ICEE-2

The Impact of Thematic Learning using Index Card Match Instructional Model on Students' Conceptual Understanding

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Abstract. This study aims to investigate the effect of thematic learning using Index Card Match instructional model on students' conceptual understanding. The method used in this study is Classroom Action Research involving fifth grade students in one of public primary school in Subang. Results suggest that after the implementation of thematic learning using Index Card Match instructional model, students' conceptual understanding was improved. Additionally, data analysis imply that students' learning activities throughout the three cycle of thematic learning with Index Card Match was increased at each meeting.

Keywords: index card match, conceptual understanding, thematic learning, primary education

INTRODUCTION ~ According to Curriculum 2013, one of essential competence that students should have is conceptual understanding. The instructional process taken place in the classroom has an important role in helping students to acquire conceptual understanding. According to Widiawati et al., (2015) to help students acquire conceptual understanding, teacher should teach the materials using real context and link them to students' surrounding. This effort will promote students' critical thinking skills and scaffold students' conceptual understanding on the topics being learnt.

Conceptual understanding refers to students' ability in understanding meaning scientifically which includes its theory and its application in daily life (Dahar, 2003). Furthermore, Dahar emphasize that after having particular learning experience students should have conceptual understanding that will be useful in solving problems related to the concept they learnt. In Rustaman et al. (2005) Bloom defined conceptual understanding as students' ability to grasp meanings in order to be able to present provided materials into another form which is easier to understand, to make interpretation as well as to apply the concept. Similarly, Omari and Chen (2016) define conceptual understanding as ability to grasp ideas in a transferrable way that help them to take what they learnt in the class and apply it across domains. Therefore, conceptual understanding can be defined as students' ability to make meaning or understand a concept and able to apply the understanding to solve problems, not only within the lesson but also in their daily life.

Observation regarding students' conceptual understanding in one of public school in Cipendeuy Subang revealed unpleasant evidence. First, instructional process was still dominated by remembering facts that previously has been explained by the teacher. Second, students tend to acquire concept without

being able to develop the 'bigger idea' thus making them unable to identify and solve problems in their daily life correspondingly. Third, the instructions were often lack of first-hand experince thus making it difficult for the students to develop ideas, process skills and attitudes. Furthermore, such lesson did not promote observation and communication skills as well.

From the aforementioned problems, an effort to improve the quality of instructional process should be undertaken. Instruction with Index Card Match could be used as an alternative effort to make the learning more interesting and fruitful. According to Istarani (Annisa et al., 2019) index card match instructional model is about "searching for matching card" activity which is fun and usually be used to recall the materials that previously has been discused. Yet, this instructional model also can be implemented for new materials with particular conditions where previously students has been given task to learn the material to ensure that they have sufficient knowledge before engage in the card matching activities.

In addition, such instruction could help students to acquire conceptual understanding. Study done by Liu and Chen (2013) revealed that the use of card game significantly increased the primary student's scientific knowledge related to particular science concept such as energy and means of transport. More specifically, study done by Rahmawati (2015) and Khasanah (2015) shows promising findings where the use of index card match instructional model in primary level were found to be beneficial in improving students' achievement including conceptual understanding. It is possible because as Hamruni (2012) suggest, Index Card Match is a fun and interactive way to review learning. Similarly to Silberman (2004) stated that Index Card Match is one of instructional techniques which is included into reviewing strategy. Index Card Match type is related to ways of recalling what students have learnt and test their current knowledge and understanding by looking for the matching card while at the same time learning about particular concept or topic joyfully that related to conceptual understanding.

However, study investigating the use of index card match in thematic learning is still limited. Yet, thematic learning is strongly suggested to be implemented in primary level (Kemendikbud, 2017) as it is beneficial both for students and teacherRusman (2016) explained that thematic learning promote meaningful learning and could help students to comprehend materials deeper. It is possible because the theme help students to see the materials as a whole and provide a clear picture that the materials are actually linked to the real world.On the other hand, teacher could make use of the time effectively since related subjects could be thaught in one theme followed by achieving a number of competence demanded in each subject. Learning

experiences presenting conceptual connection among subjects, such as in thematic learning, make the instructional process more effective. Connection among particular concepts will then become scheme that further build up into idea as a whole. Moreover, it is essential to implement thematic learning in primary level since students are generally still see everything as a whole where their physical, mental, social and emotial development are inseparable from each other (Rusman, 2016).

