

INCREASING THE QUALITY OF LEARNING THROUGH ACADEMIC SUPERVISION IN SMA NEGERI TANGGUL 1 JEMBER,

DORA INDRIANA

SMAN TANGGUL 1, Jember, Indonesia

doraindrianampd@gmail.com

Article History: Received: Juni, 24, 2022; Accepted: Juni, 25, 2022; Published: June, 30 2022

ABSTRACT

This study aims to improve the quality of learning through academic supervision at SMA N 1 Tanggul Jember. This research is a type of School Action Research, which consists of two cycles and each cycle consists of stages of planning, implementation, observation, and reflection. The method used in this study is a descriptive method with a percentage technique to see the increase that occurs from cycle to cycle. This research was conducted at SMA N 1 Tanggul Jember, from February to March 2021. The research subjects were teachers of SMA N 1 Tanggul Jember, . Meanwhile, the main objective of academic supervision of the Learning Implementation Plan is to test the ability of teachers to plan and implement learning activities, assess learning outcomes, utilize assessment results to improve learning services, create a fun learning environment, utilize learning resources, and develop appropriate learning interactions. Data collection techniques using documentation techniques, in the form of the work of the preparation of teaching administration, interviews and assessment analysis instruments. While the research data analysis technique used descriptive percentage analysis technique, by comparing the percentage of the number of teachers who made teaching administration and lesson planning. Based on the results and discussion of the research, it is concluded that continuous guidance can increase the motivation of teachers of SMA N 1 Tanggul Jember in compiling complete teaching administration and teaching planning through academic supervision, resulting in higher quality learning. The teacher shows seriousness in understanding and compiling teaching administration after receiving guidance on the development of teaching administration/RPP from the principal with an average increase in the preparation of teaching administration by 27.91%.

Keywords: learning quality, academic supervision



Copyright © 2021 The Author(s)

This is an open access article under the [CC BY-SA](#) license.

INTRODUCTION

In essence, learning can be carried out if there is interaction between teachers and students as well as learning support facilities, and one of the determinants of success in teaching and learning activities is the teacher, if a teacher is lazy to teach and is reluctant to make learning tools, then what happens to educational outcomes, nothing other students will also be lazy to study

Thus, it means, the essence of academic supervision is not at all assessing teacher performance in managing the learning process, but helping teachers develop their professional abilities. Nevertheless, academic supervision cannot be separated from the assessment of teacher performance in managing learning. (Setyosari, 2017; Syarbini Husin, 2013)

Based on this fact, in improving the quality of education in schools, it is necessary to have professional supervision who is able to guide, be an example, and be able to move teachers in improving the quality of education in schools. (Slavin, 2014)

Learning failures in educational units can be overcome by the efforts and roles of school principals who are able to detect early teacher weaknesses in evaluating student learning outcomes with their role as researchers. The failure and success of teachers are also influenced by the ability of teachers to understand the learning process. The inability of teachers to understand the aims and objectives of learning can affect learning outcomes. (Davies, Cooper, Kettler, & Elliott, 2015)

The success of education in educational units is strongly influenced by the role of the principal as a researcher in the learning leadership of teachers. The principal in the education unit has a strategic role in determining the success and failure of teachers in learning in which there is a learning evaluation system.

Government regulation No. 10 of 2005 chapter I article 1 paragraph 6 that the standard of the education process is a national standard relating to the implementation of learning in educational units to achieve a standard of graduate competence

Teachers are required to be able to understand the meaning and character of the curriculum so that they can master the material, methods, techniques, and evaluation of learning so that learning outcomes in an educational unit can be achieved optimally and of good quality. (Anderson & Boyle, 2015; Bridges, Stefaniak, & Baaki, 2018)

Based on the description above, the writer is interested in conducting School Action Research (PTS) entitled "EFFORT TO IMPROVE THE QUALITY OF LEARNING THROUGH ACADEMIC SUPERVISION AT SMAN TANGGUL 1 JEMBER"

