

IMPROVING LEARNERS' MOTIVATION AND ELT ACHIEVEMENT THROUGH DISCOVERY LEARNING MODEL AFTER THE COVID-19 PANDEMIC

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Article Info	Abstract
Article History Received: June 2022 Revised: June 2022 Published: July 2022	<i>The discovery learning model has several advantages when compared to other learning models such as that learners are involved in collaboration with peer classmates and with teachers. The activities can bring students to create a sense of pleasure and enthusiasm because they can directly investigate and find out the results. This study was aiming at improving learners' motivation and ELT achievement of the seventh-grade learners after Covid-19 Pandemic through the application of a scientific approach using Discovery Learning model. This study is a Classroom Action Research (CAR). The study was conducted at SMP 4 Mataram involving 16 learners. This research was carried out in two cycles. The research procedure consisted of planning, implementation, observation and reflection. The observation sheets, student observation sheets, motivation questionnaires and ELT tests were employed to gain the research data. The data were analyzed in descriptive ways. The results of the study in the first cycle showed that the average score for teacher activities was 3.18, learner activities were 3.38, individual assignments were 68.25, and written tests were 67.69. Those were incomplete category. Furthermore, in the second cycle, the average score for teacher activities was 4.43, learner activities were 4.21, individual assignments were 80.88, and written tests were 84.31. These were included in the complete category. These results indicate that the indicators of success (> 4.0) and ELT achievement (> 75.00) have been exceeded. Because the indicators of success have been achieved, the study is declared successful. It means that the use of discovery learning is able to improve learners' motivation and ELT achievement after Covid-19 pandemic.</i>
Keywords Motivation; English achievement; Scientific approach; Discovery Learning;	
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INTRODUCTION

The Covid-19 pandemic has disrupted the classroom learning process so that learners learn autonomously to finish their online assignments given by teachers (Gula, 2022). Thus, learners should have a communication tool with the internet network in the form of a cellphone (HP). Besides having to have a cellphone, learners also are demanded to be able to operate the internet cellphone and always be ready for the quota. Many learners are less motivated to learn with online learning models because they only deal with cellphones (Adara, 2020). Aspects that are included as the category of learning motivation such as; appearance, speaking, how to answer questions, draw conclusions, and using the learning time effectively, are not clearly detected because learners do not deal directly with the teachers or their classmates (Ramnarain & Hlatswayo, 2018).

The real situation of ELT classrooms after the Covid-19 pandemic showed that the seventh-grade learners (VII.3) at SMP Negeri 4 Mataram still have low motivation to learn. Whereas motivation to learn is an essential aspect for learners in participating in their courses

(Lin, 2015). Learners' motivation to learn after Covid-19 in several schools is also still low, including at SMPN Anggeraja, learners' motivation to learn after the Covid-19 pandemic is low (Asril et al., 2021). In addition, The learners' motivation level at the elementary schools in Ruteng NTT during the Covid-19 pandemic was still low (Jediut et al., 2021), as well as in some high schools around Indonesia, indicating that learners' motivation level was low (Cahyani et al., 2020). The decrease of learners' motivation to learn at several levels of education because the learners' learning habit which was controlled by teachers is recently turning to online learning. At top of that, learners' motivation to learn is closely related to learners' ELT achievements (Andari & Lusiana, 2015).

Learners' learning outcomes are a measure of learning success in achieving learning results. However, learners' ELT achievement during the Covid-19 pandemic are relatively low. This is evidenced from several studies regarding to learning outcomes during the Covid pandemic. For instance, the learning outcomes at SMPN Anggeraja are still relatively low (Asril et al., 2021), learning outcomes at high schools in the Yogyakarta area are relatively low (Dharma & Sudewiputri, 2021), and learning outcomes for elementary students in Ruteng NTT are low category (Jediut et al., 2021). Because of that, teachers are demanded to improve learners' learning achievement. The decrease of learners' learning outcomes at some levels of schools are caused because learners are still adapting to the online learning patterns. Learners participate previously in the classes in offline learning. Because of this, learners' motivation and learning achievement need serious attention in this study.

