the Effect of Jumping Test and Collaborative

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WORD COUNT 4565
TIME SUBMITTED 02-MAR-2020 08:33AM
PAPER ID 56045883

The Effect of Jumping Task and Collaborative Activity on Enhancement of Student Critical Thinking Ability

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PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON EDUCATIONAL SCIENCES AND TEACHER PROFESSION (ICETEP 2018)
Edited by: Abdullah, AG; Firdaus, ML; Widiaty, I; Arsyad, S; Nandiyanto, ABD; Danuwijaya, AA; Abdullah, CU
Book Series: Advances in Social Science Education and Humanities Research
Volume: 295 **Pages:** 295-301
Published: 2018
Document Type: Proceedings Paper

Conference

Conference: 1st International Conference on Educational Sciences and Teacher Profession (ICETeP)
Location: Univ Bengkulu, Bengkulu, INDONESIA
Date: OCT 26-28, 2018
Sponsor(s): Univ Bengkulu, Fac Educ & Teacher Training

Abstract

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Keywords

Author Keywords: jumping task; collaborative activity; critical thinking abillity

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Publisher

ATLANTIS PRESS, 29 AVENUE LAVMIERE, PARIS, 75019, FRANCE

Categories / Classification

Research Areas: Education & Educational Research
Web of Science Categories: Education & Educational Research

ATLANTIS PRESS

Advances in Social Science, Education and Humanities Research, volume 295

1st International Conference on Educational Sciences and Teacher Profession (ICETeP 2018)

The Effect of Jumping Task and Collaborative Activity on Enhancement of Student Critical Thinking Ability

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***Abstract*—The development of critical thinking ability needs attention in learning. To achieve this goal, collaborative activities must create in learning. The teacher can giving students a jumping task as a stimulated to collaborative activities. This study aims to examine in depth the results of learning observations for subjects in Social Sciences, Natural Sciences, and English in two partner schools of the Teacher Training and Education Faculty - University of Lampung, Indonesia. The study was conduct on 33 Senior high school students and 62 junior high school students from 2 partner schools. The focus of the research is observing collaborative activities, and improving students' critical thinking ability. Data analysis was carried out descriptively to an overview of the jumping tasks provided by educators, collaborative activities that occur to be able to create a learning community, and increase of students' critical thinking skills. The results of the study show that giving jumping tasks in learning activities (Social Sciences, Natural Sciences, and English) enables collaborative activities in the learning community to trigger students' critical thinking ability in solving problem.**

Keywords—jumping task; collaborative activity; critical thinking abillity

I. INTRODUCTION

Implementation of learning requires educators to understand the learning material, as well as insights related to the material. Besides that, educators must also be able to act as facilitators for the learning of their students. Educators must be able to develop positive attitudes of their students and be able to respond to their ideas. Educators must also be able to apply innovation in education, especially innovation learning in the classroom to improve the quality of learning. Improving the quality of learning are usually done with teacher-training activities in the form of equalizing teacher abilities, education and training, upgrading, seminars, workshops, or other similar activities. However, in reality most teachers have not been able to apply the results of their training in class. This professional development designed to deepen the teacher's knowledge of content and support the teacher's content needs during the implementation of learning. However, these efforts sometimes fail because there are often more pressing problems such as management of learning materials or pedagogy. Daring et al state that relatively few teachers in schools are involved in intensive professional collaboration in curriculum planning [1]. Therefore, it is not surprising that international attention (including Indonesia) has now shifted to the practice of professional development, which seems more successful, such as Lesson Study whose concept first appeared in Japan. Lesson Study provides an opportunity for educators to see the learning process in class in real terms. Educators focus their discussions on planning, implementing, observing, and reflecting on classroom practice. By looking at the actual practice in the classroom, educators can develop a general understanding of good learning practices; this in turn helps students understand what they are learning. Lesson Study also provides an opportunity for educators to be careful in examining learning activities and the process of understanding by students, by observing and discussing actual classroom practices. In addition, it is important to realize that they are taking part in Lesson Study "educators not teaching but learning". This is a basic philosophy in the learning community. In learning, every student must have the opportunity to learn so that from that philosophy can create joyful and meaningful learning for each student. Thus, everyone who should be involved in lesson study should learn something from the activity. In this way can be create a quality learning community. One of the activities in lesson study is open class or open lesson. Open lesson is an activity where a teacher teaches and observed by many observers. In an open class, focus of observation is student learning. Observers make detailed notes on student solution strategies. Sometimes observers choose to focus only on one or two students during the lesson or on a group of students Observers do not interact with or assist students during the lesson, because the aim is to observe the implementation of the lesson. Doig, and Groves, stated that under Japanese lesson study, teachers focus together on meeting and planning together lessons [2]. This lesson has a focus on developing skills or understanding, which is taught by one teacher, and observed by not only all teachers involved in planning learning, also by observers from other schools and possibly even from all over Japan for example in Lewis and Tsuchida [3].

