

Classroom Action Research: Biological Learning Quality Efforts in Senior High School with the Illustrated Handout Combining Concept Map

Yusnaeni*¹, Angela G. Lika¹, Sudirman*², Margareta Kleden¹

¹Biology Education Department, Faculty of Education and Teachers Training, The University of
Nusa Cendana, Jl. AdisuciptoPenfui, Kupang NTT, 85001, Indonesia

²Chemical Education Department, Faculty of Education and Teachers Training, The University
of Nusa Cendana, Kupang, 85001, Nusa Tenggara Timur, Indonesia

Email: yusnaeni_75@yahoo.co.id; sudirman_bandu@staf.undana.ac.id

Abstract

This is an action classroom research study, with the aim of increasing learning quality through the use of illustrated handouts and concept maps. The increased learning quality is measured by using the indicator of a student's learning activity, student's learning outcomes, and teacher activity. The subjects of the research are science students in the eleventh grade of senior high school, Kupang. Data collected by using the instruments i.e. test, observation sheet and questionnaire, is analysed by descriptive qualitative and quantitative. The results of the research indicate that the implementation of an illustrated handout combining a concept map had the ability to increase students' activity by 18.53%, the teacher's activity by 13.43%, and the learning outcomes by 7.88%. The percentage of student's learning completeness increased by 53.57%. This research result indicates that the implementation of the illustrated handout combined with the concept map has an ability to increase the learning quality in the class.

Keywords: concept map, illustrated handout, learning outcomes, learning activity

Introduction

Countries equipped with superior human resources will win global competition. Superior human resources are created through quality education. Quality of education in this context has various perceptions; some are focused on the evaluation of the institution (Hansen, 2009), and others are focused on teaching and learning (Mikkonen, Heikkilä, Ruohoniemi, & Lindblom-Ylänne, 2009). (Muhlisin, Susilo, Amin, & Rohman, 2018) added that the goal of optimal education can be achieved through improving curriculum, teacher quality and the quality of the learning process. In the context of this research, quality means that which is being viewed from the side of school. The learning quality in the classroom cannot be separated from the quality of the teachers and the learning efforts of the students.

There is much evidence which indicates that the teacher's quality in reflecting on their teaching activity has an effect on the outcomes of student's learning (Darling-Hammond, 2006). One of the ways of increasing the teacher's quality is to make sure that the teachers conduct a reflection and make sustainable revisions (Schön, 1983). On the other side, by the reflection mentioned, making it possible for the student to watch and review their progress of learning through the expansion of new knowledge and skills, so as to motivate them to learn more.

Problems found in senior high school of Kupang City, especially in PGRI senior high school, according to the results of the interview and questionnaire regarding the necessity of the students, found out that in the learning process, the rate of the student's learning activity is classified as low, not only in the interaction with the teacher and learning resources but also in the interactions between the students themselves. This condition formed an opinion among the students that biology is a boring subject. The lack of interaction caused by: the teaching-learning strategy being used is centred to the teacher, and the use of media and learning resources in teaching-learning process hasn't been maximised yet. This condition impacts on the low rate of the student's learning activity indicated by the lack of motivation for learning. On the other side,

their rate of once and for all learning classified as low, the average score of a student was only 67%, whereas the minimum rate score of teaching-learning once and for all is 75%. The percentage of once and for all rate was only the amount of 38%. This means that there are 62% who haven't 'once and for all' yet (data and document of the researcher).

In order to make strategic steps in solving the problem, the teacher should make various innovations in the teaching-learning process, so the subject is being taught well and understood; without killing off the students' interest and motivation in learning. So, adapting the learning resources with the student's necessity, by maximising the student's involvement in the process of learning, is the solution. (Hampden-Thompson & Bennett, 2013), reported that various forms of interaction, hands-on activities, and applications and investigations in class has a positive association with students' motivation in science. The learning resources mean here is an illustrated handout which has a mapping concept. The use of the handout helps the students understand the subject better and is going to learn and well understand the illustrated picture which corresponds to the subject and the reality. The handout is a written subject prepared by the teacher in order to enrich the knowledge of the student.