THEORETICAL FRAMEWORK

The understanding of the teacher then became wider, not only limited to scientific activities that are spiritual intelligence (spiritual intelligence) and intellectual intelligence (intellectual intelligence), but also concerning physical kinesthetic intelligence (bodily kinesthetic), such as dance teachers, sports teachers, gymnastics teachers. and music teacher. Thus, the teacher can be interpreted as a person whose task is related to efforts to educate the nation's life in all its aspects, both spiritual and emotional, intellectual, physical, and other aspects. (Kilinc, Demiral, & Kartal, 2017; Zhang, 2018) states, "teachers are people who teach ." With this definition, the teacher is equated with the teacher. This understanding of the teacher only mentions one side, namely as a teacher, it does not include the notion of a teacher as an educator and trainer. Furthermore,, "teachers are professional educators because teachers have accepted and carried the burden from parents to participate in educating children." (Sharon P. Robinson & Key, 2010)

Law on Teachers and Lecturers of the Republic of Indonesia No. 14 of 2005 "Teachers are professional educators with the main task of educating, teaching, guiding, directing, training, assessing, and evaluating students in early childhood education through formal education, basic education, and secondary education. "

Furthermore, Law No. 20 of 2003 Article 39 paragraph 2 concerning the national education system states, "Educators are professionals in charge of planning and implementing the learning process, assessing learning outcomes, conducting guidance and training, as well as conducting research and community service, especially for educators. in higher education." PP No. 19 of 2005 concerning National Education Standards states, "Educators (teachers) must have academic qualifications and competence as learning agents, be physically and mentally healthy, and have the ability to realize national education goals." above, it can be concluded that teachers are professional educators with the main task of educating, teaching, guiding, directing, training, assessing and evaluating students,

and in charge of planning and implementing the learning process.(Anderson & Boyle, 2015; Conde et al., 2021)

Academic supervision is a series of activities to help teachers develop their ability to manage the learning process in order to achieve learning objectives(Handayani, 2020) states that academic supervision is an effort to help teachers develop their abilities to achieve learning goals. Thus, the essence of academic supervision is not to assess teacher performance in managing the learning process, but to help teachers develop their professional abilities. Nevertheless, academic supervision cannot be separated from the assessment of teacher performance in managing learning. If the above said that academic supervision is a series of activities to help teachers develop their ability to manage the learning process, then assessing teacher performance in managing the learning process is an activity that cannot be avoided (Davies et al., 2015; Ellahi, Nasiri, Fath-Tabar, & Gholami, 2014). Assessment of teacher performance in managing the learning process as a process of providing estimates of the quality of teacher performance in managing the learning process is an integral part of a series of academic supervision activities. If it is said that academic supervision is a series of activities to help teachers develop their abilities, then in its implementation it is necessary to conduct an assessment of the teacher's abilities first, so that aspects that need to be developed and how to develop them can be determined. The purpose of academic supervision is to help teachers develop their abilities to achieve the learning goals set for their students (Degeng, 2017). Through academic supervision, it is hoped that the academic quality carried out by teachers will increase (Kadek Suartama et al., 2020). Capacity development in this context should not be interpreted narrowly, only emphasizing on increasing the knowledge and teaching skills of teachers, but also on increasing the commitment or willingness or motivation of teachers, because by increasing the ability and work motivation of teachers , the quality of learning will increase. Good academic supervision must be able to make teachers more competent, namely teachers increasingly master competencies, both personality competencies, pedagogic competencies, professional competencies, and social competencies. Therefore, academic supervision must touch on the development of all teacher competencies. According to Neagley (Shkuratova, 1994) there are two aspects that must be a concern for academic supervision both in its planning, implementation, and assessment. According to Alfonso, Firth, and Neville (Zhou, Wu, Long, Cheng, & Zhang, 2017) good academic supervision is supervision that is able to function to achieve the multi-purposes mentioned above. There is no success for academic supervision if it only pays attention to one particular goal to the exclusion of other goals. Only by reflecting on these three goals will academic supervision function to change the teaching behavior of teachers. In turn, changes in teacher behavior towards higher quality will lead to better student learning behavior(Priawasana & Waris, 2019; Wilson, 2016). suggest that academic supervision behavior is directly related to and affects teacher behavior. This means, through academic supervision, supervisors influence teachers' teaching behavior so that their behavior is getting better in managing the teaching and learning process. Furthermore, the teaching behavior of a good teacher will affect student learning behavior. Thus, it can be concluded that the ultimate goal of academic supervision is the development of better student learning behavior. (Ridwan, Rahmawati, & Hadinugrahaningsih, 2017)