Therefore, it is necessary to study the impact of thematic learning using index card match instructional model on students' conceptual understanding in primary level. This study will further investigate teacher's and students' activities along the lesson in each cycle as well as identify the impact of such lesson on students conceptual understanding as indicated by score improvement.

METHOD

The method used in this study is Classroom Action Research, due to the aim of this study which is to improve the quality of instruction in the classroom. In this method the action is done to solve problems found during lesson implementation. Arikunto (2006) elaborate that Classroom Action Research has particular characteristics as follow: (1) aims to revise and improve the quality of instruction, (2) is a reflective inquiry, and (3) implemented collaboratively. The classroom action research consists of four stages which includes planning, action, observation and reflection. The reflection is then followed by re-planning for the next cycle for improvement.

This study uses Kemmis & Mc Taggart model. This model is used to investigate students' conceptual understanding in Thematic lesson using Index Card Match instructional model. The research design used in this study is illustrated in Figure 3.1.

Planning stage includes designing lesson plan, preparing learning media and resources as well as constructing test items for conceptual understanding and observation sheets for teacher's and students' activities. All of these activities were implemented by considering the problems found from previous lesson

Action stage refers to the implementation of the lesson plan which is designed according to steps in Index Card Match instructional model. Next, on the observation stage, the whole instructional processes were observed and recorded for the use in reflection stage. During reflection, the lesson is evaluated and possible improvement for the next cycle is identified. The cycle is continuous until all students are able to achieve particular passing grade that has been determined in the first place.

SUBJECT

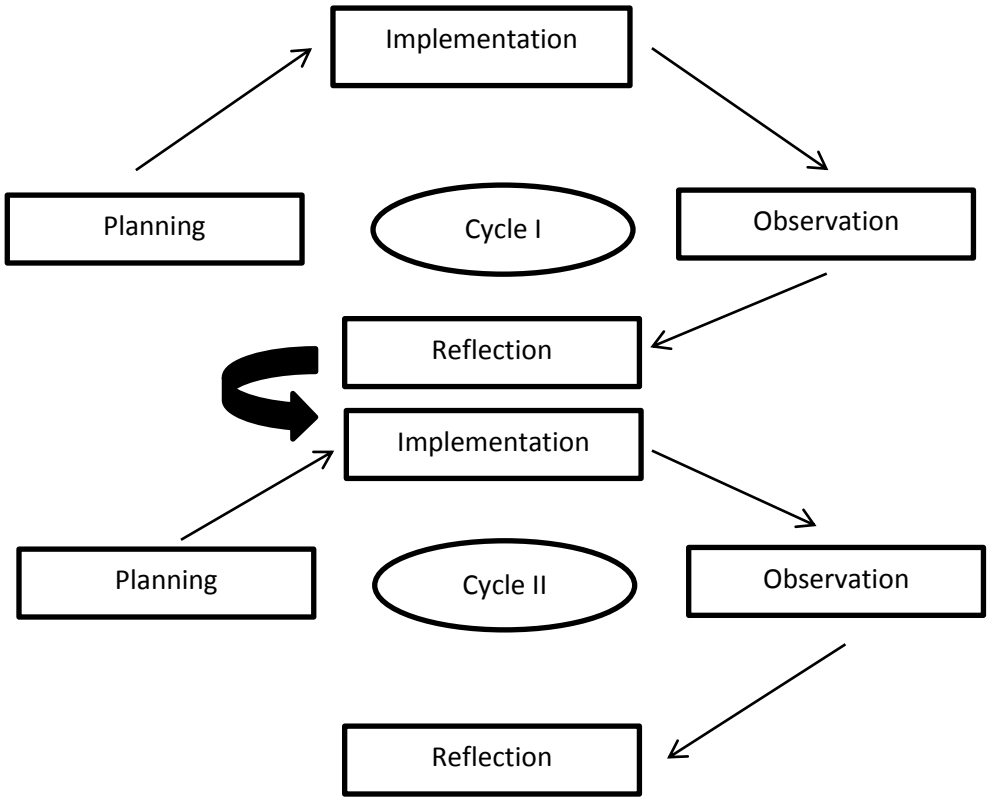
The study took place in one of public primary school in Cipendeuy Subang

involving 38 fifth grade students comprises of 20 females and 18 males.