The application of the picture and concept map as a handout gives several benefits and can help the student in understanding the concepts and relate them to the subject. Meanwhile the picture on the handout is also expected to strengthen memory and increase the student's comprehension of the subject matter. The biology teaching-learning by using the illustrated handout with the map concept, clearly contains the basic idea for the teacher and the learner. The picture functioned for attracting attention, clarifying ideas, illustrating or giving variation to the fact potentially being forgotten or omitted by the learner (Angkowo & Kosasih, 2007). Research about the use of the illustrated handout with the concept map has been conducted by (Wulandari, Suarsini, & Ibrohim, 2016) and (Nerita, 2016). Their research result concluded that the application of the handout and also an illustrated handout, can increase the rate of a student's

learning outcomes. The research of (Zubaidah, Fuad, Mahanal, & Suarsini, 2017) also reported that the use of a concept map can increase the thinking ability of student, in this context, the ability of creative thinking.

The illustrated handout with the concept map are implemented through classroom action research. Action classroom research is one form of reflexive research used in an effort to increase the teaching-learning quality in the classroom. (Elliot, 1991) gave a definition of classroom action research as the process of the teacher's collaboration in evaluating their learning quality. (Dick, 2006) added that action research is the scientific study of the teaching-learning practices in classrooms with it's problems.

Classroom action research conducted cyclically consisted of the stages of planning, action, observation and reflection. The results of the reflection was an input for the teaching-learning process revision on the next cycle (Kemmis, McTaggart, & Nixon, 2013), Winter & Munn-Giddings, (2001) added that the planning stage focused on the observation to the problem in the classroom and making a certain plan. The results of the plan, was then implemented and observed by the observer, then the reflection was conducted.

This classroom action research hopefully raises the quality of the learning process in the classroom. The raising of the quality can be pointed out through the raising rate of learning outcomes, the raising rate of students activity, and the raising rate of teacher's teaching activity. So, this research can be a frame of reference for the teachers when they face a similar problem in the classroom.

Methods

The Design of the Study

The basic design of this research is classroom action research in order to explore the changes of learning attitudes or the effects of designing the activities on the learning subject

matter, which are being used in biology, or the effects of designing the activities on the subject matter used in biology. The subject matter is the digestion system, and the subject of the class action research in the eleventh grade of science class of SMA PGRI Kupang. The eleventh grade class was chosen as the subject of this research, based on the results of teacher's observation which indicated that during the learning process an average student did not have an active attitude in the learning process, did not have an ability to solve the problem given, and their rate of once and for all in the learning process was under 68.00%. The class action research was conducted in two cycles. The first cycle was conducted from the 1st of November until the 20th of December 2018, whereas the second cycle was conducted from the 27th of November until the 15th December 2018. Each cycle consisted of stages as pointed on Figure 1.

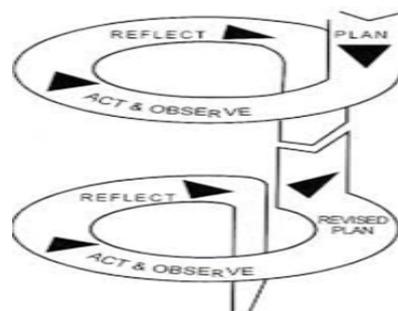


Figure 1. Stages of Classroom Action Research (Hopkins, 2014)

Data Collection Tools

The instruments of the learning process consists of the syllabus, the teaching-learning action plan, the illustrated handout with map concept, and a student's working sheet. The instrument of evaluation is in the form of a cognitive evaluation test, in order to evaluate student's learning result. The cognitive test is in the form of an essay test with as many as 10 items, and multiple choice with as many as 10 items The cognitive rubric refers to (Hart, 1994). The non-cognitive instrument is in the form of an interview sheet (in order to know the student's

response regarding the implementation of learning process), and a student's and teacher's activity observation sheet (filled by the observer in order to know the attitude condition and the level of the student's and teacher's activity during the process of learning). Students activity comprises: 1) Student's interest and enthusiasm; 2) Participation in a working group; 3) Evaluation of the student's working sheet; 4) Subject comprehension; 5) Classroom discussion; and, 6) Group discussion. The teacher's activity comprises of: 1) The teacher's performance during teaching; 2) The technique of questioning; 3) The subject mastering; 4) The systematic of presenting the subject; 5) The use of media; 6) Time management; and, 7) Closing the lesson. The evaluation criteria took reference from (Hendriana & Afrilianto, 2017), i.e. very good (81.00 - 100.00), good (61.00 - 80.00), enough (21.00 - 40.00), and less (0.00 - 20.00). While the criteria for students' learning outcomes was: very good (81.00 - 100.00), good (66.00 - 81.00), enough (56.00 - 66.00), less (41.00 - 56.00), and fail (0.00 - 41.00).