With regard to the principles of academic supervision, recently, several literatures have revealed the theory of academic supervision as the basis for any academic supervision behavior. Several terms, such as democracy (democratic), group work (team effort), and group process (group process) have been widely discussed and associated with the concept of academic supervision. The discussion is solely to show us that academic supervision behavior must distance itself from the authoritarian nature, where supervisors are superiors and teachers are subordinates. Likewise, in a school system

setting, all members (teachers) must actively participate, even preferably as an initiative, in the academic supervision process, while supervisors are part of it. All of these are modern academic supervision principles that must be realized in every academic supervision process in schools.

Good academic supervision must be able to make teachers more competent, namely teachers increasingly master competencies, both personality competencies, pedagogic competencies, professional competencies, and social competencies. Therefore, academic supervision must touch on the development of all teacher competencies. there are two aspects that must be a concern for academic supervision both in its planning, implementation, and assessment. (HALFFTER et al., 2003)

First, what is called the substantive aspects of professional development (hereinafter referred to as the substantive aspect). This aspect refers to the competence of teachers that must be developed through academic supervision. This aspect refers to the competencies that must be mastered by the teacher. His mastery is a support for his success in managing the learning process. There are four teacher competencies that must be developed through academic supervision, namely personality, pedagogic, professional, and social competencies. The first and second substance aspects represent the values, beliefs, and theories held by teachers about the nature of knowledge, how students learn, the creation of teacher-student relationships, and other factors. The third aspect relates to the extent of the teacher's knowledge of the subject matter or subject matter in the field of study he teaches.

METHODS

The subjects to be supervised are teachers at SMAN Tanggul 1, while the main target of academic supervision at SMAN Tanggul 1 is to test the abilities of teachers in planning learning activities, carrying out learning activities, assessing learning outcomes, utilizing the results of assessments to improve learning services, creating a pleasant learning environment, utilizing available learning resources, and developing appropriate learning interactions (strategies, methods, techniques). Educational supervision must also be supported by appropriate instruments

This research is in the form of School Action Research, which is a research that is a collaboration between researchers and teachers, in improving the ability of teachers to be better in compiling the learning process. The method used in this study is a descriptive method, using the percentage technique to see the improvement that occurs from cycle to cycle. Descriptive method can be interpreted as a problem-solving procedure investigated by describing / describing the state of the research subject of a person, institution, community, etc.) at the present time based on the facts that appear or as they are (Nawawi, 1985:63). With this method, the researcher tries to explain the data collected through direct communication or interviews, observations/observations, and discussions in the form of percentages or numbers.

This study aims to describe the difficulties experienced by teachers in the learning process. Furthermore, researchers provide alternatives or efforts to improve the ability of teachers in making quality learning processes. The important things that must be considered in School Action Research, according to Sudarsono, F.X, (1999:2) are:

1. Plan

What actions will be taken to improve teacher competence in preparing lesson plans. The solution is by conducting: a) interviews with teachers by preparing interview sheets, b) discussions in a pleasant atmosphere and c) providing guidance in compiling the learning process

2. Implementation

What researchers do as an effort to improve teacher competence in lesson planning is by providing continuous guidance to teachers.

3. Observation

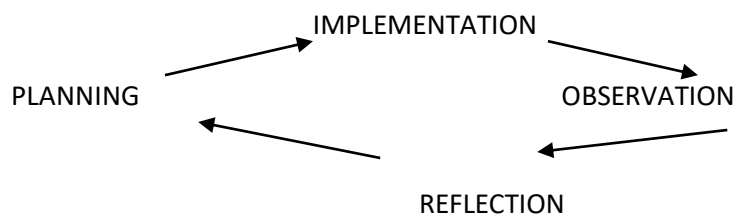
Researchers made observations of lesson plans to capture how far the teacher's ability to evaluate programs, processes, and learning outcomes was. In addition, researchers also recorded things that happened in meetings and interviews. Records from meetings and interviews will be used for later analysis and commentary.

4. Reflection

The researcher examines, sees, and considers the results or impacts of the actions that have been taken. Based on the results of this reflection, the researcher and the teacher carried out revisions or improvements to the learning process activities.