CONTEXT

In this study the materials being learnt is subtheme 1 - Human and Environment which is included in theme 8 – Environment is Our Bestfriend for grade 5 according to national curriculum used in primary level (Kemendikbud, 2017). The first lesson includes science and Bahasa Indonesia subjects. The second lesson includes SBdP, science and Bahasa Indonesia subjects. The third lesson include SBdP, science and Bahasa Indonesia subjects.

Figure 1 Kemmis & Mc Taggart Model



The instructional approach which is used in this study is scientific approach. This is due to the characteristics of basic competence in each subject included in Environment is Our Bestfriend theme is related to helping students to be aware of and understand the materials by using scientific approach.

The conceptual understanding being investigated refers to cognitive processes according to Anderson dan Karthwohl (2017) which includes interpret, exemplify, conclude, compare and explain. Test item used for pre and post-test has already tested for validity, reliability, differentiating power and difficulty level.For each cognitive process of conceptual understanding, the students were given 3 multiple choice question and 1 structured questions. The score for correct answer on multiple choice question is 1 point, while

the maximum score for correct answer on structured question is 4 points.

On the other hand, teacher's and students' activities were observed and rated by using rating scale ranging from 1 to 4 points. The observation sheet for teacher's activities can be seen on Table 1. Meanwhile the observation sheet for students' activities can be seen on Table 2.

Tabel 1. Indicator of teacher's activities

No.	Indicator of teacher's activities	SCORE			
		1	2	3	4
1.	Teacher manage the students in the classroom				
2.	Teacher give motivation, aperception and learning orientation				
3.	Teacher inform lesson objectives				
4.	Teacher give reading task to students. The text is different in each cycle				
5.	Teacher ask students to sort out the phenomena identified on the text that they have read				
6.	Teacher give explanation about the materials being discussed				
7.	Teacher ask students to write down function of water for human, animals and plants				
8.	Teacher motivate students to ask and answer questions actively				
9.	Teacher do preparation for Index Card Match				
10.	Teacher distribute cards containing questions and answers to students				
11.	Teacher explain how to play the Index Card Match games prior to the cards playing activities				
12.	Teacher guide students during the card playing activities especially during the students are looking for the matching cards				
13.	Teacher give clue as needed to students who have not found the matching card				
14.	Teacher give opportunity for the students to present the matching cards				
15.	Teacher give clarification for particular concept when necessary				
16.	Teacher guide students to review and conclude the lesson				
17.	Teacher give opportunity for the students to do whole class discussion about concept which is still confusing				
18.	Teacher close the lesson by concluding the lesson				

Tabel 2 Indicator of students' activities

No.	Indicator of Students' Learning Activities	SCORE			
		1	2	3	4
1.	Students are motivated to engage in the lesson				
2.	Students understand the materials or concept learnt in thematic instruction (as indicated in discussion session)				
3.	Students understand the terms or procedure of cards playing activities using index card match				

	instructional model
4.	Students obtain the cards containing question and answers
5.	Students demonstrate good attitude while looking for the matching cards
6.	Students able to find the matching cards
7.	Students respond to questions from others
8.	Students give participation in concluding the lesson

RESULTS

This study was done for three meetings with time allocation as much as 70 minutes for each meeting. The first meeting refers to pre-cycle while the second and the third meet things refer to cycle I and cycle II of thematic learning with Index Card Match instructional model.

MEETING 1: PRE-CYCLE

The pre-cycle was done to understand what was actually happening in the classroom as well as identify to what extend students' able to understand the concept. To obtained this data, pretest was administered for 35 minutes. The results show that only 13% students are able to achieve minimum passing score while the rest (87%) were still below the minimum passing score. Overall, class average score is 45,02 which is smaller than 70 as the minimum passing score. This finding imply that students conceptual understanding are generally low. Thus, it is necessary to improve the instruction, such as by performing classroom action research using Index Card Match instructional model.

CYCLE 1

In cycle I teacher plan the lesson by developing a lesson plan and preparing learning media in form of cards containing questions and answers. The cards were in various shape and colors make the lesson more interesting for the students. planning stage was done collaboratively among researcher and class teacher.