The learning process during the Covid-19 pandemic have caused learners become passive, less creative, and low motivation in understanding English lessons. Because of this, the percentage of learner success was labelled very low, and it has a strong effect toward the lack of learners' confidence over teachers (Jaber & BouJaoude, 2012) It also seems during the ELT learning processes. During the learning process, learners tend not to care about what the English teacher explains. When the English teacher asks them to provide a question of the learning materials, they tend to be passive learners. No learners have an intention to raise their hand to ask. If they don't understand and don't know at all, every learner has no response. When learners are provided with group assignments, they are not active. When each group is asked to come forward to perform the results of their discussion, they pointed each other. This situation can be stated that most learners have no a strong motivation to learn.

Factors causing uncondusive class situations in the learning process include; 1) the effect of online learning during one year 2020, which is usually independent and relaxed at home; 2) the low motivation of learners which results in not achieving the passing grade; and 3) the learners' enthusiasm in participating the learning process is low. These effects can be seen when they followed group group discussion (Nurfathurrahmah, 2018). When the group is asked to present the results of their group work, no group doesn't want to come forward, and even they are pointing each other. This situation causes uncondusive learning activities (Kusuma, 2019).

An alternative solution that can be done by researchers is to apply the "Scientific" approach to the Discovery Learning model. The Discovery Learning model has several advantages when compared to other learning models (Sunyono & Meristin, 2018a). The advantages of the Discovery Learning model are; 1) learners are able to find several concepts and principles through collaboration with peer classmates and with teachers; 2) obstacles do not occur for learners to improve their skills during the learning process; 3) create a sense of pleasure and enthusiasm for learners because they can directly investigate and find out the results (Zulaichah & Masykuri, 2019). The stages of scientific approach of the Discovery Learning model cover observing, asking, trying, associating, and communicating (Ridlo, 2018).

Given the learners' problems related to their motivation and learning achievement, this study was focused on implementing the scientific approach with using the discovery learning model. This learning model was considered as an appropriate solution to improve learners'

motivation and ELT achievement. To probe that the scientific approach of the Discovery Learning model can increase the learners' motivation and learning achievement in the seventh-grade learners in session I after the Covid-19 pandemic in the second semester at SMP Negeri 4 Mataram, the researcher conducted classroom action research (CAR) in two cycles to solve the learners' motivation and learning achievement.

RESEARCH METHOD

Research Setting

This study is classroom action research (CAR) which consists of cycles. One cycle consists of four stages of activities, namely planning, implementation, observation, and reflection. This study aims to increase learners' motivation and ELT achievement at SMPN 4 Mataram. This study was prepared in two cycles, but if the second cycle has not been achieved, it will be continued to the next cycle.

Research Variables

The research variables are the motivation and learning achievement of the junior high school learners. The improvement of motivation and learning outcomes seen in learners' activities during group discussions, which has an impact on increasing motivation and learning outcomes for the seventh-grade learners in Session I after the Covid-19 pandemic Semester two of the 2021/2022 academic year at SMP Negeri 4 Mataram. With the variables of motivation and learning outcomes, another variable of this study is the implementation of lesson plans (teacher's and learners' learning activities) by applying a scientific approach of the Discovery Learning model in an effort to improve learners' motivation and learning outcomes after the Covid-19 pandemic.

Action Plans

The activities in the seventh-grade learners of Session I after the Covid-19 pandemic consist of carrying out the learning process by applying the Discovery Learning model to increase motivation and ELT outcomes in the seventh-grade learners of Session I after the Covid-19 pandemic at SMP Negeri 4 Mataram in the second semester academic. The action taken by the English teacher is to prepare learning cycles. The learning cycles can be seen in Figure 1 that contains 4 (four) stages, namely: 1) Planning, 2) Implementating, 3) Observing, and 4) Reflecting.

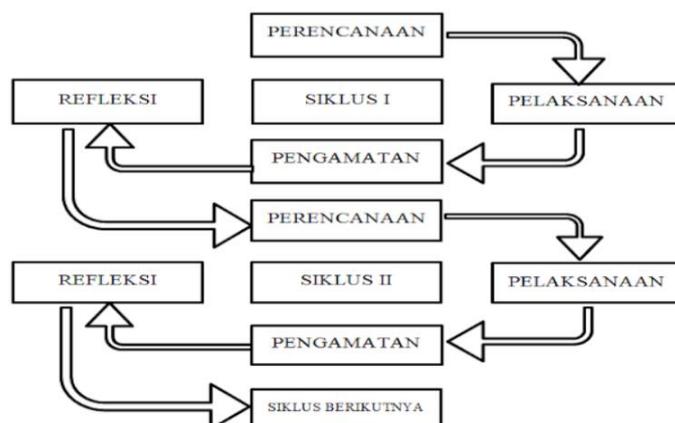


Figure I. Stages of Learning Cycles (Arikunto, 2013).

