World Journal of Vocational Education and Training
2019 Vol. 1, No. 1, pp. 42-58
ISSN: 2690-280X
DOI: 10.18488/journal.119.2019.11.42.58

AGRIBUSSINESS MOBILE BASED LEARNING: ADIC MODEL TO SUPPORT STUDENTS' HOTS AND LIFE SKILL IN VOCATIONAL SCHOOL

Hary Soedarto Harjono[1]
Budi Prasetyanto[2+]
Rahmat Murbojono[3]

[1,2,3]*Jambi University, Indonesia.*
[2]*Email: budiphs@ymail.com*

(+ Corresponding author)

Article History
Received: 21 January 2019
Revised: 13 March 2019
Accepted: 18 April 2019
Published: 2 July 2019

Keywords
ADIC model
Mobile based learning
Agribusiness
HOTS
Lifeskill
Vocational school.

ABSTRACT

This study aimed to investigate the effect of the Attainment, Discussion, Implementation, and Conclusion (ADIC) model for learning Agribusiness in Vocational School by utilizing a delivery system model of Agribusiness to attain HOTS and life skill that suitable with material and student characteristic in the vocational school. This was a research and development (R & D) and continued with an experimental study. This study was conducted in class XI of a vocational school (SMK Negeri 10) in Muaro Jambi by involving one experimental class and one control class groups. In this case, the post-test on the experimental class was compared to post-test on control class. As a result, ADIC model as one of the delivery system models can improve and promote students' HOTS and life skill in the current school effectively. Through the ADIC model, a teacher can take place students as a learner actively to control their learning activity, to attain their knowledge, to compose discussion material and discuss it, to conduct practice and experiment, and to conclude their experiment.

Contribution/Originality: This study originates a new model of teaching that integrated mobile devices for Agribusiness in the vocational school. This model is used to facilitate students to attain HOTS and life skill. The model developed focused on the active learner to access the website, discussing, practicing, experimenting, and making conclusion to solve the learning problem.

1. INTRODUCTION

The growth of mobile networker in Indonesia was extremely rapid. It is noted 93,4 million mobile networkers in 2015 and it increased 2017 and estimated to be 112,6 million (Kominfo, 2015). This describes that information via the internet is so important and needed by people. In the same condition, communication and internet access using a mobile smartphone are very massive in the last decade and it has high potential in learning transformation as media and learning resources (Romrell *et al.*, 2014).

The growth of communication and information technology gives educator a chance and challenge to revolute learning both in and out classroom as learning resources to get information, thinking process, and to communicate with each other. Messages delivered in the classroom carry out electronically and give chance face to face in the traditional classroom (Fisher and Baird, 2006). On the other hand, the growth of technology takes easily students to access all information related to learning via internet access by using mobile devices such smartphone, tablet, laptop (notebook), and netbook (Al-Said, 2015).

Creativity is needed by a teacher to face this smart technology to facilitate students in order to increase learning process. Technology is also important to integrate learning in increasing students' academic scores. The existence of technology is really important for smartphone user in learning subject material. Therefore, teacher needs to redesign and usetechnology to help students not only to get information but also to make it as learning resources in getting life skill.

The effort of integrated technology to learning process started by valid studies. The previous studies reported about using mobile technology in the classroom and showed that the trend of integrated technology in the classroom with students learning (*mLearning*) has an important role in learning process, and is available supportive strategies in using mLearning integration in the classroom (Baran, 2014). Several studies revealed that using computer mediated communication increases students' learning result effectively to carry out posttest, and increase students interaction in learning group (Dewitt *et al*., 2014). More specifically, students have positive perception and there were learning communication effectively by using mobile learning, and they appreciate learning by using mobile devices due to consuming time efficiently (Al-Said, 2015).

The rapid growth of information and communcation technology (ICT) is assumed positively by several Agribusiness teachers to support learning during the last time focused on lifeskills' achievement. The learning is influenced by statement that vocational students will find a job after graduating. The learning paradigm changes to integrating technology suitable with challenge of 21st century learning. It changes a teacher as resources in learning process to facilitate and to attain students' metacognition like; 1) problem solving and critical thinking, 2) communication and collaboration, and 3) creative and innovative (Sutrisno, 2012). Hence, it can be inferred that Agribusiness learning will support Higher Order Thinking Skills (HOTS) attainment.

HOTS is very important for learner to get success in the future (Hopson *et al*., 2001; Barak and Dori, 2009) related to global competition such MEA 2015. Zoller (2011) emphasized that learning is not only about knowing an information, but also thinking skill (learning to think). It helps students to have critical thinking skill, evaluative, and making a decision in problem solving. With higher thinking skill (analysis, evaluation, and creation), students think logically and reflective in decision making to something certainty is true, so they can solve problems in their life effectively.

In case of how important this higher order thinking skill, Reisnick on 1987 had advised long years in the past time to support HOTS as a school program started in kindergarten school level to University level for all courses (Aksela, 2005). The existence of technology supports students' HOTS attainment in the classroom like Wegerif's statement to enrich learning process in three stages; information delivery was dynamic, 2) technology is as a teacher and resource when they discuss and explore new ideas, and computer network makes students' creation directly with each other without wall and time limitation (Sutrisno, 2012).

The role of technology to support students HOTS attainment is noted by Hopson *et al*. (2001) by using learning environment with computer technology enriched. This study resulted two important things, students in the classroom with computer technology enriched are having difference score significantly compared by traditional class after post-test, and having high motivation and creativity significantly. In this study, the existence of computer is very important used in the classroom.