Next there is a question and answer session that discusses lessons that have taken place, observers suggest learning modifications. One of the programs initiated by *Dirjen Belmawa - Kemristekdikti* is the *Penugasan Dosen ke Sekolah (PDS)* Program. The program focused on assignment of lecturers to school on collaborating with teachers to find the reality of learning in the class and character of students. One part of the PDS program is open lesson. This activity is a tangible form of efforts to create learning communities. In learning community, educators learn from each other. With this collegial culture, the atmosphere of the teacher will help each other, there are no teachers who are 'great' themselves and there are no 'left behind' teachers themselves. The same thing happens among students.

To be able to instill such an attitude in students, the design of assignment given to students is crucial. The task is a series of activities provided by the teacher to his students in order to achieve the learning objectives. Watson and Mason, state that the task "in the full sense includes the activities produced by the participants who initiate the task" [4]. Furthermore, Doig et al. noted that the task is a stimulus activity for learning [5]. That is, one can use assignments and problems alternately, if their common goal is to stimulate learning. In the field of mathematics, Mason, and Johnston-Wilder argue that the purpose of the mathematical task is to start mathematically fruitful activities" [6]. Furthermore, Breen and O'Shea, report that Mason and Johnston-Wilder also suggest, "The task must be involve a variety of possibilities and offer students the opportunity to discuss ideas" [7]. Some experts state that the task is what must be done by participants [8,9]. In completing the task, students perform activities. This activity is a series of motives that arise because of the interaction between students, teachers, the environment, etc. due to the task given. In this study, the task include of repetitive exercises, solving single-stage and multi-stage problems, considering several possibilities, trying and investigating a problem and so on. Therefore, the task is everything can make the students demonstrate the task to bring interactive activities between them. Task is a tool to mediate between teaching and teaching a lesson topic. The main issue is how assignments are given and how tasks are used pedagogically in class. This means how educators design tasks so that students can learn through the assignments given. In Brousseau's theory - Theory of Didactic Situations [10]; a simple task is taken from a general task. The new task as a series of tasks given by educators requires prior experience that helps students in completing the next task. Therefore, the task given to students must start from a simple task to a complex task. According to Savery and Duffy, there are five strategies in manipulating problems, reflecting different assumptions about what is learned or how learning occurs [11]. The strategies are (1) problem as a guide: a problem is raised with the aim to focus the attention of students; (2) problems as an example: problems used as part of learning material; (3) the problem as an integrator or test: the problem is presented after reading, so students can apply their knowledge, which is obtained from reading. This will help the process of transfer from learning to application; (4) problem as a vehicle of process: problem is a tool to focus students in critical thinking; the problem becomes a vehicle to practice thinking skills; (5) problems as a stimulus for authentic activities: the problems focused on developing problem solving skills.