CYCLE I

Plann Phase

The activities in the planning stage covered; preparing lesson plans with scenarios according to the stages of the scientific learning model of the Discovery Learning model; prepare sources, materials, and all tools used in the study; compiling the teacher's observation sheets and student observation sheets; and develop evaluation tools.

Action Phase

Activities done at the action stage consisted of two learning meetings, namely meeting I and meeting II. Learning activities refer to the Discovery Learning model which consists of observing, asking, trying, associating, and communicating. At the first meeting, the learning activities were done. At the first meeting, the ELT teacher divided learners into four small groups. Each group consists of four members. Then, each group is given a problem to be solved together in groups. Then, the teacher goes around to guide the main group who is having difficulties or problems. At the second meeting, each group came forward to present the results of group work in turns, and then a written test is conducted.

Observation Phase

Activities done in observation cover the teacher observations and learner observations. The teacher's observations were carried out by the English supervisor as well as the teacher's supervisor in carrying out classroom action research. Furthermore, the student observations are carried out by the real teacher as well as the researcher in this study through group discussion activities.

Reflection Phase

In the reflection stage, the activities cover a series of reflection on data collected through acquisition, processing and analysis of research data, matching the results of data analysis with indicators of success, and plans for improvement and follow-up.

CYCLE II

In this cycle, all activities and stages during the study are alike to previous cycle. Basically, they are repeating and correcting actions that still require refinement and justification as it should be. If the indicators of success in cycle II have been met, the classroom action research is discontinued. However, if the indicators of success have not been achieved, the research is continued in the next cycle.

Research Subjects

The research subjects as a source of data in this study consist of 16 learners the seventh-grade learners of Session I after the Covid-19 pandemic. The research was conducted for four months, starting from February to May 2022, which is included in the even semester of the academic year of 2021/2022.

Research Instruments

The research instrument consisted of four types, namely teacher observation instruments, student observation instruments, motivation instruments and learning achievement instruments. The teacher's observation instrument applies the learning activities contained in the lesson plans made by the teacher, as well as the student activity observation sheet using the learning activity instrument. Furthermore, the instrument for measuring motivation used a learning motivation questionnaire. The instrument for collecting learning achievement was

using individual reports on the results of group discussions and the results of written tests carried out at the end of the learning process.

Data Analysis Technique

Data analysis was carried out in a quantitative descriptive ways through data collection, analysis and discussion of the data obtained by matching the level of optimization to the learners' achievements of existing success indicators. Success indicators consist of two types, namely as follows; a) the teacher has been declared successful in carrying out the learning process with the scientific approach of the Discovery Learning model, if the scores obtained on teacher observation activities and learner observations have reached an average score of > 4.00 , which is labelled with good category; b) learners' motivation to learn is declared to have increased if 85% of the number of learners have obtained an average score of > 4.0 and learning outcomes are declared to have increased if 85% of the number of students have obtained an average score of > 75.00 , which is in line with the passing grade.

RESEARCH FINDINGS AND DISCUSSION

Research Findings

The cumulative data of the classroom action activities from cycle I to cycle II are presented in Table 1. Based on the results of the study, it can be seen that the average score on the teacher observation activities is 3.18 with incomplete categories. Furthermore, the average student observation value is 3.38 in the incomplete category. Likewise, the average value of individual assignments obtained an average of 68.25 in the incomplete category. Similar results in the written test obtained an average score of 67.69 in the incomplete category.

Table 1
The cumulative data in Cycle I

No	Activities	Indicator Success	Cycle I		Mean	Category
			I	II		
1	Techer observation	≥ 4.00	2,93	3,43	3,18	Incomplete
2	Learner observation	≥ 4.00	3,23	3,53	3,38	Incomplete
3	Motivation	≥ 75.00	-	68,25	68,25	Incomplete
4	Learning Achievement	≥ 75.00	-	67,69	67,69	Incomplete

Based on the results in cycle I, the data showed incomplete results. So, the cycle continued to the next stage, namely cycle II. The results obtained in cycle II are presented in Table 2. Based on the analysis, the data showed that the average of teacher observation score is 4.43 with the complete category. The mean score of student observation is 4.21, which is labelled with complete category. Likewise, with individual assignments, learners get an average score of 80.88 in the complete category, and the average score on the written test is 84.31 in the complete category.