Implementation of Classroom Action Research

Before conducting the learning process on the first and second cycle, we preceded by making a pretest and before conducting a reflection on the first and second cycle, we preceded by making a posttest. In this classroom action research using the instrument in the form of a learning instrument consisting of: the syllabus, the action plan of the learning process, an illustrated handout with concept mapping regarding the subject matter of the digestion system, student's working sheet and the instrument of evaluation in the form of: a cognitive evaluation test in order to evaluate the results of the student's learning process; and a cognitive instrument in the form of an observation sheet. The observer in this research consisted of the collaboration of 3 biology teachers. The working procedure in this classroom action research is presented in Table 1.

Table 1. Action Description of Teaching Phase of Classroom Action Research

Cycle	Stage	Working Description
I	Plan	Designing learning instrument (syllabus, lesson plans, student worksheets, etc.) and assessment instruments (test, observation sheets for teacher and student activities)
	Act	Conduct the learning process
	Observe	Making observation during the learning process going on, in the form of the student's learning activity and the teacher's teaching activity. The observation carried out by the observer according to the observation sheet that has been arranged before.
	Reflection	To conduct it, there was collaboration between the teachers' team and the observer for discussing the weaknesses that were still discovered during the learning process.
II	Plan	To make a plan of revision based on the result of discussion on the first cycle reflection phase
	Act	To conduct the learning process
	Observe	Making observations during the learning process going on, in the form of the

student's learning activity and the teacher's teaching activity. The observation carried out by the observer according to the observation sheet that has been arranged before.

Reflection Conducted in collaboration between the teachers' team and the observer. Based on the observation of observer, student's and teacher's activity stipulated that the learning process was not being proceeded in the second cycle. This decision is also based on the result of the student's learning process which indicate that the average score has already gone above the minimum rate of once and for all.

Data Analysis

The data of learning outcomes, the student's learning activity and the teacher's teaching activity being analysed descriptive quantitatively and quantitatively. The quantitative analysis was being used for analysing the results of the test evaluation, i.e. from examination result, the evaluation of presentation and the evaluation of the product. The qualitative data was being used for analysing the non test data based on the results of the interview and observation sheet. The interpretation of the learning outcomes of the students refers to (Hendriana & Afrilianto, 2017).

Findings

After conducting classroom action research regarding the subject matter of the human digestion system, two results of student's learning process, student's learning activity and teacher's teaching activity, were found. The preliminary result of reflection based on the result of the observation find out that: 1) The lack of teacher's effort in raising students' interest and motivation to the subject matter by presenting during the learning activity, also the lack of discussion activity as most of the students were still shy and afraid of expressing their opinion, and the interaction between students and teacher, even among the students themselves was still low. 2) The lack of student's comprehension of the subject matter was pointed out by the low rate of the student's activity in doing a task given on the student's working sheet. Besides that, the minimum score of once and for all rate was still low i.e. on average of 74.00% with 43.33% once and for all rate. From the second reflection, it was found out that : 1) The teacher has been able to raise students' interest and motivation, group discussion was well conducted as indicated by the well performed interaction between student and teacher. 2) The students already have a good comprehension of the subject presented, indicated by the increase of student's ability to finish the task given in the student's working sheet, and the raise of the once and for all rate to 80.96% with 93.33% once and for all.

The results of action in the classroom on the first and the second cycle, was in the form of the evaluation data of student's learning activity, teacher's teaching activity, and student's learning outcomes, as presented below:

Student's Learning Activity

The average evaluation of observer to the student's learning activity on the 1st and 2nd cycle presented in Table 2.