In Lesson Study, there are two kinds of tasks to bring about collaborative activities. The task consists of two levels: level sharing and level jumping. The first type of assignment is a task that can completed by students independently without the help of others. These tasks can be manipulated through the 2nd and 3rd strategies according to Savery and Duffy above. While the jumping task can be developed through the 4th and 5th strategies according to Savery and Duffy [11]. As a result, jumping tasks training thinking skills and demanding the development of problem solving skills. This makes possible collaborative activities, because the students need other people to ask questions when having trouble. Collaborative activity that occurs in learning is the result of students who have not mastered a topic of learning to be eager to ask questions, and students who have mastered the subject matter become more understanding. This can happen because students are involved in helping and working together. Furthermore, the open lesson activities carried out continuously will provide opportunities for the creation of a learning community for both teachers, students, and for anyone who follows the activity. This study discusses the open lesson activities carried out by three lecturers in the PDS program, namely lecturers of Social Sciences, Natural Science, and English at two partner schools of Faculty of Teacher Training and Education- University of Lampung, Indonesia. The problems observed in each of the open lesson activities are: (1) jumping tasks that given by the teacher, (2) collaborative activities that occur during learning, and (3) improving of students' critical thinking ability during learning activities.w.

II. METHOD

This research took place in two partner schools in Bandar Lampung city, which will be referred to as D schools and Y schools. These schools participated in the PDS program (Assignment of Lecturers in Schools) funded by the Ministry of Research and Technology of the Republic of Indonesia, in collaboration with the University of Lampung located in Bandar Lampung. The objectives of this activity are (1) the University of Lampung as a study center and a network of partner schools to help lecturers to produce quality learning tools, get best practices from the learning activities carried out by lecturers, (2) conduct learning research.

There are several classes in each partner school, but this learning research focuses on two studies in D school, which is Natural science learning, and English learning; and one study in Y school, that is social sciences learning. In each of these schools, the study was carried out only for one learning cycle. Researchers observe each lesson meeting and make field notes, record learning and then transcribe and analyze the jumping tasks provided by educators, collaborative activities that occur, and increase students' critical thinking ability. The science class consists of 32 students, English class consist of 33 students, and an IPS class consisting of 30 students.

The method used in this study is direct observation on open lesson activities in each partner school. Stages of observation were carried out starting from the planning of learning,

implementing learning, and reflection activities after learning. Open lesson is carried out in the period between August and mid October 2018. Observations are carried out by conducting video observations and field notes and reflection journals. Video footage is intended to obtain a complete picture of the implementation of learning that is likely not recorded in the field notes. Reflection journals are used as additional notes from observations during learning reflection activities. The results of video recordings, field notes, and reflection journals were then observed and analyzed for later descriptive discussion.

III. Result and Discussion

The following is the result of observations of open lessons carried out in school's D and Y. The description contains three parts, namely jumping tasks, collaborative activity, and learning communities.

A. Observation at School D for Natural Science Subject

Figure 1 shows sharing and jumping tasks, in natural science lessons at school D.

Tabel 1. Tabel Pengamatan Hubungan Gaya dan Usaha

No	Jenis Benda	Gaya *(Applied Force)*	Perpindahan *(Position)*	Usaha *(Wsum)*	Catatan
1	File Kabinet	100 N			*Pada saat gaya berapa benda terdiam sesaat baru bergerak?*
2		250 N			
3		275 N			
4		300 N			
5		325 N			
6		350 N			
7		375 N			

1. *Berdasarkan Tabel 1, jika gaya di simbolkan F (Newton) dan Usaha di simbolkan W (Joule), lukislah grafik gaya terhadap usaha*
2. *Berdasarkan grafik pada soal nomor 1, bagaimana hubungan gaya dan usaha?*
3. *Berdasarkan Tabel 1, kapan usaha bernilai nol? Jelaskan!*
4. *Berdasarkan catatan Tabel 1, menurut mu mengapa benda terdiam sesaat sebelum bergerak?*

Fig. 1. Sharing and jumping task.

This task is divided into two questions: (a) question 1 (Based on Table 1, if the Force is symbolized as F (Newton) and Work is symbolized as W (Joule), then draw a graph of Force against the Work in the column provided) and question 2 (2. Based on the graph on problem number 1, how is the relationship between Force and Work?) are level sharing task. This is the task of understanding, meaning that if students are able to complete it as same as they are able to apply the knowledge gained. Observations on student activities show that students in general can solve this problem without a hitch. In Figure 2 seen that many students in the group were observed diligently working on their own tasks and when the teacher asked them to answer, many students showed their hands as a sign they wanted to answer the question.