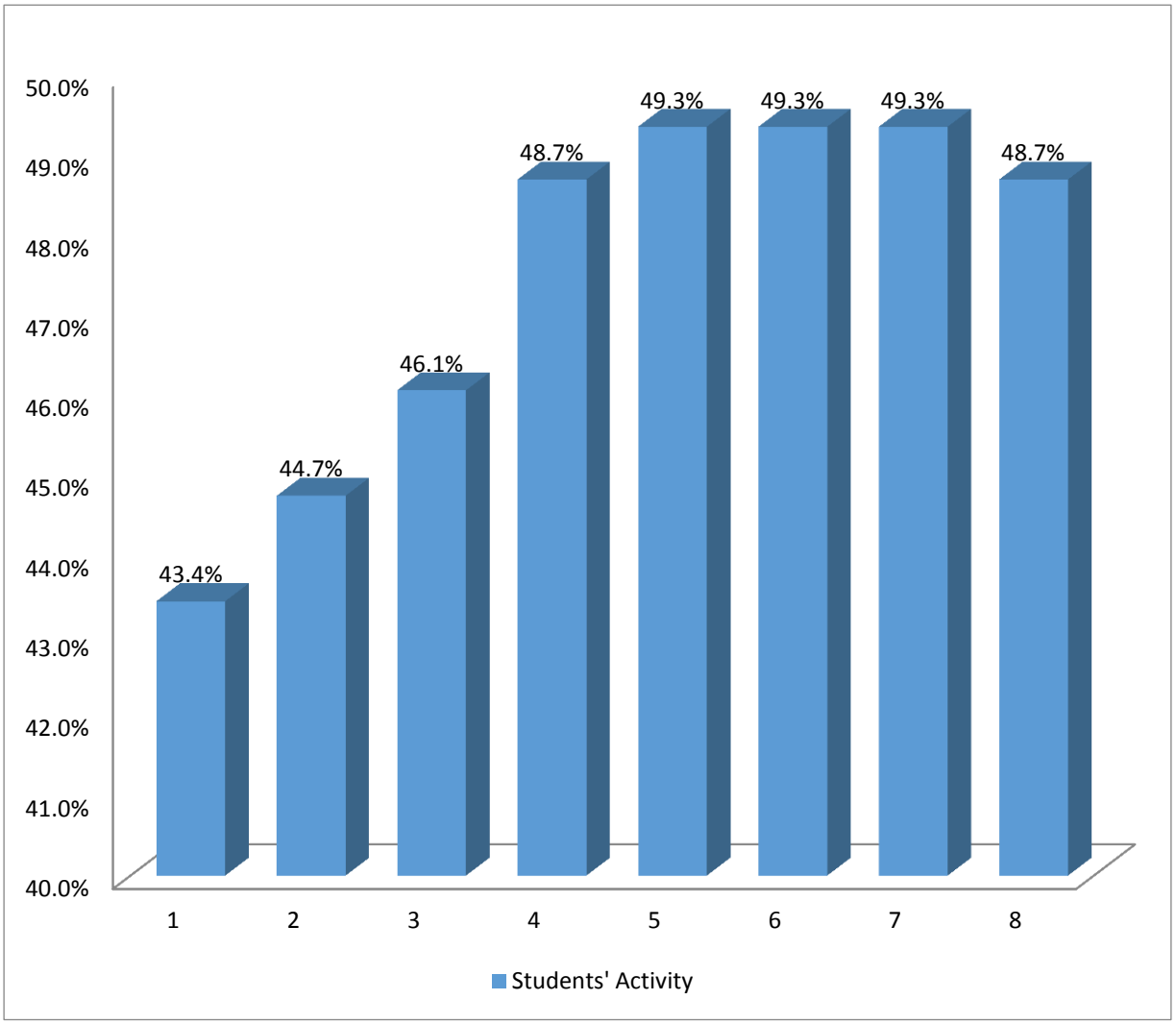
Before engage in cards playing activity, students were given time to read text related to function of water for living things. The reading activity was followed by discussion session to ensure that students are able to understand the text well. Once the discussion ended, students were provided time to play with the cards according to stages of Index Card Match instructional model. In the end of the playing card session, teacher give confirmation and clarification if needed. In addition, a whole class discussion was done to reflect on what has been learnt during card playing activities.

In the end of the lesson, a post test using 15 multiple choice questions and 5 structured questions administered. The test results can be seen on Table 3.