The other effort to increase students HOTS was conducted by McMahon (2010) by using e-learning. The result showed that e-learning increases students HOTS and students learning motivation. To support students centered learning, mobile technology in learning is used to activate student in exploration, collaboration, assessment, and reflection (Fisher and Baird, 2006) to support learning principle anytime and anywhere due to having high mobility (Kee and Samsudin, 2014) and to have small portable that easily running anywhere and access internet directly (Kukulska-Hulme, 2009).

1.1. Mobile Learning

Wireless network and using portable mobile wireless has a new chance and challenge to develop new learning environment (Al-Said, 2015). Mobile devices based learning environment are like library or laboratory cause learning not only focus on one place in the classroom but conducting out the classroom anywhere without walls of room and time is mobile learning or M-learning (Kee and Samsudin, 2014).

Mobile learning is learning activity designed by teacher by using mobile technology such smart phone and tablet as communication tools to connect people (Fisher and Baird, 2006). In the last decade, the communication tools grow specially handphone to receive and call. In the progress, smartphone as personal computer with trendy, small, portable, and light has superiority with smart feature to download, send and receive short message, image, song, e-mail, internet access, and even social media (Traxler and Vosloo, 2014).

Teacher can use many feature on students mobile devices. The features in the smartphone are short message (Lim *et al*., 2011) bluetooth (Dennett and Traxler, 2008) video (Geri et al., 2014) mobile games (Koutromanos and Avraamidou, 2013) and social media (Norman et al., 2015). Every result of previous studies presented the use of several media in the mobile learning context.

1.2. Higher Order Thinking Skills

Higher Order Thinking Skill (HOTS) is someone' ability to think in order to analyze, synthesize, and evaluate in Blooms taxonomy structure. HOTS is an approach in learning used by teacher to facilitate students learning critical, logical, reflective, metacognitive, and creative thinking. This thinking ability will appear when students meet a new problem with pre-ability they have before.

Blooms (1956) created a cognitive ability classification to six order thinking such knowledge, comprehension, application, analyze, synthesis, and evaluation. This classification is to group two thinking order; lower order thinking skills including knowledge, comprehension, and application, and higher order thinking skills including analyze, synthezise, and evaluation (Adams, 2015).

Gezer *et al.* (2014) explained that Bloom taxonomy was composed from lower to higher and from simple to complex thinking, so knowledge, comprehension, and application are pre-cognition and analyze, synthezise, and evaluation are metacognition. Moreover, HOTS was developed from Bloom taxonomy and then revised by Bloom student, Anderson, who worked with Krathwohl during five years to result different order thinking succh remembering, understanding, applying, analyzing, synthezing, and creating.

Glazers defined HOTS as students ability in order to understand a lessons, answer the question, and solve a problem (Grossen, 1991). This is in line with Zohar & Dori, they state that learning facilitates students in order to increase students higher order thinking skills with asking student to think critically, make and give question to teacher or peers, answer a question, and solve a problem (Barak and Dori, 2009).

Based on previous several definitions, HOTS is defined as complex and abstract thinking ability based on simple thinking activity with activities in the learning process included asking, answering, and finding solution of a problem. Students are trained to critical thinking to be creative and innovative to answer and solve the life problems in the globalization era.

HOTS is a demand of 21st century learning that tends to be creative, innovative, critical thinking, solve a problem, communicate by using digital technology, and have collaboration skills (Preus, 2012). The problem faced in 21st century learning needs to solve from life aspects. The existence of information and communication technology (ICT) in this digital century gives an extraordinary effect on learning paradigm change to be creative and innovative teacher.

The challange of HOTS learning in 21st century is learning can't be separated from technology by using collaborative design to be creative and innovative students and technology is utulized to increase higher order thinking skills. Ada (2009) in his study on using computer to support collaborative learning resulted positive

collaborative quality with HOTS of students. There was a high social interaction level and collaboration by using computer and contributed in shaping learning group community and students' HOTS through shaping knowledge process together.

1.3. Agribusiness Lifeskill

Lifeskills in this context will be attained by vocational students to support their life after graduation. Lifeskills are reminded by students after they watched an example and practice it and they are able to increase learning experience after practices many times. Besides, lifeskills are attained from all vocational courses in SMK (senior vocational school).

On the other hand, Agribusiness life skills in vocational schools in Indonesia were ruled in subject spectrum in 2009 and now revised in 2017 about competency and sub-competency related to Agritechnology and Agri-industry. Life skills such psychomotor is a domain because it is conducted by muscular dominantly including memory and human thinking. Agribusiness life skill is psychomotor domain that signs with physic movement and can be observed directly. Simpson has composed a physichomotor skill hierarchy to seven skills ordered by Thomson; P1 (Perception), P2 (physic readiness), P3 (guided movement), P4 (ordinary movement), P5 (complex movement), P6 (adaptation), and P7 (creativity). Those seven skills are a chain-related skill procedural (Dimyati and Mudjiono, 2006).

Besides, conditional learning is conducted to reach objective in learning process. The effort to reach learning objective signed by reaching all sub-competencies. The effectiveness of the learning facilitated by a teacher after assessment. The effectiveness of learning depends on teacher ability in designing the lesson, so learning process will carry out properly.

Authentic learning assessment on psychomotor learning skill is performance test. Related to skill test of Agribusiness learning, the Simpsons hierarchy is the guidance or reference in composing the attainment indicators of skill. Students will possess competence after they perform their skill fluently, nimblely, efficiently, and correctly. Authentic assessment of Agribusiness learning measures students' skill as the indicatorsof ability. The result of the assessment is used to make decision and gives information globally in order to avoid bias decision. Learning assessment carries out all indicators composed before and after they complete a competency of the lesson.