The research procedure is a series of research stages from beginning to end. This research is a process of reviewing a cyclical system as the framework developed by SuharsimiArikunto et al. This procedure includes the following stages: (1) planning, (2) implementation, (3) observation, and (4) reflection. The four activities are interrelated and sequentially form a cycle. School Action Research is cyclical research, meaning that research is carried out repeatedly and continuously until the research objectives can be achieved.

PTS flow can be seen in the following figure:



1. Data collection technique

Data collection techniques were carried out with documentation in the form of the work of preparing teaching administration, interviews and assessment analysis instruments.

1. Action Planning

a) Topic selection

b) Conduct a syllabus review to get clear learning objectives for the topic and look for ideas from the material in the textbook.

c) Develop a learning implementation plan

d) Determine the indicators that will be used as a reference

e) Preparing subject groups

f) Prepare learning media.

g) Creating evaluation format

h) Make an observation format

i) Make teacher and student response questionnaires

2. Action Implementation

Implement actions according to plan, with steps:

1. Each teacher who has prepared a lesson plan presents or presents his lesson plan, while other colleagues/teachers provide input, until finally a better lesson plan is obtained.

2. The appointed teacher uses these inputs to improve the lesson plan.

3. The appointed teacher presents his lesson plan in front of the class to get feedback.

3. Observation (observation)

1. Observer makes observations according to the plan using the observation sheet
2. Assess actions using the evaluation format.
3. At this stage a teacher implements the lesson plans that have been prepared, other teachers make observations using the prepared observation sheets.

2. Data Analysis Techniques

The data were analyzed using descriptive percentage analysis, namely comparing the percentage of the number of teachers who made teaching administration and lesson planning, such as:

1. Increased teaching administration made by teachers at least 75%
2. Improving learning planning through academic supervision carried out by teachers at least 80%
3. Quality learning which is marked by the level of student activity in learning above 75%

RESULTS AND DISCUSSION

A. Initial Condition

From the results of interviews with ten teachers, researchers obtained information that all teachers (ten people) did not know the framework for preparing teaching administration such as lesson plans by applying learning models, only three people had standard process documents (one), only four teachers who have attended RPP development training with the application of learning models, generally teachers adopt and adapt RPP that apply learning models in it, most teachers do not know and do not understand preparing RPP with the complete application of learning models, they agree that teachers should use lesson plans by applying learning models in carrying out the learning process that can be used as guidelines in the learning process. In addition, most teachers are not familiar with the components of lesson plans that fully implement learning models.

Based on the results of the researcher's observations of ten lesson plans made by teachers (specifically in cycle 1), data were obtained that there were still teachers who did not complete their lesson plans with components and sub-components of RPP implementing certain learning models, for example component indicators and assessment of learning outcomes. (scoring guidelines and answer keys). The formulation of student activities in the components of the steps of learning activities is still less interactive, inspiring, and systematic.

In terms of teacher competence, there was an increase in preparing teaching administration from cycle to cycle. It can be seen in the appendix of the recapitulation of teaching administration with various learning models from Cycle 1 to Cycle 2.

A. Cycle 1

The first cycle consists of four stages, namely: (1) planning, (2) implementation, (3) observation, and (4) reflection as follows.

1. Planning (Planning)

1. Make pre-observation and post-observation interview sheets
2. Create a teaching administration assessment format/instrument
3. Make a recapitulation format of the results of the preparation of the RPP for the application of learning models in cycles 1 and 2
4. Make teacher questionnaires about academic supervision in the implementation of learning

2. Implementation (Acting)

At the beginning of the first cycle, the teaching administration made by the teachers was not in accordance with the wishes of the researcher. This is evidenced by the existence of teaching administration components such as 1) syllabus, 2) lesson plans, 3) Prota, 4) Promissory note, 5) Attendance list (DH), and 6) a list of grades (DN) has not been made by the teacher.