Fig. 2. Students are able to answer level sharing task.

For question number 3 (Based on Table 1, when is the work is zero? Explain!) And question number 4 (Based on Table 1, why does the object stop, just before moving?) are jumping task. Because to answer questions 3 and 4 students are required to give reasons for the answers. To answer this type of task, students need a discussion with a group of friends. When answering questions number 3 and 4, collaborative activities conducted by students are more numerous (figure 3). The students generally have difficulty on this task, and then try to finish on task independently first, but in general students in groups class cannot complete their own tasks. Therefore, it was not so long that they immediately discussed. A number of groups, it turned out when they had difficulty, then discussed with each other. At first time, they were trying to work independently (figure 4A), but there were one or two students in the group who started asking friends to discuss (figure 4B). When they had not found the answer, then they began searching for various sources of information such as books and the internet (figure 4C). Collaborative activity increases when all group members begin to engage in discussion.

Fig. 3. Discussion activity on jumping tasks.

Their conversations during the discussion showed an increase in their critical thinking. This happens because they think carefully about the problems at hand, look for various relevant sources, try to apply concepts to the problems they face. This is according to opinions of Facione, which states that critical thinking requires the individual to question, make a conclusion not only to observe the conditions as shown [12-14]. Someone as critical thinkers, usually have a high interest towards something, eager to rethink, customized to a complex problem, behave carefully for information, rational in selecting the criteria, and persistent in achieving results. With this discussion finally these students can complete their assignments.

Fig. 4. Collaborative activity.

Overall, observations show that learning flow is very visible, where students who are initially tense, stiff, and show confused expressions, then smile and laugh after learning ends. In the learning process, most students are very enthusiastic in participating in activities. Broadly speaking, collaboration is seen when student's complete assignments in groups. All students succeed in solving the questions given by the teacher who are at the sharing level, and at the level of jumping they can solve it by working together in the group.

B. Observation at School D for English Subjects

Figure 5 shows the design lessons made by the teacher in English language lessons at school D. In the observed learning, the teacher facilitates students with activities to understand the concept of "caption". From the lesson design, there are two types of tasks given by the teacher.

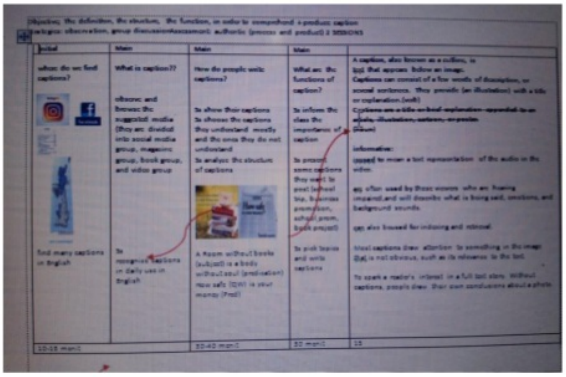


Fig. 5. Lesson design.