Table 2. The Average of Student's Activity on Each Indicator

No	The Indicator of Student's Activity	Average		Average	
		1 st Cycle	2 nd Cycle	1 st Cycle	2 st Cycle
1.	Student's Interest and Enthusiasm	77.00	87.50	Good	Very good
2.	Participation in	66.75	87.50	Good	
3.	Group Student's	64.75	75.00	Good	Very good
4.	Working Sheet	66.75	85.50	Good	Good
5.	Subject Matter	77.00	98.00	Good	
6.	Comprehension Group Discussion Classroom Discussion	68.75	83.25	Good	Very good Very good Very good

Table 2 indicates that there is an increase of student's learning activity on each evaluation indicator from 1st cycle to 2nd cycle. The highest increase came true on the indicator of the student's participation in the group, whereas the lowest increase came on the student's interest and enthusiasm. Qualitatively there is a change of student's learning activity from the category of good to the category of better, except in the indicator of the student's activity in doing a task

given in the student's activity sheet. However, although there is no change in the category (from good and remains good), the increase is bigger than the indicator of the student's interest and enthusiasm. The average of the student's activity on the 1st cycle is 79.17%, and the 2nd cycle is 86.13%. The percentage of increasing activity from 1st to 2nd cycle is 18.53%.

Teacher's Teaching Activity

The result of observer's evaluation to the teacher's teaching activity on the 1st cycle and the 2nd cycle can be seen in Table 3.

Table 3. The Average of Teacher's Activity on Each Indicator

No	The Indicator of Teacher Activity	Average		Category	
		1 st Cycle	2 nd Cycle	1 st Cycle	2 nd Cycle
1.	Teacher's	86.00	97.25	Very	Very
2.	Performance	72.25	80.50	good	good
3.	Technique of Asking	72.25	94.50	Good	Good
4.	Question	89.00	97.25	Good	Very
5.	Subject Matter	91.75	97.25	Very	good
6.	Mastering	66.75	83.25	good	Very
7.	Subject Matter	75.00	88.75	Very	good
	Presentation			good	Very
	The Use of			Good	good
	Media/Resource			Good	Very
	Time Managing				good

To End the lesson	Very good
-------------------	--------------

Table 3 indicates that there is an increase of teacher’s teaching activity on each valuation indicator from 1st cycle to 2nd cycle. The highest increase came true on the indicator of mastering the subject matter, whereas the lowest increase became on the use of media/resource. Qualitatively, there is a change of teacher’s teaching activity from the category of good to very good, except in the technique of asking questions indicator. However, although there is no change in the category (from good and remains good), there is increase quantitatively, as well as in the subject matter presentation, and the use of media/resource indicators (very good and remains very good). The average of teacher's activity on the 1st cycle is 79.00%, and the 2nd cycle is 91.25%. The percentage of increasing activity from 1st to 2nd cycle is 13.43%.

The Student’s Learning Outcomes

The complete data regarding the student’s learning outcomes on the 1st and the 2nd cycle, is presented in Table 4. Then, the percentage gained of student’s learning outcomes and the sums of student’s learning outcomes raising on the 1st and the 2nd cycle as visualised in Figure 1.

Table 4. The Average Score Preetest and Posttest Students in the 1st and the 2nd Cycle

The Average Score	1 st Cycle	2 nd Cycle
Preetest	44.09	55.93
Posttest	74.56	80.96
Improvement (%)	40.89	30.91

Table 4 indicates that on the the 1st cycle the average score of student’s learning outcomes as indicated by the score of posttest haven’t come up with the score of student’s learning once and for all rate as stated i.e. 75.00. On the 2nd cycle it is seen that the average score of student’s learning outcomes has gone over the limit rate of once and for all, i.e. 80.96 > 75.00. Based on the evaluation result mentioned, the 2nd cycle is not being proceeded. Then, the percentage comparison of gaining learning outcomes rate, and the amount of gaining rate of the student’s once and for all learning outcomes score on the 1st and the 2nd cycle, can be visualised in the form of the graphic as shown in Figure 1.