1.4. The Need of Development Mobile Based Teaching Model for Agribusiness

The rapid growth of informaton, communication technology (ICT) in the last decade affects teacher creativity to utility the computer, internet, and digital devices such smartphones as media and learning resources (Wang and Woo, 2007; Romrell *et al*., 2014; Al-Said, 2015). The computer devices with internet can access many applications like google, yahoo, and social media and finally they cause students enjoying and killing their time. (Arends, 2008b) stated that teacher has to control their students in learning process. Technology is used by students to access learning resources, to complete the task, and to conduct experiment in collaboration, so the devices avoid students to be individualistic.

In the current time, students have personal interest to carry out the instructional via social media and make online community group, discuss, and complete the task. The need on technology integration in the instructional need adapts many strategies on online instruction such e-learning as discussion, grouping, and collaborative learning environment as a manifestation of active learning students by using ICT (Khan *et al*., 2017). The adaption of ICT for learning as blended learning or hybrid learning is an example of strategy by adapting ICT (Delialioglu and Yildirim, 2007; Delialioğlu, 2012; Jahjouh, 2014).

Several designs and teaching models with communication technology integration have build as ASSURE model by Heinich *et al*. (2001) and ICARE model developed by Hoffman and Ritchie (1998). Wang and Woo (2007) has developed systematic model to integrate communication technology that divided to three areas; macro level

(curriculum), meso (topic), and micro (instruction). They developed model into seven stages; problem statement, learning objective, technology required, rationale, strategies, assessment, and reflection.

Learning supported by communication technology have enriched by using cooperative model is needed to adapt and use it Ada (2009) collaborative learning by using mobile devices (Dewitt *et al*., 2014), mobile learning by using an application program such edmodo (Al-Said, 2015) and distance learning (Cano, 2014). However, creative teacher doesn't feel satisfy with the existence of communication technology without using it into learning process. Adapting several teaching models supported by communication technology by colouring and enriching the learning practitioners to develop new model that is relevant and specific models suitable with learner context, learner characteristic, and material characteristic because one approach is suitable with a subject while not for all courses principally.

Face to face learning in Agribusines classroom has no specific model to learn students to support life skill even HOTS. Based on pre-investigation, there were several teaching models usual used by teachers such presentation and explanation, direct instruction, and cooperative models. This condition is a gap to conduct development research to develop new specific model for Agribusiness.

The change of technology gives the educator new chance to integrate it into traditional learning. Additionaly, blended learning has big potency to increase learning quality (Krasnova and Vanushin, 2016). Several studies have published showed that blended learning was effectively for science planning and there it increased both learning process and learning result (Jahjouh, 2014).

Mobile technology can support learning anytime and anywhere because it has high mobility with relatively and ortable (Kee and Samsudin, 2014) easy operated anywhere, and internet access directly (Romrell *et al*., 2014). Blended learning uses computers as learning environment in the classroom and laboratory and mobile device is considered to support learning anywhere and anytime.

The growth of mobile communication technology as smartphones with internet connectivity instantly in the last decade gives us technology choices in facilitating student learning as media and learning resources. Considering all potencies of mobile technology, adapting several models of teaching needs to think and to develop a delivery system model of Agribusiness material to attain HOTS and life skill that is suitable with material and student characteristic in vocational school.

1.5. The ADIC Model for Agribusiness in Vocational School

In this study, the ADIC Model has four procedural stages. The model is synthesized from four models in the learning; direct instruction, problem based learning, presentation and explanation, and cooperative learning. The detail of developed model stages can be seen in Table 1 as follows.

Table-1. Four developed procedural stages of te ADIC model.

No	Model	Syntax				Approach
1	Direct Instruction	Demonstration	Guided practice	Check an understanding	Independent practice	Active teacher
2	Cooperative Learning	Presentation of an information	Grouping	Team work	Confirmation	Active learner
3	Presentation and Explanation	Presentation	Explanation	Check an understanding		Active teacher
4	Problem Based Learning	Orientation of a problem	grouping	investigation	Confirmation	Active learner
5	ADIC	Attainment	Discussion	Implementation	Conclusion	Active learner

Source: Arends (2008a; 2008b), Joyce *et al*. (2009), Eggen and Dan Kauchak (2012).

1.6. Syntax of the Model

In this study, the developed Syntax of the model describes four stages as acronym of the model; attainment, discussion, implementation, and conclusion to reach higher thinking skill and life skill. The four developed stages can be seen in Table 2 as follows.

Table-2. The four developed stages of Syntax.

Stages	Teacher Activity	Learner Activity
Attainment	• Direct the class how to conduct the learning • Grouping and help group learning to on line activity using *smartphone*	• Make a group learning • Coordinating group learning • Access internet *online* • Compose discus material to next meeting • Prepare to investigation /experiment
Discussion	• Help students to express material concept	• Present all concept was attained by a group • Class discussion
Implementation	• Guide students conduct practice for agribusiness skill • Guide students conduct an experiment • Guide students to observe and make an experiment report	• Guided practice • Investigation/experiment • Observation on experiment • Make experiment report
Conclusion	• Give students time to present their experiment report • Help students to conclude learning result • Rewarding to students achievement individually and group	• Confirmation result of investigation by a group • Conclude result of learning • Receive learning rewards

Source: Arends (2008a; 2008b), Joyce *et al.* (2009), Eggen and Dan Kauchak (2012).