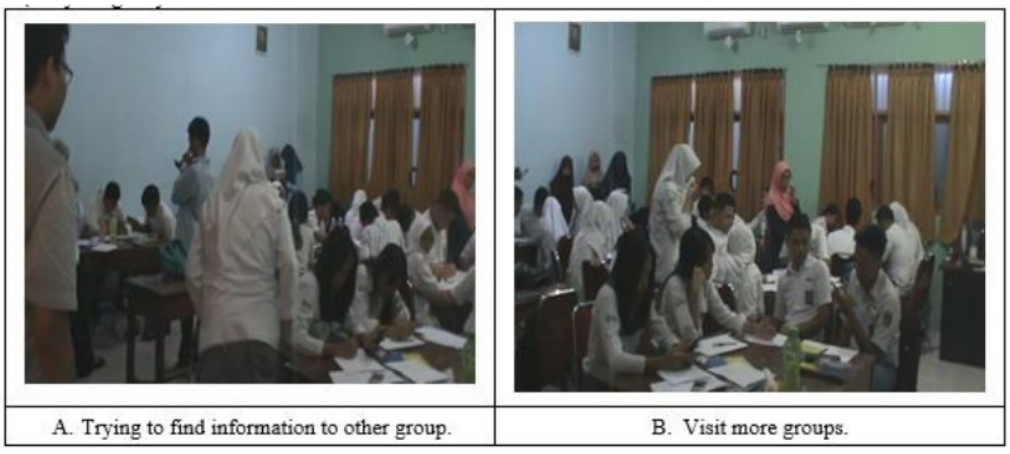
There are four questions related to the "caption" material, namely: 1. where do we find captions?(Find many captions in English); 2. What is the caption? (Observe and browse the suggested media (they are divided into social media groups, magazine groups, book groups, and video groups, recognize captions in daily use in English); 3. How do people write captions? (Show their captions choose the captions they understand mostly and the ones they do not understand, analyze the structure of captions); what are the functions of caption? (Inform the class of caption, present some captions they want to post (school trip, business promotion, book project, pick topics and write captions).

Fig. 6. Independent activity to find information.

Questions 1 and 2 are sharing tasks, because it can be directly answered by students based on their experience. The results of observations on student activities show that in general students can solve this problem without a hitch. From figure 6 it can be seen that each student tries to find information through their smart phone. After they get information, they diligently work on their own tasks and when the teacher asks them to answer, they can answer correctly. Questions 3 and 4 are jumping task, because to answer this questions students are required to give reasons for the answers. Collaborative activity triggered by questions 3 and 4 turned out to be more. In general students have difficulty working on this task. In the group that we observed, it was seen that students initially tried to work independently, but there were students who tried to discuss with friends a group, as shown in figure 7.

Fig. 7. Group discussion.

Further collaborative activities can occur, as in the group we observe. When group discussions did not get results, there were students in the group who took the initiative to seek information from other groups. As shown in Figure 8A and the Figure 8 B. After obtaining information, then return to the group to discuss it with a group. When they were still not finished, they also returned to the other group, until they are sure of their answers.



A. Trying to find information to other group. B. Visit more groups.

Fig. 8. Getting informations.

C. Observation in School Y for Social Studies Subjects

The questions proposed by the teacher are: 1. Look for the potential of each region in the Asean country (natural potential, human resource potential, and cultural potential), 2. Look for cooperation between countries in relation to this potential, 3. Any potential that has not been developed in cooperation? Question 1 is sharing task. The results of observations on student activities show that in general students can solve this problem without a hitch. This can be seen from Figure 9A. The picture shows that each student tries to find information through the book they have. Question 2 and Question 3 are jumping tasks. Because to answer questions 2 and 3 students are required to be able to give reasons for their answers, find relevant data and information from various sources, need to discuss with friends a group of related information. Collaborative activity triggered by questions 2 and 3 turns out to be more. In the group we observed, students were seen initially trying to work independently, but because of difficulties, they discussed with friends a group, as shown in figure 9B.

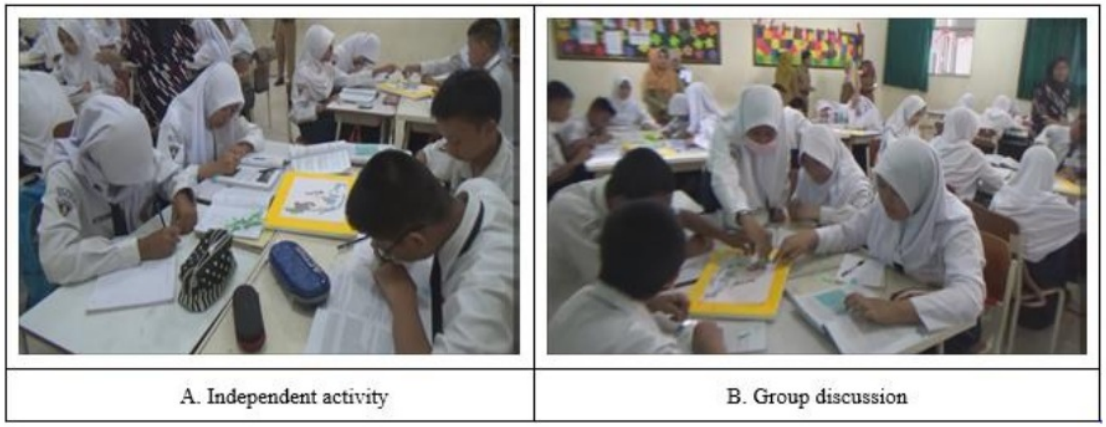


Fig. 9. Getting informations.