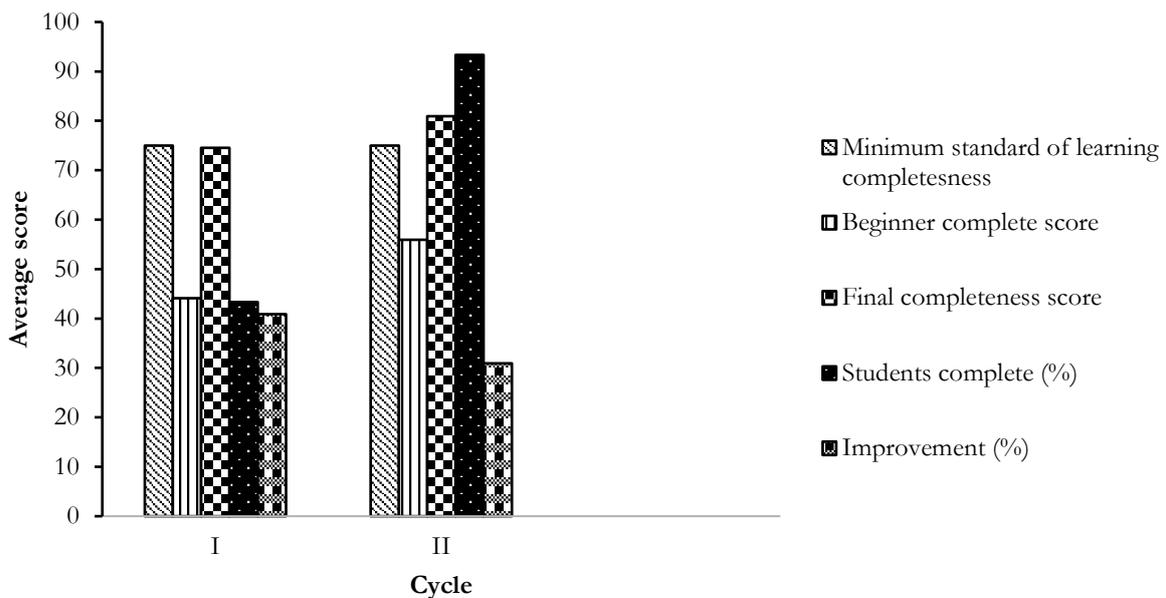


Figure 2. The Percentage of Increasing Learning Outcomes and Student Learning Completeness in the 1st Cycle and the 2nd Cycle

Figure 2 indicates that on the 1st cycle, the score of achievement of completeness is as much as 74.56, but hasn’t reach the minimum learning completeness limit (75.00). While in the 2nd cycle, the score of achievement of completeness is as much as 80.96 over the minimum

learning completeness limit. The percentage of students who completed on the 1st cycle is as much as 43.33% that haven't reach the completion criteria, which is more than 75.00%, while on the 2nd cycle it had exceeded 93.33%. Both these indicators are taken as the base to proceed with the learning process on the 2nd cycle, although the increase in the complete score of the 1st cycle (40.89) is greater than the on the 2nd cycle (30.91). Because the score of the completeness has reach over the completeness limit, the sums of students who completed the learning have over than 75%, so being stated that 3rd cycle learning process was not conducted.

Results and Discussion

The results of the classroom action research with the learning process innovation in the form of application illustrated handout with concept map, made the increase of student's learning activity, teacher's teaching activity and learning outcomes. The use of illustrated handout with the concept map can help the students in deepening and comprehending the subject matter and increase the activity in the interaction among the students, which can be seen through their participation and active manner in the group. This case appears in the increase of scores from the 1st to the 2nd cycles. The great impact also appears in the percentage of students who pass in their learning process with the score coming over the limit.

The increase of learning outcomes and activities caused by the use of handout media in presenting the subject matter briefly by using concept maps and pictures, make the students easily understand. The handout was applied using language that is easily understood by student's, by using simple and communicative sentences. Aside from that, the handout has an attractive appearance that can raise up the learner's interest for learning it. Such things are in accordance with the opinion of (Wertsch, Daniels, Cole, & Wertsch, 2007) regarding the organising of teaching that involves the student in doing the things according to their level of comprehension, in the end of which enables the student to increase subject matter mastering. (Demircioglu, Ayas,

& Demircioglu, 2005) also added that the results of the student's learning process being taught by using teaching subject matter the teacher has designed, by adapting the student's needs and conditions, have an ability to increase the learning outcomes significantly. Such things, also supported by the research result of (Wahyuni, 2012), which shed light on that handout which is designed in an attractive form of its content, colour and picture appearance, will motivate the students in the learning activity. The description of subject matter which is arranged according to the student's necessity will stimulate the student's thinking ability to construct their knowledge themselves, so they can raise up learning outcomes. (Long & Carlson, 2011) added that when students constructed thinking maps, they were able to achieve greater understanding. In the same manner, concept maps allow for students to feel more connected to the material, as it forces them to map out their thought process on paper, which leads to an increase in connections between content and experience.