1.7. Social System of the Model

The social systems to support the model are students in online environment, student cooperation in group learning, and solving problem in group investigation. Students interact with their peer in a cooperative group to prepare materials and discuss them in the classroom face to face and online. Students work together and cooperative to complete the task and do investigation in experiment method independently and actively. All students are active and have equal roles with others. Reaction of principal in the model stated students' activity in and out the classroom in online, discussion in the classroom, investigation and making a conclusion, and practicing skilsl in cooperative team work together.

1.8. Teacher Role

Using the ADIC model asks a teacher not as a learning resource and learning model but as a facilitator. For this reason, a teacher prepares all students' need for learning such developing material, website, and video. A teacher sets every learning stage with activity completely to ask them learning in group, complete a task, do experiment, prepare a presentation, and make a conclusion. Teacher doesn't give lecturing or demonstrating a skill, but only giving motivation before and during learning process and then giving reward to students and finally assessing students' competency. The relation of teacher and students in the model is as not between active teacher and passive students but as facilitator and active students.

1.9. Supporting System of the Model

In this study, learning will carry out properly as the stages of this model if it conducts in these three core activities; mobile based learning, face to face learning, and investigational learning. Furthermore, learning with this

model was supported by smartphone devices, job sheet, designed classroom for discussion learning, and laboratory. The conceptual framework in the developed ADIC model in this study can be seen in Figure 1 as follows.

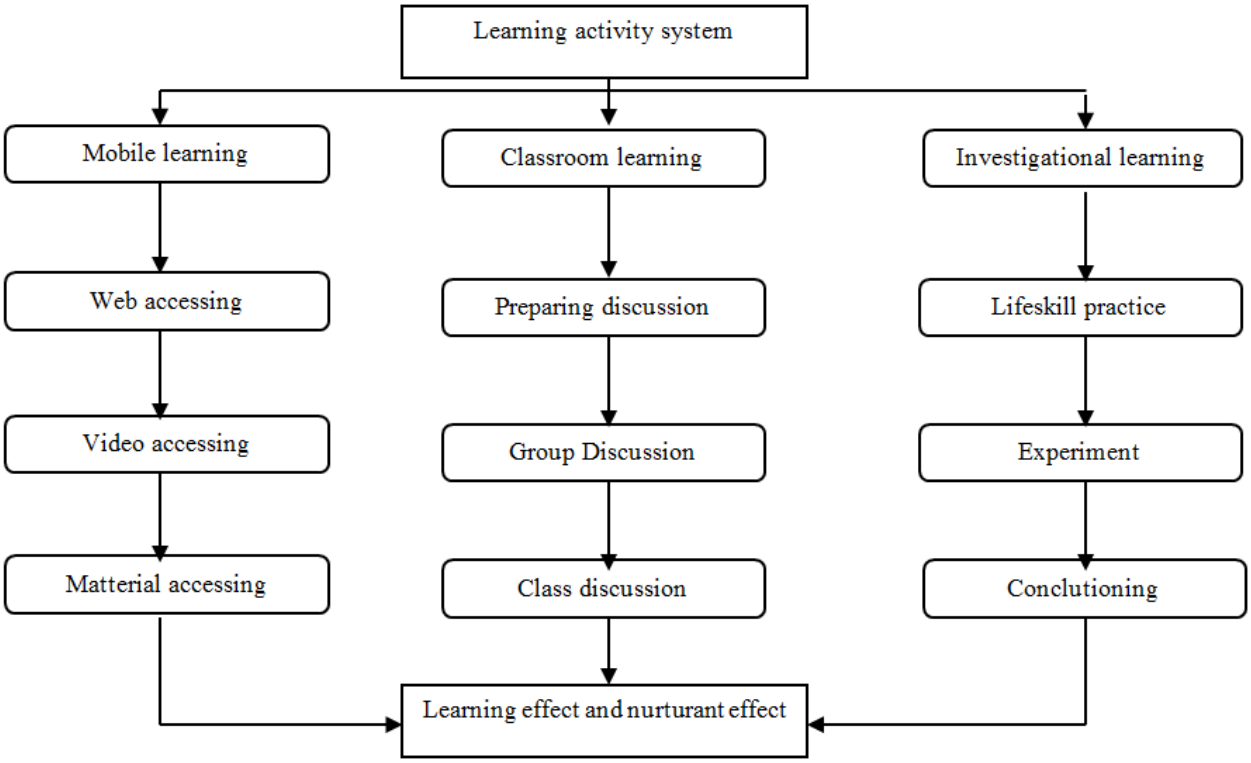

Figure-1. The conceptual framework in the developed ADIC model.

Source: Arends (2008a; 2008b), Joyce *et al.* (2009), Eggen and Dan Kauchak (2012).

1.10. Learning Effect and Nurturant Effect of the Model

The ADIC model was developed to facilitate Agribusiness student to attain higher order thinking skills that focuses only for life skill attainment. The learning effect needed are materials and skill achievement, higher order thinking skills, and skill to manage a group and social, and nurturing effects of the model independently in the learning, toleration and acceptence of multicultural, and supporting to technology literation. Two effects of the developed ADIC model can be seen in Figure 2 as follows.