Tabel 3. Students' Conceptual Understanding in Cycle I

No	Conceptual Understanding Indicator	Average	Percentage
1	Explain	4.97	71%
2	Exemplify	4.05	58%
3	Conclude	3.76	54%
4	Compare	3.63	52%
5	Interpret	2.60	37%

Figure 2 Students' activity in Cycle I



The posttest results show that explaining was the highest while interpreting was the lowest. Yet, the overall results imply that in general students' were still having difficulties in performing particular cognitive processes of conceptual understanding. It is due to students' activities which is still in sufficient category with the percentage average is 47.45%. The recapitulation of students' activities in Cycle I can be seen on Figure 2.On the other hand, the observation results also indicate that teacher's still need to improve her performance in implementing the lesson. It is indicated by percentage of teacher's performance as much as 62,5%.

When students' performance is compared to the minimum passing score it is found that only 10 students (13%) are able to reach the minimum passing score while the rest of the students (28) were still below 70 eventhough the class average score for conceptual understanding was increased (53.60) as compared to class average score on pretest (45.02) administered on pre-cycle.

The results were not surprising since reflection session revealed several important findings as follow: (1) students were confused with playing card activities, less interested into the lesson and pay less attention to the teacher, (2) students were lack of confidence to express ideas and pose questions.

These evidence indicate that teacher should design and implement the lesson in such a way so that the studentscan be more engaged in the lessonand eventually acquire better conceptual understanding. Therefore, it is necessary to implement another cycle of classroom action research to improve the lesson.

Cycle II

In Cycle II the teacher plans the lesson based on reflection on previous cycle. The improvement from Cycle I includes improving class management, give extra guidance prior to and during card playing activity, give more encouragement and opportunities for students to express ideas and pose questions, as well as being more firm to students to ensure that they pay attention to teacher's instruction. In addition, teacher designed more interesting card by adding pictures and make the card in star shape. Moreover, the question inside the card is made clearer and structured to avoid ambiguity.

Similar to Cycle 1 students were given a reading task about water cycle and its effect on living things before they engaged in card playing activity. The reading task is followed by question and answer session and whole class discussion. Students shows active participation during the discussion.

Once the discussion ended, teacher explained how to play the card in details to ensure that students did not confused when they start playing.

The procedure of card playing activities were the same as in the previous cycle. However, in cycle II teacher give confirmation and clarification everytime each pair of students read aloud the question and answers of the matching card. This is done to help students understand each material well.

After finish with the matching cards, teacher give reinforcement on several concepts as needed. Students were then given time to re-read the text about water cycle followed by discussion about another example of water cycle. Teacher guide the students to write down their ideas on mind map and give opportunity to students to pose question regarding things that is still confusing for them.

In the end of the lesson, a post test comprises of 15 multiple choice questions and 5 structured questions was administered.

According to students' postest score it is found that students' conceptual understanding in Cycle II increased as compared to Cycle I. The recapitulation of students' conceptual understanding in Cycle II can be seen on Table 2.As compared to minimum passing score, it is found that in Cycle II there were 28 (74%) students obtained score higher than 70 while there were only 10 students (26%) obtained score lower than 70. Similarly, class average score increased into 71.15 which is higher than previous cycle. These evidences suggest the improvement of students' conceptual understanding in Cycle II.

This improvement is possible because the lesson implementation is way better than the previous cycle as indicated by teacher's activities. According to observation results it is found that teacher's activities in cycle II improved into 78% which is higher than teacher's activities in cycle I.

Furthermore, reflection session revealed several things that still need to be improved especially regarding class management and encouragement for students to be more active and persistence along the lesson so that eventually their conceptual understanding can be improved.

Table 4. Students' Conceptual Understanding in Cycle II

No	Conceptual Understanding Indicator	Average	Percentage
1	Explain	6.57	94%
2	Exemplify	5.47	78%
3	Conclude	4.68	67%
4	Compare	4,50	64%
5	Interpret	4.21	60%