Student participation in the 2nd cycle also increases; this is possible because of creating a mind map activity potentially being able to assist the students to plan, monitor, and evaluate or correct the results of a mind map. This is in line with (Adodo, 2013) research that mind mapping activity can improve self-regulation of the learning progress. Social interactions that occur between them require students to be actively involved and expand their thinking processes. This has an impact on student confidence, so that activities in group and class discussions also increase.

Based on the results of the reflection, then being evaluated and being discussed among the teachers and observer and several revision sessions were conducted, being implemented in the 2nd cycle. The revisions conducted were: 1) to increase the teacher's readiness before the learning process, in this context, to have a connection with the mastering of the subject matter and to prepare all things involved in the learning process, especially to make the appearance of the handout attractive; 2) to pay attention to the performance in teaching and motivate the

students by putting to them the questions that stimulate their thinking and manner to higher order thinking skills, and making an approach to the students by motivating them to participate more in learning. Through the revision mentioned, learning process quality in the 2nd cycle totally increased much better than in the 1st cycle. The student's participation in joining the lesson, in discussion, cooperation, answering the teacher's questions, and their activity of doing the task given, have already been given category of 'better'. This case is in accordance with (Wittek & Habib, 2013), was that the quality of learning can be achieved through the conversion of knowledge by teachers especially, group discussions and the use of media, which can improve the quality of learning.

There are some indicators that can be used in evaluating the learning quality in the classroom, among them are: whenever the teaching/learning process is supported by the teacher and the student and then a reflection is conducted, the student can control and review their teaching/learning progress, and a high quality of teaching/learning process can be reached. This can happen whenever the teacher performed his depth of comprehension regarding the subject matter presented, to design the teaching-learning activity the most effectively, to maximise the effectiveness of using time, and to cite the variety and the wide range of relevant learning resources. The teacher controls the student's comprehension systematically. According to (Coe, Aloisi, Higgins, & Major, 2014) the high quality of the teaching-learning process is performed by supplying an orderly activity adapted with the student's need, to plant the responsibility upon their own task, to maintain their high involvement, and to apply the variety approach, method, strategy and technique. (Alrashidi, Phan, & Ngu, 2016), added too that in the classroom, there are four major indicators of active learning, namely: group work, elaborated feedback, situated learning, and Information Communication technology (ICT). These had an impact on students' leaning and successful achievement. In addition, student engagement in learning also aims to improve the quality of learning. Engagement of students according to (Fredricks,



Blumenfeld, & Paris, 2004), needs three components, namely: behavioural engagement, emotional engagement, and cognitive engagement.

Conclusion

Based on the research results and analysis, it can be concluded that the application of the illustrated handout, combined with the concept map in the classroom action research, have an ability to increase the student's and teacher's activity, and learning outcomes. The increase of students activity is an amount of 18.53%, the teacher's activity is 13.43%, and learning outcomes is 7.88%. The percentage of student's learning completeness on the first cycle is an amount of 43.33%, whereas on the second cycle is the amount of 93.33%. This research result indicates that the implementation of the illustrated handout, combined with the map concept, has an ability to increase the learning quality in the class.