3. Observation (Observation)

The results of observations in cycle 1 can be described as follows: Observations were carried out on Monday, July 16 2012, to ten teachers. All of them arrange teaching administration, but there are still teachers who have not completed their teaching administration with teaching administration components such as 1) syllabus, 2) lesson plans, 3) Prota, 4) Promissory note, 5) Attendance list (DH), and 6) List of Values (DN). The results of observations from ten teachers were obtained as follows:

- 1 One person does not complete it with RPP
2. One person does not equip it with prota
3. Two people do not complete it with a promissory note
4. One person does not complete the Attendance List (DH)
5. Three people did not complete the List of Values (DN)

Furthermore, they are guided and advised to complete it with a collaborative dialogue approach

1. Reflection

Reflection activities in the form of reflections or questions that can be used as a reference to step into cycle 2, including:

1. Has the teacher completed all the administration completely?
2. Has there been no socialization regarding changes or development of teaching administration?
3. Can the steps taken in cycle 1 solve the problem of teacher teaching administration?
4. Can the solutions offered by researchers improve the quality of learning?

B. Cycle 2

The second cycle also consists of four stages, namely: (1) planning, (2) implementation, (3) observation, and (4) reflection. The results of observations in the cycle to can be described as follows:

Furthermore, they are guided and advised to complete it with a collaborative dialogue approach

The School Action Research conducted at SMAN Tanggul 1 consisted of forty (38) teachers, and was carried out in cycle 1 and cycle 2. Ten teachers were considered representative of each subject interviewed. Even so, all teachers are still required to complete their teaching administration. All of these teachers showed a good attitude and were motivated in compiling a complete teaching administration. This the researcher knows from the observations during the interview and guidance in the preparation of teaching administration.

Furthermore, judging from the competence of teachers in preparing teaching administration, there was an increase from cycle 1 to cycle 2.

1. Syllabus

Of the 40 teachers who have made a syllabus the results are quite good, there is not a single teacher who has not made a syllabus. In other words 100% .

2. Learning Implementation Plan (RPP)

There was an increase in the making of lesson plans, namely 12 teachers who previously did not make lesson plans, in cycle 2 all of them made lesson plans after having a dialogue with researchers, in other words there was an increase of 39.9%

3. Annual Program (Prota)

There was an increase of 5.7% in the making of prota for the 40 supervised teachers. If in cycle 1 there were 2 teachers who did not make prota, then in cycle 2 all teachers had made it after having a dialogue with the researcher.

4. Semester Program (Prosem)

There was an increase of 28.25% in the making of procedures for the 38 supervised teachers. If in cycle 1 there were 10 teachers who did not make prosem, then in cycle 2 all teachers had made it after interviews with researchers.

5. Attendance List (DH)

There was an increase of 23.6% in making attendance lists for the 38 supervised teachers. If in cycle 1 there were 8 teachers who did not make prosem, then in cycle 2 all teachers had made it after interviews with researchers.

6. List of Values (DN)

There was an increase of 46.9% in the preparation of the score list for the 38 supervised teachers. If in cycle 1 there were 18 teachers who did not make prosem, then in cycle 2 all teachers had made it after interviews with researchers.

Meanwhile, the results of the academic supervision instrument for all teachers are as follows:

1. 13 teachers (30.23%) have not carried out teaching preparation related to point I.5. Lesson plan.
2. 26 teachers (60.47%) have not carried out teaching preparation related to point I.6. A value book that contains all invoices that have been carried out.
3. 17 teachers (39.53%) have not carried out teaching preparation related to point II.A.3. Apperception.
4. 19 teachers (44.19%) have not carried out teaching preparation related to point II.A.4. Clarity of basic competencies/indicators.
5. 5 teachers (11.63%) have not carried out teaching preparation related to point II.A.5. Readiness of teaching materials.
6. 20 teachers (46.51%) have not carried out teaching preparation related to point II.B.11.b Students make a summary/conclusion guided by the teacher
7. 7 teachers (16.28%) have not carried out teaching preparation related to point II.B.11.d Communicating orally/written
8. 5 teachers (11.63%) have not carried out teaching preparation related to point II.B.11.g Making decisions/drawing conclusions
9. 2 teachers (4.65%) have not carried out teaching preparation related to point II.C.2. Cleaning style / material after use
10. 6 teachers (13.93%) have not carried out teaching preparation related to point II.C.3. Assignments for the next meeting

After a collaborative dialogue with teachers to complete all teaching administration, the following improvements were made:

1. 4 teachers (9.30%) have not carried out teaching preparation related to point I.5. Learning Implementation Plan, resulting in an increase of 20.93%
2. 11 teachers (25.58%) have not carried out teaching preparation related to point I.6. Value book that contains all invoices that have been executed, resulting in an increase of 34.89%
3. 5 teachers (11.63%) have not carried out teaching preparation related to point II.A.3. Apperception, resulting in an increase of 27.90%
4. 8 teachers (18.60%) have not carried out teaching preparation related to point II.A.4. Clarity of basic competencies / indicators, resulting in an increase of 25.59%
5. 1 teacher (2.32%) has not carried out teaching preparation related to point II.A.5. Readiness of teaching materials, resulting in an increase of 9.31%
6. 7 teachers (16.28%) have not carried out teaching preparation related to point II.B.11.b Students make a summary/conclusion guided by the teacher, resulting in an increase of 30.23%
7. 2 teachers (4.65%) have not carried out teaching preparation related to point II.B.11.d Communicating orally/written, resulting in an increase of 6.98%
8. All teachers have implemented point II.B.11.g. Taking decisions/drawing conclusions, resulting in an increase of 4.65%
9. All teachers have implemented point II.C.2. Cleaning tools/materials after use, resulting in an increase of 4.65%

10. All teachers have implemented point II.C.3. Assignments for the next meeting, resulting in an increase of 13.93%

The seriousness of the teachers who are academically supervised results not only in increasing their teaching abilities, but also in their complete teaching administration so as to improve the quality of learning.

A. CONCLUSION

Based on the results of the School Action Research (PTS) it can be concluded as follows.

1. Continuous guidance can increase teacher motivation in compiling complete teaching administration and teaching planning through academic supervision so as to produce higher quality learning. The teacher shows seriousness in understanding and compiling teaching administration especially after getting guidance on the development of teaching administration/RPP from researchers so that the average increase in the preparation of teaching administration is 27.91%
2. Academic supervision activities can improve teacher competence in preparing lesson plans which in turn improve the quality of learning. This can be proven from the results of observations which show that there is an increase in teacher competence in teaching from cycle to cycle so that the average increase in learning planning is 17.91%

B. Suggestion

1. It has been proven that continuous guidance can increase the motivation and competence of teachers in preparing teaching administration and learning planning. Therefore, the researcher submits some suggestions as follows.
2. The motivation that has been embedded, especially in the preparation of teaching administration and learning planning, should be maintained and improved.
3. Lesson planning documents should be made at least 2 copies, one for school archives and the other for teacher guidance in carrying out the learning process.

REFERENCE

- Anderson, J., & Boyle, C. (2015). Inclusive education in Australia: Rhetoric, reality and the road ahead. *Support for Learning*, 30(1), 4–22. <https://doi.org/10.1111/1467-9604.12074>
- Bridges, J., Stefaniak, J., & Baaki, J. (2018). A Formative Design Examining the Effects of Elaboration and Question Strategy with Video Instruction in Medical Education. *Journal of Formative Design in Learning*, 2(2), 129–143. <https://doi.org/10.1007/s41686-018-0025-5>
- Conde, M., Rodríguez-Sedano, F. J., Fernández-Llamas, C., Gonçalves, J., Lima, J., & García-Peñalvo, F. J. (2021). Fostering STEAM through challenge-based learning, robotics, and physical devices: A systematic mapping literature review. *Computer Applications in Engineering Education*, 29(1), 46–65. <https://doi.org/10.1002/cae.22354>
- Davies, M., Cooper, G., Kettler, R. J., & Elliott, S. N. (2015). Developing Social Skills of Students with Additional Needs Within the Context of the Australian Curriculum. *Australasian Journal of Special Education*, 39(1), 37–55. <https://doi.org/10.1017/jse.2014.9>
- Degeng, I. N. S. (2017). Interactive Effects Of Instructioal Strategy And Learner On characteristics ON Learning Effectiveness and Appeal. *Kapita Selektta Karya Ilmiah Dosen Pascasarjana Universitas Negeri Malang*, 0(0). Retrieved from <http://pasca.um.ac.id/conferences/index.php/kskid/article/view/296>