Table 2
The cumulative data in Cycle II

No	Activities	Indicator Success	Cycle II		Mean	Category
			I	II		
1	Techer observation	≥ 4.00	4,29	4,57	4,43	Complete
2	Learner observation	≥ 4.00	4,06	4,35	4,21	Complete
3	Motivation	≥ 75.00	-	80,88	80,88	Complete
4	Learning Achievement	≥ 75.00	-	84,31	84,31	Complete

Discussion

This study was aiming at improving learners' motivation and ELT achievement of the seventh-grade learners of Session I after Covid-19 Pandemic at SMP Negeri 4 Mataram through the application of a scientific approach using the Discovery Learning model. This study is done in the classroom action research activities, which have two cycles. Each cycle consisted of planning, acting, observing, and reflecting. The elaboration of each cycle activity is explained as follows.

Cycle I

Plan Phase

At the planning stage, the activities carried out were compiling lesson plans with scenarios of applying the scientific approach to the Discovery Learning model, teacher and student observation sheets, motivational instruments and students' ELT tests. The preparation of teacher observation instruments and student observation instruments also experienced problems. After the guidance of the English teacher as the researcher, the teacher was successful in compiling the teacher observation sheets and student observations in an effort to improve their learning motivation. In preparing the evaluation tool, the researcher did not experience any obstacles or difficulties.

The learning activities of Discovery Learning requires careful planning so that learning objectives are achieved (Sunnyono & Meristin, 2018b). Likewise, the research instruments used must be well prepared. The instruments used in this study were teacher and student observation sheets, motivation questionnaires and ELT tests.

Action Phase

Meeting I

The implementation stage at the first meeting was in accordance with the Discovery Learning model which consisted of the following activities.

Observing Activities

Activities at the observing stage consist of assigning learners to small groups to explore information from textbooks about the subject matter presented. Furthermore, the English teacher explains the teaching materials and provides concrete examples that can be understood by learners. To do this, a discussion was done among teacher mates at the school. The result of the observation activities become insight for teacher to know classroom atmospheres. In addition, it can help teachers identify the initial conditions of learners so that teachers can better understand learning materials (Zulaichah & Masykuri, 2019).

Asking Activities

Activities at the questioning stage consist of giving tricks for learners about good and correct procedures for asking questions according to the teaching material being learned. Furthermore, learners regularly can ask about things that have not been understood according to the learning material. Questioning activities in Discovery Learning facilitate learners to focus their thoughts and attention in following the learning processes (Ridlo, 2018).

Trying Phase (Collecting data and Information)

The activities at the trying stage cover learners in groups to discuss the problems that are their responsibility. Practice finding solutions in groups to the problems being discussed. Collect data from all group members. The activity of trying to collect data is an important activity in learning because it trains learners in practicing a work step (Handoko, 2017).

Associating Information

All group members answer and review all the answers that have been discussed together. The results of the answers are analyzed together to be presented in front of the class when

conveying information. The group makes a final agreement from the results of the group discussion. Making a final agreement requires thoroughness and sharpness of thinking because it is the end of the thinking process (Sunyono & Meristin, 2018).

Meeting II

Communicating Phase

The activities carried out at the communicating stage consist of delivering a description of the teaching materials related to the previous results of observing, asking, trying, and processing information. The teacher invites all group members to inform the results of their group work. All learners in groups respond to each presentation from other groups. Learners with the teacher's guidance make joint conclusions from all problems and questions that are their responsibility. Learners' activities in explaining the conclusions require a good way of communicating and require continuous practice because communication is one of the language skills needed in the era of the industrial revolution 4.0 (Retnawati et al., 2018). The last activity is a written test.

Observing Phase

The teacher's observation in the first meeting obtained an average score of 2.93 and the meeting II obtained an average score of 3.43, the results of student observations in an effort to improve motivation and ELT achievement at the seventh-grade learners of Session I after the Covid-19 pandemic in the second semester at SMP Negeri 4 Mataram, the average score for the first meeting was 3.23 and the second meeting was 3.53. From the value of the assignment and the results of the written test whose material was only about what was taught at the same time, the average value was 68.25 and 67.69, which is labelled with category enough.