References

- Adodo, S. O. (2013). Effect of mind-mapping as a self-regulated learning strategy on students' achievement in basic science and technology. *Mediterranean Journal of Social Sciences*, 4(6), 163.
- Alrashidi, O., Phan, H. P., & Ngu, B. H. (2016). School of Education, University of New England, An Overview of Four Proposed Indicators of Active Learning to Improve English Teaching and Learning in Saudi Arabia. . . *International Journal of English Language Education*.
- Angkowo, R., & Kosasih, A. (2007). *Optimalisasi media pembelajaran*. Gramedia Widiasarana.
- Coe, R., Aloisi, C., Higgins, S., & Major, L. E. (2014). *What makes great teaching? Review of the underpinning research*.
- Darling-Hammond, L. (2006). Constructing 21st-century teacher education. *Journal of Teacher Education*, 57(3), 300–314.
- Demircioglu, G., Ayas, A., & Demircioglu, H. (2005). Conceptual change achieved through a new teaching program on acids and bases. *Chemistry Education Research and Practice*, 6(1), 36–51.
- Dick, B. (2006). Action research literature 2004-2006: Themes and trends. *Action Research*, 4(4), 439–458.
- Elliot, J. (1991). *Action research for educational change*. McGraw-Hill Education (UK).
- Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, 74(1), 59–109.
- Hampden-Thompson, G., & Bennett, J. (2013). Science teaching and learning activities and students' engagement in science. *International Journal of Science Education*, 35(8), 1325–1343.
- Hansen, H. F. (2009). Educational evaluation in Scandinavian countries: Converging or diverging practices? *Scandinavian Journal of Educational Research*, 53(1), 71–87.
- Hart, D. (1994). *Authentic Assessment: A Handbook for Educators. Assessment Bookshelf Series*. ERIC.
- Hendriana, H., & Afrilianto, M. (2017). Langkah Praktis Penelitian Tindakan Kelas Bagi Guru. *Bandung: Refika Aditama*.



- Hopkins, D. (2014). *A teacher's guide to classroom research*. McGraw-Hill Education (UK).
- Kemmis, S., McTaggart, R., & Nixon, R. (2013). *The action research planner: Doing critical participatory action research*. Springer Science & Business Media.
- Long, D. J., & Carlson, D. (2011). Mind the map: How thinking maps affect student achievement. *Networks: An Online Journal for Teacher Research*, 13(2), 262.
- Mikkonen, J., Heikkilä, A., Ruohoniemi, M., & Lindblom-Ylänne, S. (2009). "I Study Because I'm Interested": University Students' Explanations for Their Disciplinary Choices. *Scandinavian Journal of Educational Research*, 53(3), 229–244.
- Muhlisin, A., Susilo, H., Amin, M., & Rohman, F. (2018). The Effectiveness of RMS Learning Model in Improving Metacognitive Skills on Science Basic Concepts. *Journal of Turkish Science Education (TUSED)*, 15(4).
- Nerita, S. (2016). Pengembangan Handout Bergambar Disertai Peta Konsep Pada Materi Ekosistem Untuk Siswa Smp/mts. *Jurnal BioConcetta*, 2(2), 84–92.
- Schön, D. A. (1983). *The Reflective Practitioner: How Professionals Think in Action*. Arena. Ashgate Publishing Limited, Aldershot, UK.
- Wahyuni, S. (2012). Meningkatkan Hasil Belajar Matematika Siswa Menggunakan Handout Matematika Berbasis Kontekstual Pada Materi Bangun Ruang Sisi Datar. *Journal Pendidikan Matematika UNP*, 1(1).
- Wertsch, J. V, Daniels, H., Cole, M., & Wertsch, J. V. (2007). *The Cambridge Companion to Vygotsky*. Cambridge, New York.
- Winter, R., & Munn-Giddings, C. (2001). *A handbook for action research in health and social care*. Psychology Press.
- Wittek, L., & Habib, L. (2013). Quality Teaching and Learning as Practice within Different Disciplinary Discourses. *International Journal of Teaching and Learning in Higher Education*, 25(3), 275–287.



- Wulandari, S., Suarsini, E., & Ibrohim, I. (2016). Pemanfaatan Sumber Belajar Handout Bioteknologi Lingkungan Untuk Meningkatkan Pemahaman Konsep Mahasiswa S1 Universitas Negeri Malang. *Jurnal Pendidikan: Teori, Penelitian, Dan Pengembangan*, 1(5), 881–884.
- Zubaidah, S., Fuad, N. M., Mahanal, S., & Suarsini, E. (2017). Improving Creative Thinking Skills of Students through Differentiated Science Inquiry Integrated with Mind Map. *Journal of Turkish Science Education (TUSED)*, 14(4).