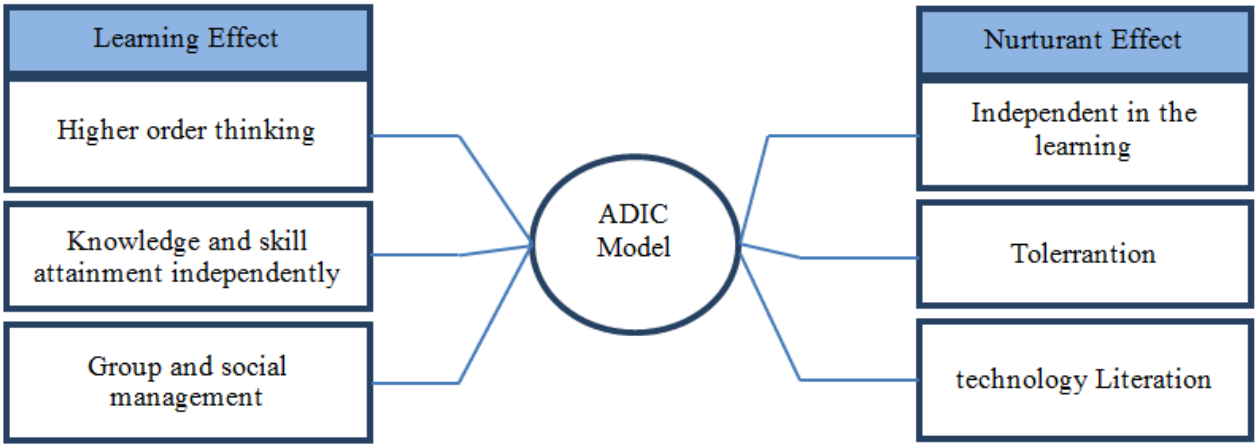

Figure-2. Two effects of the developed ADIC model.

Source: Tan (2003), Arends (2008a; 2008b), Joyce *et al.* (2009).

2. METHODOLOGY

This study used Research and Development (R & D) method supported by quantitative data. The RD method was focused on developed ADIC model. The quantitative data were used to support the RD method to evaluate stages and the quantitative method was used in experiment class after developing model by using field test.

2.1. Stages of the Research

This study was a Research and Development (R & D) method that conducted in four stages; analysis, design, development, and evaluation (Borg and Gall, 1983; Lee and Owen, 2004; Richey and Klein, 2007). Evaluation stage was conducted in two stages validated by three experts and tested by students in the classroom (Tessmer, 1993). Validation was conducted by instructional technology expert, instructional media expert, and subject material expert. Evaluation by students was conducted in three stages; an evaluation, small group evaluation, field test, and continued by experimental class.

2.2. Research Design

The research has been carried out in a vocational school (SMK 10) in Muaro Jambi, Indonesia. The field test and experiment of the model in the study was conducted in Class XI Agribusiness by involving 18 students as participants for field test and 38 students for experimental stage. The participants in the field test were 5 males and 13 females. In experimental stage, the participants in control class were 19 students (15 males and 4 females) and 19 participants (10 males and 9 females) in experimental class

2.3. Instruments

The aim the study was to examine the using of ADIC model and the effect to students HOTS and life skill in learning process. A test was used to examine students HOTS and performance test was used to examined students life skill. Development process of the model used questionnaire for validators and students. Pre-test was conducted before treatment and post-test was after treatment, and students HOTS attainment was examined after students completed a competence in the field test class and experimental class.

Table-3. Research design on field test of ADIC model.

Group	Pre- test	Treatment	Post- test
1	2	3	4
Experimental	O_1	X_1	O_2

Note:
O_1: Pre- test of experimental group.
O_2: Post- test of experimental group.

The field test of ADIC model in the research was conducted in class XI Agribusiness with 18 students as in Table 3. Students learn using smartphone to acess material and video in website. Comparing pre-test and post-test was conducted to examine the effectivity of the model in the learning as a treatment, and examination in daily test to examine HOTS and life skill of the students.

Table-4. Research design on experiment class of ADIC model.

Group	Treatment	Post- test
1	2	3
Experimental	X_1	O_1
Control	X_2	O_2

Notes:
O_1 : Post- test of experimental group.
O_2 : Post- test of control group.
X_1 : Learning agribussiness using ADIC model.
X_2 : Learning agribussiness using conventional model.

The experimental of ADIC model in the research was conducted in class XI Agribusiness with 38 students as in Table 4. Students learn using smartphone to acess material and video in website in the experiment class and other class as controll class learn matterial using conventional model were Direct instruction. In the stages, to examine the effectivity of the model with comparing post-test experient class and controll class after students complete their class. Activity in the examination to examine HOTS and life skill of the students

2.4. Collecting and Data Analysis

Data presented here were the data collected from field test class and experimental class. Collecting data was conducted in order to gain empirical data of learning toward Agribusiness students in a vocational school (SMK 10) in Muaro Jambi to investigate students HOTS and life skill. The empirical data of this study was collected from the second grade on pre-test, post-test, and first examination.

3. RESULT

3.1. Students' Learning Results on a Limited Trial

The results of student learning in class XI of Agribusiness in SMK 10 Muaro Jambi between pre-test and post-test shown by the average score was 53.47 in pre-test and 73.61 in post-test, minimum score was 25.00 in pre-test and 37.50 inn post-test, and maximum score was 75.00 in pre-test and 100.00 in post-test from 18 students. The score achievement in pre-test and post-test can be seen in Figure 3.