Reflecting Phase

The results in the first cycle showed that the average score for teacher activities was 3.18, the score of student activities was 3.38, the score of individual assignments was 68.25, and the written test was 67.69. These results were labelled with incomplete category. Real efforts that can improve the next learning process which include actions in cycle II are: 1) teachers can optimize the Discovery Learning model approach well, 2) deficiencies or errors that occur in cycle I was minimized by developing more effective learning scenarios and can be absorbed by all learners.

Because the indicators of success have not been achieved, the cycle is continued to cycle II to optimize the application of learning strategies with a scientific approach to the Discovery Learning model in increasing the motivation to learn and ELT achievement at the seventh-grade learners of Session I after the Covid-19 pandemic in the second semester at SMP Negeri 4 Mataram.

CYCLE II

Action Phase

The implementation of learning activities contained in the lesson plans has taken into account the mistakes in the first cycle so that it becomes better in the second cycle. The researcher has focused on a precise strategy plan so that the learning process with a scientific approach using the discovery learning model can be realized properly. Therefore, in the preparation of the scenario, each aspect of the learning process is thoroughly detailed with the discovery learning model. Furthermore, each stage of learning is carried out properly so that each stage is done well. This is because learning can direct learners to achieve the learning objectives (Anderson et al., 2001).

Before the learning process is carried out, the researcher prepares all the tools, materials, and everything so that the implementation of the learning process runs well according to the

planned scenario. In order for the learning process to be resolved, the researcher also prepared teacher observation sheets and student observation sheets as benchmarks for achieving high motivation and learning outcomes for the seventh-grade learners of Session I after the Covid-19 pandemic at SMP Negeri 4 Mataram.

Action Phase

At the implementation stage in cycle II, basically it still refers to the implementation of cycle I, namely the application of the scientific approach to the discovery learning model. The difference seems that this cycle is more effective. All learning steps that have not been implemented in cycle I have been attempted to be implemented in cycle II. The hope is that the learning process with the discovery learning model can be maximized, then the learners' motivation and learning outcomes get better than before. Learning activities at the implementation stage have followed all the stages of learning written in the lesson plans. Finally, learners can achieve learning objectives (Nurfathurrahmah, 2018).

Observation Phase

In the second cycle, the results of the observation in meeting I that the mean score is 4.29 with the complete category, and in the second meeting is 4.57 with the complete category. Efforts to improve learners' motivation to learn was obtained an average score of 4.06, which is labelled completed category, and the second meeting was 4.35, which is labelled completed category. It means that the seventh-grade learners of Session 1 after Covid-19 pandemic have good motivation and learning achievement at the second semester at SMPN 4 Mataram after implementing the discovery learning model. The real impact of increasing learning motivation is that learning outcomes also increase, from the data obtained the average value of individual assignments and written tests is 80.88 in the complete category and 84.31 in the complete category. Because in the second cycle the average score of motivation and learning outcomes was complete, the research was discontinued to third or next cycles.

Based on the results, learners have followed the learning well in cycle II, and also the teacher as a facilitator in learning have good roles. Thus, the discovery learning model during the Covid-19 pandemic has been able to improve learners' learning motivation. It is the same findings found by other researchers that online and offline learning during the Covid-19 pandemic was able to enhance learning motivation (Asril et al., 2021). Likewise, the results of other studies using the constructivist model can increase learning motivation to learn English (Irawan & Indramayu, 2016).

The students' ELT outcomes also experienced an increase so that they were included in the complete category. This is because the teacher has implemented discovery learning well, and the learning activities was able to stimulate learners to study harder even though it is still in the post-Covid-19 period. This finding was also found by some studies informing that learners' learning outcomes can be developed after using innovative models, one of which is discovery learning (Asril et al., 2021; Purnama Sari et al., 2018; Rezeki et al., 2015).

Reflection Phase

Because the indicators of success have been achieved, there is no need for improvement and refinement efforts. The scientific approach of the Discovery Learning model has been able to improve learners' motivation and ELT outcomes which is marked by the achievement of indicators of success and an increase in ELT achievement. The classroom action was stopped in cycle II with satisfactory results.

