. (2021). Upaya meningkatkan aktivitas dan hasil belajar Biologi dengan model problem based learning pada materi bakteri. *Jurnal Pendidikan Matematika dan Sains*, 9(2), 136–148. <https://doi.org/10.21831/jpms.v9i2.42921>
- Murniati, N., Febyasha, R., & Irwandi, I. (2020). Hasil belajar kognitif dan berpikir kritis siswa menggunakan model pembelajaran kooperatif tipe Think Pair Share (TPS) di MAN 2

Kota Bengkulu. *Diklabio: Jurnal Pendidikan dan Pembelajaran Biologi*, 4(1), 94–105.
<https://doi.org/10.33369/diklabio.4.1.94-105>

Pratiwi, E. D., Masykuri, M., & Ramli, M. (2021). Active learning strategy on higher education biology learning: A systematic review. *Tadris: Jurnal Keguruan dan Ilmu Tarbiyah*, 6(1), 75–86. <https://doi.org/10.24042/tadris.v6i1.7345>

Rahayu, P., & Widayati, A. (2019). Effectiveness of Think Pair Share and Spontaneous Group Discussion towards problem solving skill student of X accounting graders SMK Negeri 1 Wonosari. *Jurnal Pendidikan Akuntansi Indonesia*, 17(2), 117–130.
<https://doi.org/10.21831/jpai.v17i2.28698>

Republik Indonesia. (2003). Undang-Undang Republik Indonesia Nomor 20 Tahun 2003 tentang Sistem Pendidikan Nasional.

Saputra, R. Y., & Harjono, N. (2024). Model kooperatif Teams Games Tournament dalam meningkatkan keaktifan dan hasil belajar IPA siswa SD. *Jurnal Educatio FKIP UNMA*, 10(1), 88–97. <https://doi.org/10.31949/educatio.v10i1.6811>

Suandi, I. N. (2022). Metode diskusi kelompok untuk meningkatkan hasil belajar Matematika kelas VI SD. *Journal of Education Action Research*, 6(1), 135–140.
<https://doi.org/10.23887/jear.v6i1.45083>

Theobald, E. J., Hill, M. J., Tran, E., Agrawal, S., Arroyo, E. N., Behling, S., Chambwe, N., Cintrón, D. L., Cooper, J. D., Dunster, G., Grummer, J. A., Hennessey, K., Hsiao, J., Iranon, N., Jones, L., Jordt, H., Keller, M., Lacey, M. E., Littlefield, C. E., ... Freeman, S. (2020). Active learning narrows achievement gaps for underrepresented students in undergraduate science, technology, engineering, and math. *Proceedings of the National Academy of Sciences*, 117(12), 6476–6483. <https://doi.org/10.1073/pnas.1916903117>

Utami, P., Kadir, K., & Herlanti, Y. (2021). Meta-analisis pembelajaran kooperatif di Indonesia. *Jurnal Inovasi Pendidikan IPA*, 7(1), 106–115. <https://doi.org/10.21831/jipi.v7i1.39574>

Xu, X., Bos, N. A., Wu, H., & Lin, X. (2023). Student engagement and learning outcomes: An empirical study applying a four-dimensional framework. *Medical Education Online*, 28(1), Article 2268347. <https://doi.org/10.1080/10872981.2023.2268347>