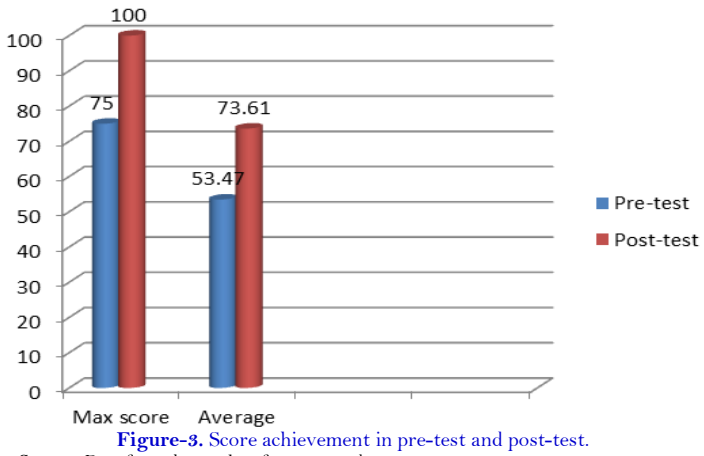

Figure-3. Score achievement in pre-test and post-test.
Source: Data from the results of pre-test and post-test.

From figure 3, it can be inferred that score of the first question was 63.89% in pre-test and 80.56% in post-test, score of the second question was 63.89% in pre-test and 72.22% in post-test, score of the third question was 22.22% in pre-test and 61.11% in post-test. The score in pre-test and post-test of each item can be seen in Figure 4 as follows.

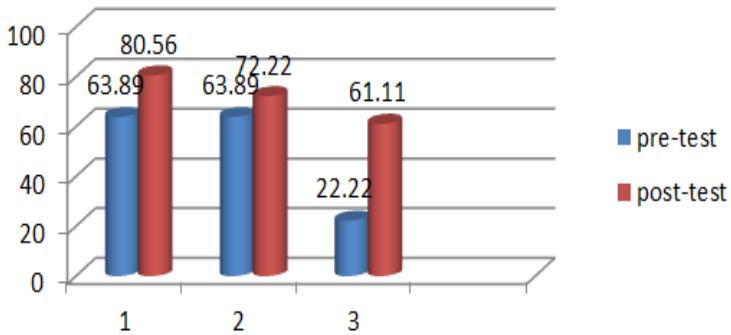

Figure-4. Score achievement on pre-test and post test per item.
Source: Data from the results of pre-test and post-tesr per item.

From the data, the average score in the first daily examination reached by students' in class XI Agribusiness in SMK 10 Muaro Jambi was 76,14 from 18 students with maximum score was 94.12 and minimum score was 47.06. From 18 students, 11 students were competence and 7 students were incompetence. The average achievement for students' lifeskill in the performance test was 87,75. Therefore, student learning achievement can be seen in Figure 5 as follows.

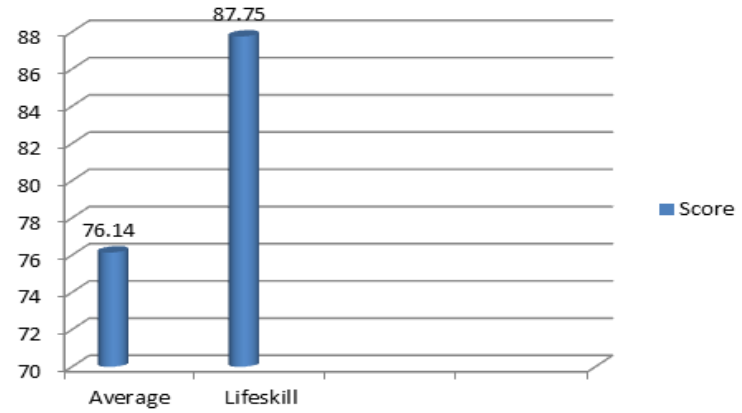

Figure-5. Student learning achievement

Source: Data from the results of student learning achievement.

From the data, score for the first question was 72.22, the second question was 61.11, the third question was 97.22, the fourth question was 100, and the fifth question answered by students was 100. Student learning outcomes (%) of each item can be seen in Figure 6 as follows.

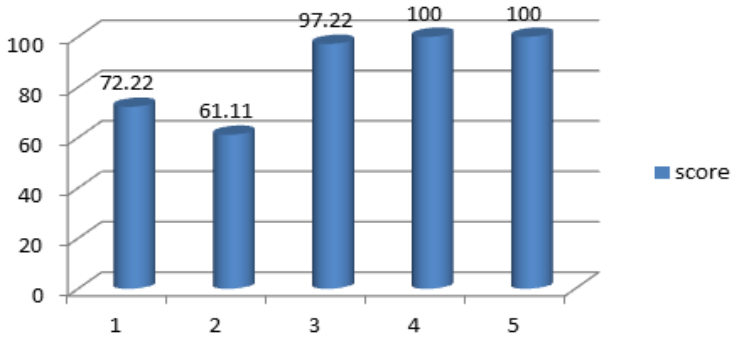

Figure-6. Student learning outcomes.

Source: Data from the results of student learning outcomes.

3.2. Students' Learning Results in Experimental Class

Students' learning outcomes of Agribusiness students at experimental class in a vocational school (SMK 10) in Muaro Jambi by using the ADIC model reached the maximum achievement score was 75.00 and the minimum achievement score was 12.50 with the average score was 38.82 in pre-test. The achievement of maximum score in post-test of the experimental class was 87.50, minimum score was 37.50 and average score was 76.32. There were 13 students' competences and 6 students' competences from 19 students in class XIA.

On the other hand, the class XIB as a control class didn't use the ADIC model in the pre-test reached data that the maximum achievement score was 62.50 and the minimum achievement score was 12.50 with the average score was of 22.37 from 19 students. The achievement score on post-test in the controll class were maximum 87.50, minimum score 37.50 and average score 66.45. There were 9 complete students and 10 incomplete students. The result showed that the competence of student learning achievement in the experimental class is higher than the control class. For the detail of the result, each data on experimental and control class can be seen in Figure 7 as follows.