CONCLUSION

The results of the current study in the first cycle showed that the average score for teacher activities was 3.18, the mean score of student activities was 3.38, the mean score of individual assignments was 68.25, and the written test was 67.69. All of the results were

labelled with an incomplete category. Furthermore, in the second cycle, the average score of teacher activities was 4.43, the student activity was 4.21, the individual assignment was 80.88, and the written test was 84.31. All of the results in second cycle were stated in the complete category. These results indicate that the indicators of success (> 4.0) and ELT outcomes (> 75.00) have been exceeded. Because the success indicators have been achieved, the current study is declared successful and stopped in cycle II. The use of the scientific approach of the Discovery Learning model is able to improve learners' motivation and ELT achievement at the seventh-grade learners of Session 1 at SMP Negeri 4 Mataram. Facts have shown that the average score of learners' learning motivation from cycle I to cycle II has exceeded the established success indicators. The research was declared "successful" and stopped in cycle II.

SUGGESTIONS

This study recommends to peer teachers to carry out classroom action research in an effort to improve some of the basic language skills of learners in facing the current era of the industrial revolution 4.0, such as critical thinking skills, creativity, communication, and collaboration. It is recommended for the seventh-grade learners of Session 1 at SMP Negeri 4 Mataram after covid-19 pandemic to get used to learning with a contextual approach, especially strategies that are able to arouse their learning motivation so that learning outcomes can be achieved as expected.

REFERENCES

- Adara, R. A. (2020). Meningkatkan Motivasi Belajar Bahasa Inggris Melalui Digital Story Telling. *Interpretasi*, 1(1), 29–39.
- Andari, T., & Lusiana, R. (2015). Profil Kreativitas Mahasiswa Dalam Memecahkan Masalah Geometri Pada Materi Sistem Koordinat Ruang. *JIPM (Jurnal Ilmiah Pendidikan Matematika)*, 3(2), 439–451. <https://doi.org/10.25273/jipm.v3i2.513>
- Anderson, L. W., Krathwohl Peter W Airasian, D. R., Cruikshank, K. A., Mayer, R. E., Pintrich, P. R., Raths, J., & Wittrock, M. C. (2001). *Taxonomy for_ Assessing a Revision OF Bloom's Taxonomy Of Educational Objectives*. <https://www.uky.edu/~rsand1/china2018/texts/Anderson-Krathwohl - A taxonomy for learning teaching and assessing.pdf>
- Arikunto, S. (2013). *Prosedur Penelitian suatu Pendekatan Praktik*. Bumi Aksara.
- Asril, C. M., Suburan, M. H., Renaldy, R., Teknik, F., Makassar, U. N., Makassar, U. N., Jasmani, P., Keolahragaan, F. I., Negeri, U., Kewarganegaraan, P., Sosial, F. I., & Makassar, U. N. (2021). *Dampak Covid-19 Pada Pembelajaran Daring Terhadap Motivasi Belajar Siswa SMPN 1 Anggeraja ABSTRAK Sistem pendidikan di Indonesia dialihkan ke metode pembelajaran online atau daring disebabkan karena adanya penyebaran wabah virus Covid-19 . Pengalihan meto. X*, 312–319.
- Cahyani, A., Listiana, I. D., Puteri, S., Larasati, D., Islam, U., Sunan, N., Yogyakarta, K., Islam, U., Sunan, N., Yogyakarta, K., Islam, U., Sunan, N., Yogyakarta, K., & Belajar, M. (2020). *Motivasi Belajar Siswa SMA pada Pembelajaran Daring di Masa Pandemi Covid-19*. 3(01), 123–140.
- Dharma, I. A., & Sudewiputri, P. (2021). *Motivasi Belajar Mahasiswa pada Pembelajaran Daring Selama Pandemi Covid-19*. 4(2), 295–301.
- Gula, L. P. (2022). Challenges Encountered By the Teachers Handling Oral Speech Communication Courses in the Era of Covid-19 Pandemic. *Journal of Languages and Language Teaching*, 10(2), 234. <https://doi.org/10.33394/jollt.v10i2.4963>
- Handoko, H. (2017). Pembentukan Keterampilan Berpikir Kreatif Pada Pembelajaran Matematika Model Savi Berbasis Discovery Strategy Materi Dimensi Tiga Kelas X.