In the open lesson activities carried out, everyone involved in, will get lessons or learn something. Teachers get real experience in learning in their own class, students become successful in learning, and observers get best practice from the learning.

Based on the results of observation and analysis of the learning process in three classes in two partner schools, it was obtained an illustration that in general the task design by the teacher has a strategic role in creating community learning that supports the achievement of learning objectives. Knowledge needed by the teacher in the classroom so that students can achieve the desired goals is very important. Shulman, classified the knowledge needed for teaching into three categories [15]: Subject Matter Content Knowledge (SMCK), Pedagogical Knowledge (PK) and Pedagogical Content Knowledge (PCK). He argues that PCK is a special and interesting knowledge, because it is a collection of knowledge for teaching. A teacher's understanding of the characteristics of students is needed to design the right assignment for their students. Because giving the right learning experience will bring students to understanding as expected.

Improving student learning outcomes will have an impact on improving teacher professionalism. In an effort to develop a successful professional teacher, Ingvarson state that there is a reciprocal relationship between students learning outcomes and teacher professional development [16]. If students are more successful in learning, the greater the chances of teachers adopting learning practices that encourage further success. Guskey, states that improvements in the world of education usually result from changes made by teachers in the practice of learning in their own classrooms, such as new learning approaches, the use of new materials or curriculum, or simply modifying teaching procedures or class formats [17]. This is indeed better because according to Royce, teachers who learn by doing the best in their learning will easily build their understanding than if told [18].

There are several important things that support the achievement of maximum learning outcomes; among them is the constructivism learning theory. In this learning theory there are 3 basic things, namely: 1. social interaction, 2. the more knowledgeable other (MKO), and zone of proximal development (ZPD).

Social interaction plays a fundamental role in the process of cognitive development. Vygotsky states that every function in the development of a child's culture appears twice [19]: first, at the social level, and then, at the individual level; second, between people (Inter psychological) and then in children (Intra psychological). This is the reason why interaction with friends in groups or outside the group will help students understand the lesson, as well as occurring in the open class observed.

The More Knowledgeable Other (MKO) refers to anyone who has a better understanding or a higher level of ability than students, in connection with certain tasks, processes, or concepts. MKOs are usually regarded as older teachers, coaches, or adults, but MKOs can also be peers, younger people, or even computers [20]. This is also the reason why

through asking friends who understand or seek information through the internet using a computer is beneficial in student learning achievement. Therefore, it is reasonable to reason that the increased collaborative activity in this study is the result of the assignment given. Jumping task requires someone to look for MKO.

The concept of ZPD is the distance between students' ability to perform tasks under the guidance of adults and/or collaboration with colleagues and the ability of students to solve problems independently. According to Vygotsky, learning occurs in this zone. Vygotsky focuses on the relationships between people and the socio cultural context in which they act and interact in shared experiences [21].

IV. Conclusion

Based on the description above, it can be concluded that: (1) there are two types of tasks that can be provided by educators to students, namely the usual tasks and tasks of jumping (jumping task), (2) The tasks designed by the teacher provide opportunities for collaborative activities when the task demands students understand the concept and demand that students solve problems using high-level thinking skills, especially critical thinking; (3) Learning communities can occur in classrooms when students can learn, between learners can learn, teachers learn, between teachers also learn something from the learning carried out (open lesson). Therefore, teachers should always design tasks that are capable of creating collaborative activity among students. Open lesson should be a routine activity carried out by an educator because open lesson activities enable the creation of community learning that supports the creation of quality learning.

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