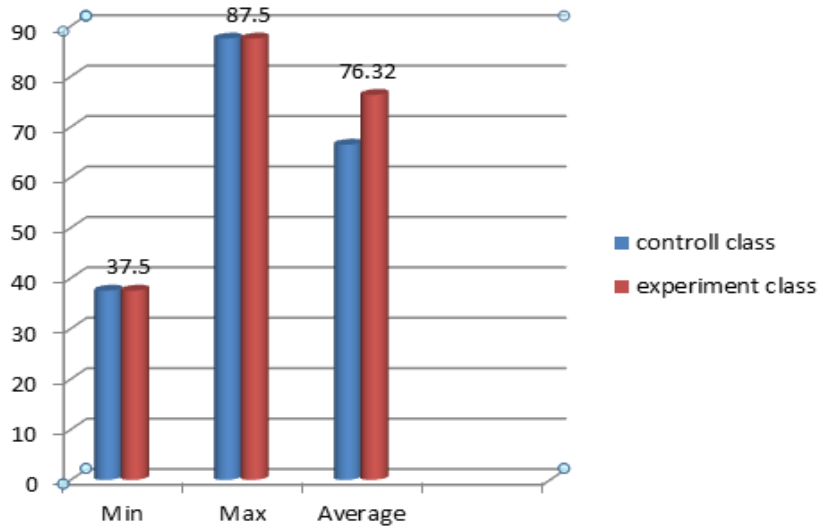

Figure-7. Students achievement in control class and experimental class.
Source: Data from the results of students achievement on control class and experiment class.

From the data, score for experimental class for each item covered the first question was 76.39, the second question was 83.33, the third question was 75.00 in post test. Meanwhile, achievement score for control class covered the first question was 72.22, second question was 63.89, and the third question was 58.33 in post- test. Therefore, student learning outcomes (%) of each item can be seen in Figure 8 as follows.

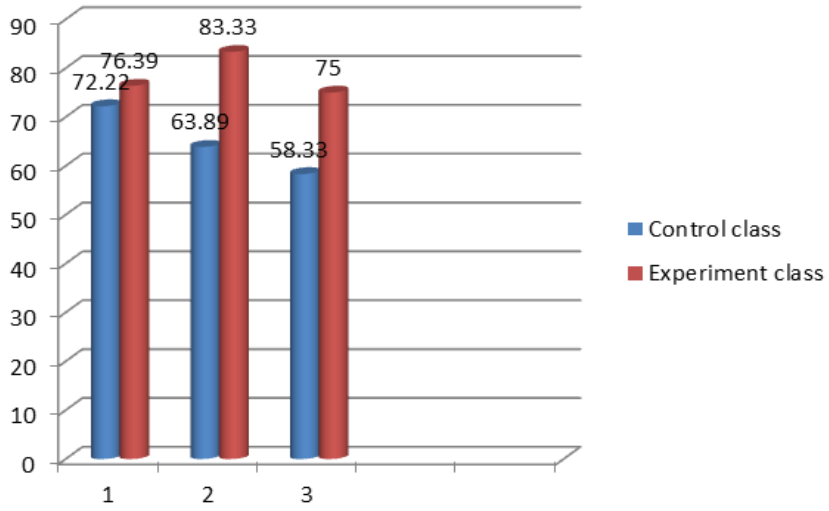

Figure-8. Students achievement on control class and experiment class.
Source: Data from the results of students achievement on control class and experiment class.

In this case, it can be inferred that the average achievement in the daily examination for experimental class reached by students' in class XIA of Agribusiness students in a vocational school (SMK 10) in Muaro Jambi was 81,42 from 18 students with maximum score was 94.12 and minimum score was 58.83. From 19 students, 12 students were competence and 7 students were incompetence. The average achievement on experiment class for students lifeskill in the performance test were 89.92. While the average of student learning achievement for controll class was 76.16 with maximum score was 88.24 and minimum score was 35.29. The average achievement in control class for students life skill in the performance test was 86.71. Therefore, students learning and lifeskill achievement can be seen in Figure 9 as follows.

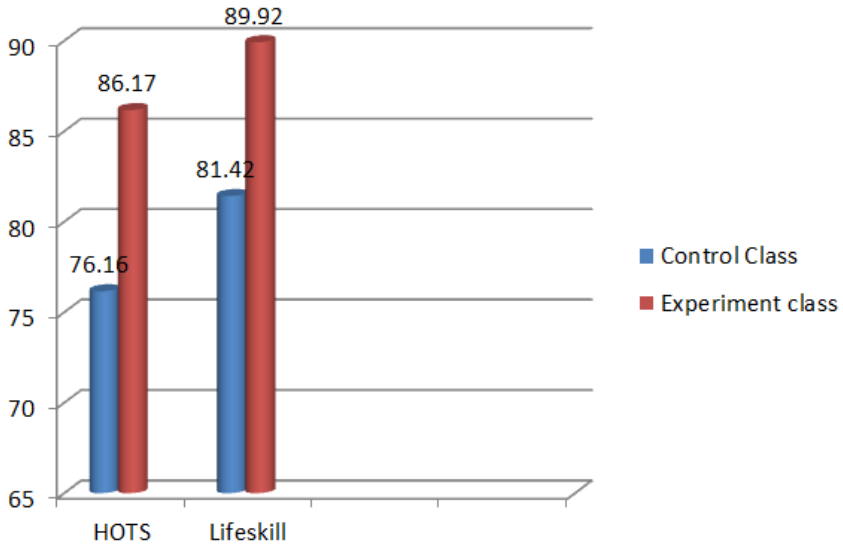

Figure-9. Students learning and lifeskill achievement
Source: Data from the results of students learning and lifeskill achievement.