- Eduma: Mathematics Education Learning and Teaching*, 6(1), 85. <https://doi.org/10.24235/eduma.v6i1.1711>
- Irawan, D., & Indramayu, U. W. (2016). Pengaruh Kebiasaan Berbicara Bahasa Inggris Dan Bahasa Inggris Siswa. *Faktor Jurnal Ilmiah Kependidikan*, 3(3), 185–196.
- Jaber, L. Z., & BouJaoude, S. (2012). A Macro-Micro-Symbolic Teaching to Promote Relational Understanding of Chemical Reactions. *International Journal of Science Education*, 34(7), 973–998. <https://doi.org/10.1080/09500693.2011.569959>
- Jediut, M., Sennen, E., Ameli, C. V., Pgsd, P., Santu, U., Ruteng, P., Jend, J., & Yani, A. (2021). *Manfaat Media Pembelajaran Digital dalam Meningkatkan Motivasi Belajar Siswa SD Selama Pandemi Covid-19 Motivation of Elementary School Students During The Covid-19 Pandemic) Pendahuluan Kegiatan pembelajaran di kelas melibatkan beberapa pola interaksi*, 2(2), 1–5.
- Kusuma, C. S. D. (2019). Integrasi bahasa Inggris dalam Proses Pembelajaran. *Efisiensi - Kajian Ilmu Administrasi*, 15(2), 43–50. <https://doi.org/10.21831/efisiensi.v15i2.24493>
- Lin, L.-F. (2015). The impact of problem-based learning on Chinese-speaking elementary school students' English vocabulary learning and use. *System*, 55, 30–42. <https://doi.org/https://doi.org/10.1016/j.system.2015.08.004>
- Nurfathurrahmah, N. (2018). Penerapan Model Problem Based Learning (PBL) Berbasis Kontekstual Terhadap Peningkatan Kemampuan Berpikir Kritis Mahasiswa. *Oryza (Jurnal Pendidikan Biologi)*, 7(1), 21–28. <https://doi.org/10.33627/oz.v7i1.7>
- Purnama Sari, R., Rahmatan, H., & Mudatsir, M. (2018). Penerapan Model Pembelajaran Learning Cycle 7E Untuk Meningkatkan Motivasi Dan Hasil Belajar Peserta Didik Di Smp. *Jurnal Pendidikan Sains Indonesia*, 5(2), 68–74. <https://doi.org/10.24815/jpsi.v5i2.9819>
- Ramnarain, U., & Hlatswayo, M. (2018). Teacher beliefs and attitudes about inquiry-based learning in a rural school district in South Africa. *South African Journal of Education*, 38(1), 1–10. <https://doi.org/10.15700/saje.v38n1a1431>
- Retnawati, H., Djidu, H., Kartianom, Apino, E., & Anazifa, R. D. (2018). Teachers' knowledge about higher-order thinking skills and its learning strategy. *Problems of Education in the 21st Century*, 76(2), 215–230.
- Rezeki, R., Nurhayati, N., & Mulyani, S. (2015). Penerapan Metode Pembelajaran Project Based Learning (Pjbl) Disertai Dengan Peta Konsep Untuk Meningkatkan Prestasi Dan Aktivitas Belajar Siswa Pada Materi Redoks Kelas X-3 Sma Negeri Kebakkramat Tahun Pelajaran 2013 / 2014. *Jurnal Pendidikan Kimia Universitas Sebelas Maret*, 4(1), 74–81.
- Ridlo, S. (2018). Creative Thinking Analysis, Motivation and Concept Mastery on Learning of Cooperative Discovery Model in Elementary School. *Journal of Primary Education*, 7(1), 48–56. <https://doi.org/10.15294/jpe.v7i1.21736>
- Sunyono, S., & Meristin, A. (2018a). The effect of multiple representation-based learning (MRL) to increase students' understanding of chemical bonding concepts. *Jurnal Pendidikan IPA Indonesia*, 7(4), 399–406. <https://doi.org/10.15294/jpii.v7i4.16219>
- Sunyono, S., & Meristin, A. (2018b). The Effect of Multiple Representation-Based Learning (MRL) to Increase Students'™ Understanding of Chemical Bonding Concepts. *Jurnal Pendidikan IPA Indonesia*, 7(4), 399–406. <https://doi.org/10.15294/JPII.V7I4.16219>
- Zulaichah, S., & Masykuri, M. (2019). *Seminar Nasional Pendidikan Sains*. 0298, 91.