- Ellahi, H. R., Nasiri, R., Fath-Tabar, G. H., & Gholami, A. (2014). On Maximum Signless Laplacian Estrada Indices of Graphs with Given Parameters. *Encyclopedia of Mental Health*, 317–323. <https://doi.org/10.1016/B978-0-12-397045-9.00059-8>
- HALFFTER, G., Zikán, W., Wygodzinsky, P., Castillo, C., Boucher, S., Salazar, K., ... Postal, A. (2003). Undang Undang Republik Indonesia Nomor 20 tahun 2003 tentang sistem pendidikan. *The Coleopterists Bulletin*, 1(1), 1–11. Retrieved from <http://dx.doi.org/10.1016/j.cretres.2011.11.017><http://www.conabio.gob.mx/www.unal.edu.co/icn/publicaciones/caldasia.htm>https://pdfs.semanticscholar.org/9bb8/973866467bf10fef937356ac16349c35874b.pdf?_ga=2.109558917.1250767975.1574828256-287221478.1
- Handayani, D. (2020). Multi-drug resistant tuberculosis. *CPD Infection*, 3(1), 119.
- Kadek Suartama, I., Usman, M., Triwahyuni, E., Subiyantoro, S., Abbas, S., Umar, ... Salehudin, M. (2020). Development of E-learning oriented inquiry learning based on character education in multimedia course. *European Journal of Educational Research*, 9(4), 1591–1603. <https://doi.org/10.12973/EU-JER.9.4.1591>
- Kilinc, A., Demiral, U., & Kartal, T. (2017). Resistance to dialogic discourse in SSI teaching: The effects of an argumentation-based workshop, teaching practicum, and induction on a preservice science teacher. *Journal of Research in Science Teaching*, 54(6), 764–789. <https://doi.org/10.1002/tea.21385>
- Priawasana, E., & Waris, W. (2019). Peningkatan Kemampuan Berfikir Kritis Dengan Pendekatan Problem Based Learning. *Madrosatuna: Journal of Islamic Elementary School*, 3(1), 49. <https://doi.org/10.21070/madrosatuna.v3i1.1975>
- Ridwan, A., Rahmawati, Y., & Hadinugrahaningsih, T. (2017). STEAM Integration In Chemistry Larning For Developing 21ST Century Skills. *MIER Journail of Educational Studies, Trends & Practices*, 7(2), 184–194.
- Setyosari, P. (2017). menciptakan pembelajaran yang efektif dan berkualitas. *JURNAL INOVASI DAN TEKNOLOGI PEMBELAJARAN (Kajian Dan Riset Dalam Teknologi Pembelajaran)*, 1(1), 20–30. Retrieved from <http://journal2.um.ac.id/index.php/jinotep/article/view/2103/1239>
- Sharon P. Robinson, & Key, K. (2010). *21ST CENTURY KNOWLEDGE AND SKILLS IN EDUCATOR PREPARATION*. Retrieved from http://www.p21.org/storage/documents/aacte_p21_whitepaper2010.pdf
- Shkuratova, I. P. (1994). *Cognitive style and communication*. Rostov-on-Don: Publishing house of Rostov Pedagogical University.
- Slavin, R. E. (2014). Making cooperative learning powerful. *Educational Leadership*, 22–26. <https://doi.org/10.1080/00405849909543834>
- Syarbini Husin. (2013). *Bakery Metagraf, Creative Inprint*. Surakarta: tiga serangkai.
- Wilson, O. (2016). *The Second Principle The work of Leslie Anderson and Krathwohl-Bloom's Taxonomy Revised Understanding the New Version of Bloom's Taxonomy*. Retrieved from <https://thesecondprinciple.com/teaching-essentials/beyond-bloom-cognitive-taxonomy-revised/>
- Zhang, L. (2018). “Hands-on” plus “inquiry”? Effects of withholding answers coupled with physical manipulations on students’ learning of energy-related science concepts. *Learning and Instruction*, (December 2017), 0–1. <https://doi.org/10.1016/j.learninstruc.2018.01.001>

Zhou, Y., Wu, J., Long, C., Cheng, M., & Zhang, C. (2017). Performance Evaluation of Peer-to-Peer Energy Sharing Models. *Energy Procedia*, 143, 817–822.
<https://doi.org/10.1016/j.egypro.2017.12.768>