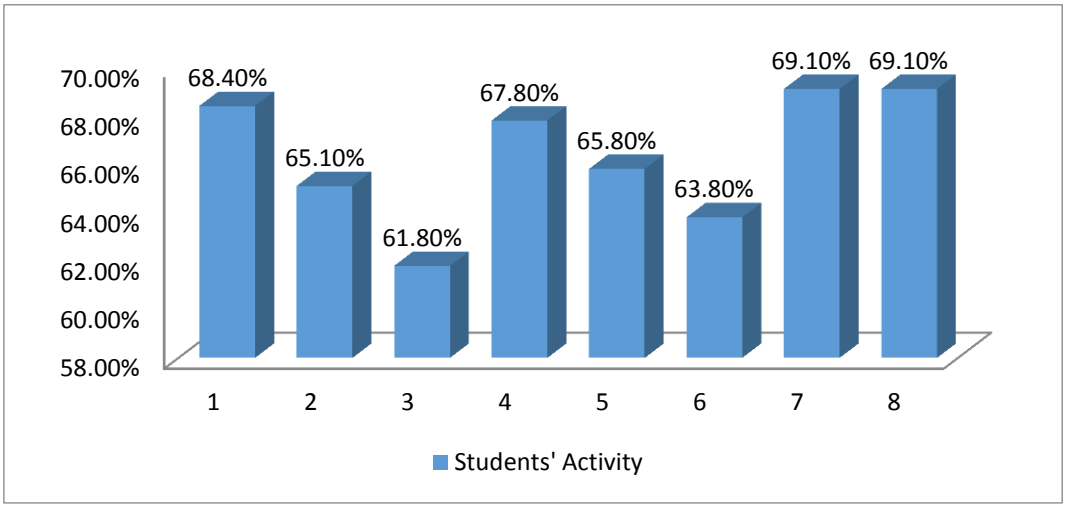


Figure 3. Students' activity in Cycle

Cycle III

In this cycle, teacher plan the lesson by considering findings from reflection in cycle II. In addition, teacher designed the cards in another interesting shape and added interesting pictures on each question cards.

Similar to previous cycle, before students engage in card playing activities, they were given reading task followed by discussion session. Next, as the playing cards activities ended, teacher lead whole class discussion and give reinforcement to ensure that students understand the materials well. The lesson was then ended by administering posttest consisting 15 multiple choice questions and 5 structured questions.

Results obtained from posttest shows that students conceptual understanding in Cycle III is better than in previous cycles. The recapitulation of students' conceptual understanding can be seen in Table 5. Furthermore, the number of students who are able to reach minimum passing score increased into 95% with the class average score as much as 88.60.

Teacher's and students' activities along the lesson in cycle III give significant contribution to the improvement of students' conceptual understanding. Observation results indicate that both teachers' and students' activities in cycle III is much better than the previous lesson. Teacher's activities improved into 90% while the average of students' activities was improved into 83.72%.

Table 5. Students' Conceptual Understanding in Cycle III

No	Conceptual Understanding Indicator	Average	Percentage
1	Explain	6.63	95%
2	Exemplify	5.94	85%
3	Conclude	5,78	83%
4	Compare	5,13	73%
5	Interpret	4.87	70%

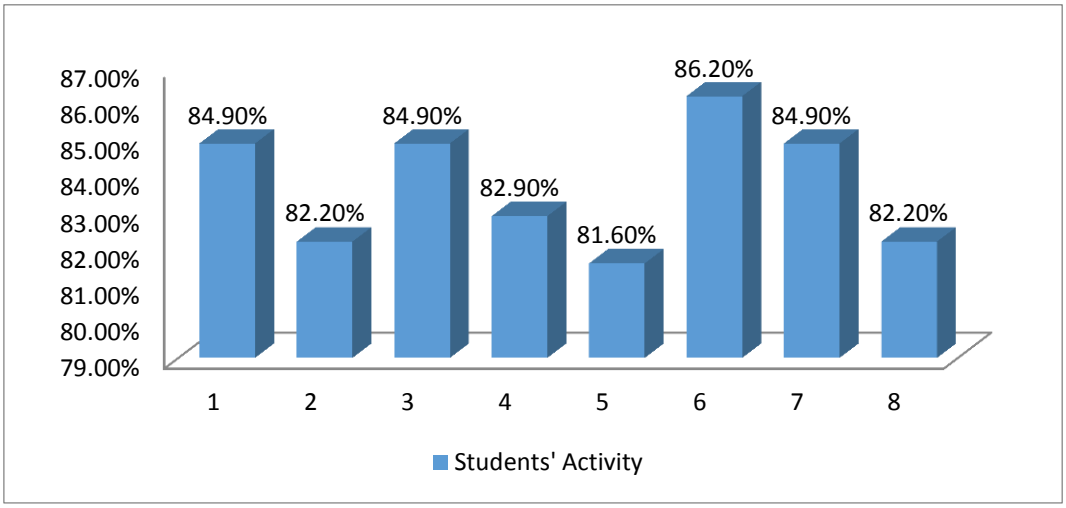


Figure 4. Students' activity in Cycle III

cycle I, II and III can be seen on Figure 5. While the number of students passing the minimum score along the three cycles can be seen on Figure 6. As illustrated by figure 7, it can be seen clearly that teacher's and students' activities improved from one cycle to the next. These improvements eventually followed by students' conceptual understanding which is also increasing in each cycle.

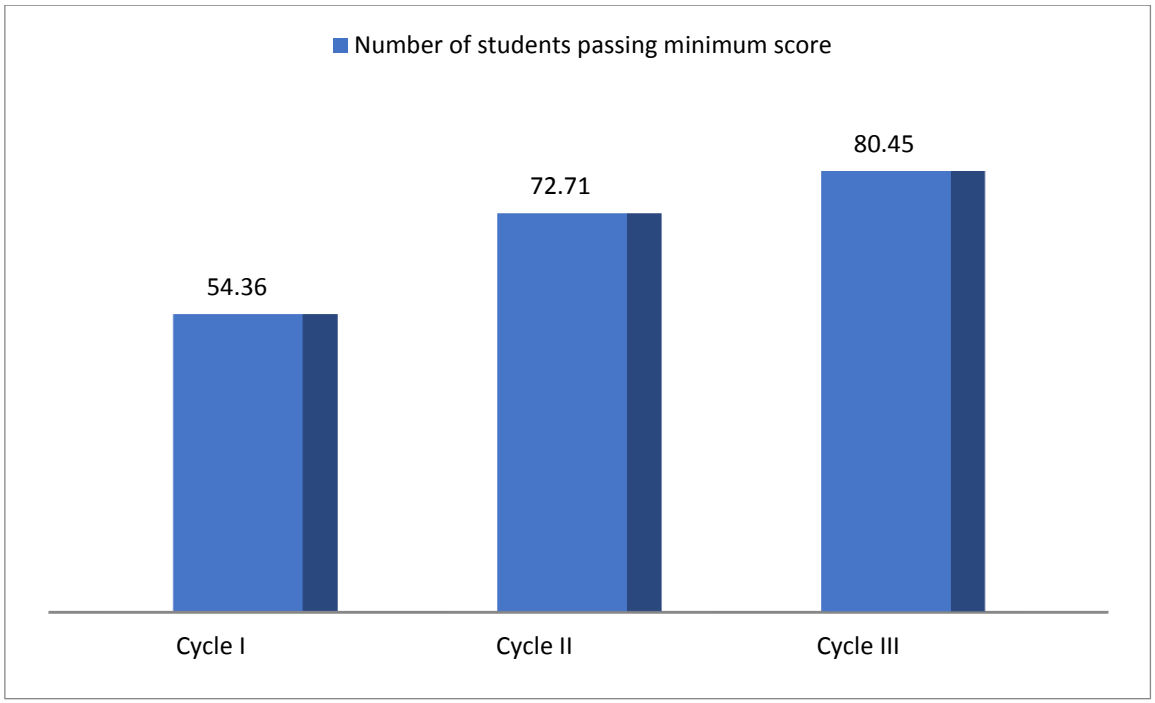


Figure 5. Number of students passing minimum score

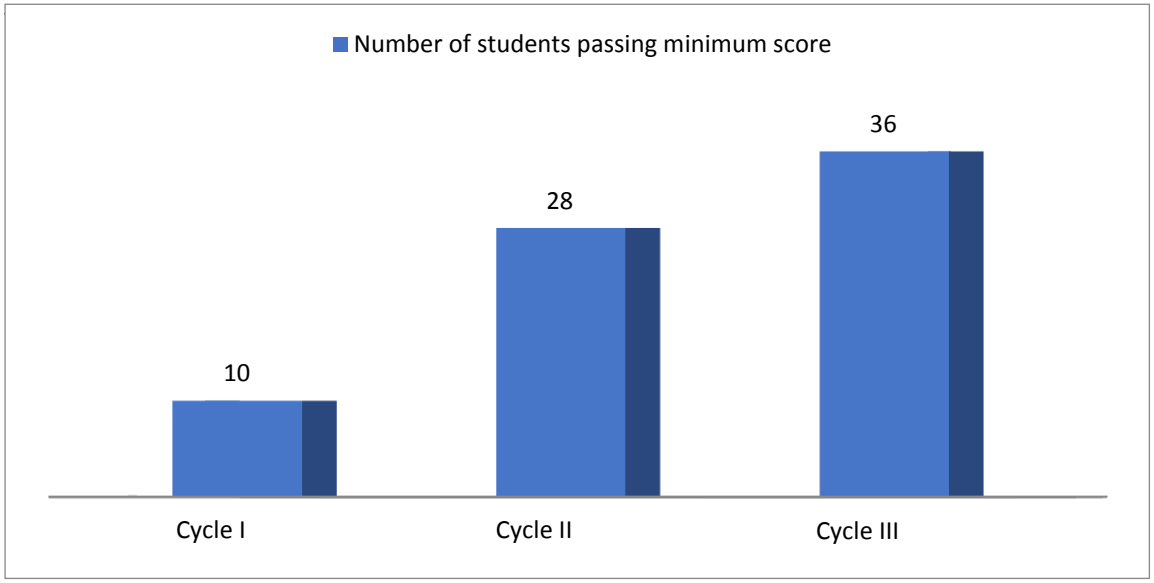


Figure 6 Class average of conceptual understanding

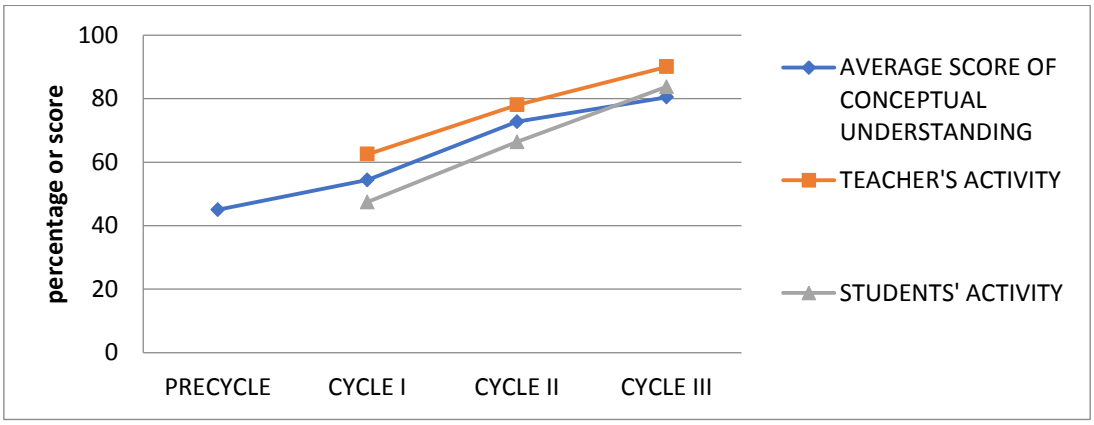


Figure 7. Improvement of instructions and students' conceptual understanding

The overall findings elaborated above suggest that the Index Card Match instructional model can be well implemented in grade 5 primary level. Through such instructions, students are able to acquire conceptual understanding of particular materials and demonstrate active participation in the lesson. This finding is in line with Harumni (2012) who stated that index card match instructional model is a fun way to review the learning materials. Silberman (2004) explained that index card match instructional model is a reviewing strategy that promote active learning. Therefore, Index card match instructional model is interesting for the students thus motivate them to review the materials actively. Students' active participation observed during the lesson is eventually contribute to better achievement, in this case the conceptual understanding. Study done by Bima (2017) shows similar findings where it is found that Index card match can improve students' conceptual understanding and can be used as an alternative teaching strategy

that can be applied on materials that tend to be boring for students.

CONCLUSION

According to evidence found in this study it can be concluded that teacher's activities increased along the three cycle. Similar trends also applied for students' activities. Students demonstrate active participation especially during card playing activities that contribute to better performance in conceptual understanding.

The low percentage of students who were able to reach the minimum passing score in pre-cycle indicate that there should be a treatment done to improve students' achievement, that is by implementing index card match instructional model. As the thematic learning using index card match instructional model implemented, students' shows improvement in conceptual understanding from one cycle to another. Therefore, it can be concluded that the implementation of thematic learning using index card model instructional model gives positive impact on students' conceptual understanding as indicated by improvement of conceptual understanding in each cycle.

Results from this study give continued suport for efforts to implement index card match instructional model in grade 5 primary since it can improve teacher's and students' activities that facilitates the improvement of students' conceptual understanding. Further study could investigate the impact of Index Card Match instructional model on other cognitive processes or skills, such as critical thinking skills or communication skills.

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