From the achievement of the examination, detail score on experimental class can be inferred. Score reached of the first question was 76.32, second question was 80.70, third question was 86,84, fourth question was 92.11 and fifth question was 84, 21. Detail score on control class reached for the first question was 73.68, second question was 72.81, third question was 78.95, fourth question was 81.58, and fifth question was 78.95. Therefore, the achievement of score per item in experimental and control class can be seen in Figure 10 as follows.

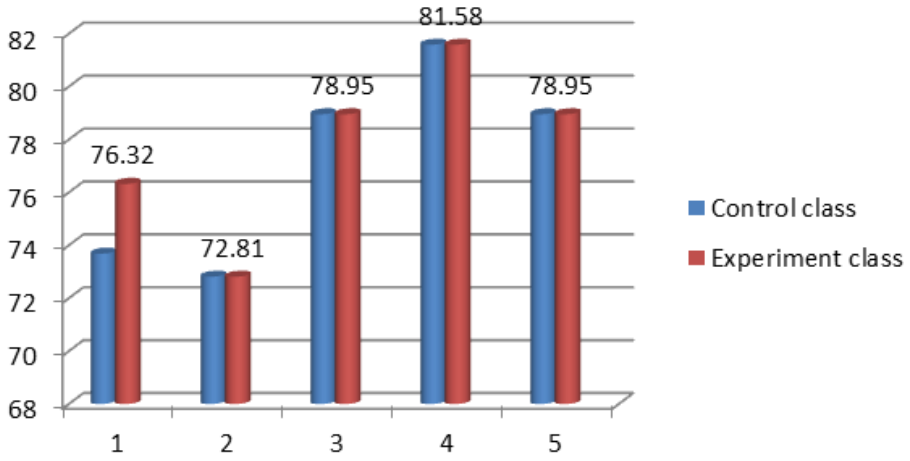

Figure-10. Students learning and lifeskill achievement per-item.
Source: Data from the results of students learning and lifeskill achievement per-item.

4. DISCUSSION

The achievement of higher order thinking skill and life skills was measured by busing a test and a performance test in both examinations, treatment and controll class. The result of examination to determine the achievement of HOTS in figure 7 showed that class XIA as an experimental class using the ADIC model was reached average score 77,63 with 78,95% completetion. Meanwhile, result of examination in control class using conventional model was reached average score 66,45 with 47,39% completetion. Hence, it can be inferred that there was difference significant result of learning achievement between experimental class and control class from average and class completetion.

The result of practical examination showed that classs XIA as an experimental class using the ADIC model reached average score as 89,92 with 100% completetion. Besides, the result of practical examination on class XIB as

control class using conventional model reached average score as 86,71 with 100% completetion, too. From the results, there was no different achievement results betweeen experimental class and control class.

The model choosen by a teacher will affect the achievment of learning. Arends (2008a) stated that a model chosen by a teacher with an approach was designed to reach an objective. He noted that there were no most comfortable approaches to teach all skills because a comfortable approach depends on student characters and objectives to be reached by students in learning process. The learning objectives were used to formulate the preparation of learning that place a teacher in a choice to use a model implemented in the classroom.The model chosen was described in the lesson plan and if a teacher designed objective learning to facilitate students to reach higher order thinking skills, the model used in the classroom were in forms of cooperative, problem based learning, discovery learning, or inquiry learning (Tan, 2003; Arends, 2008b; Joyce *et al*., 2009; Eggen and Dan Kauchak, 2012). If a teacher designed learning objective to reached psychomotor skill, the model was not in forms of presentation and explanation model, but in forms of direct instuctional and it was not used to facilitate higher order thinking skill (Arends, 2008a; Joyce *et al*., 2009; Eggen and Dan Kauchak, 2012).

The result of t-test by using SPSS 17 was 2,260 more than t-table 2.02439. This showed that there was different significant effect in experimental class by using the ADIC model in learning compared with post-test in control class by using conventional model. However, the result of t-test showed that using of the ADIC model of Agribusiness students in learning in experimental class effectively reached learning objectives that had higher order thinking skills if compared with conventional model.

The result of practical examination reached score 89,92 in experimental class and 86,71 in control class showed that there was no different significant effect because both classes have 100% completetion. The result showed that there was no different effect between experimental class using ADIC compared by result in practical examination in control class using conventional model in the study. Besides, the result showed that the ADIC model implemented in the Agribusiness learning in the experimental class was effective to reach the life skills to achieve learning objectives. Also, control class reached effective result by using conventional model with little bit difference. In the learning process in controll class by using conventional model, the life skill achievement was in good level and there was no problem because the activity of practice was enough. Magliaro *et al.* (2005) noted that direct instruction model need to think and review to carry out integrated technology to support the learning process. Eggen and Dan Kauchak (2012) proposed the same thing with technology supporting as tutorial video to conduct learning by using direct instructional model.

The ADIC model was develop from four models to support higher order thinking skills are problem based learning and cooperative learning consisted from STAD, Jigsaw, and group investigation. The ADIC model that developed on the experiment stage in the syntax of the model as a format to inquiry to solve the problem by students. The investigation stage of the model specifically was adapted from problem based learning model and group investigation model. One of the ADIC model syntax can support life skill achievement was direct instruction model. The ADIC Model was develop has practice stage on the "implementation stage" to reach life skill. The implementation stage procedurally in the syntax was adapted from direct instruction model and also known by demonstration model because there is an example by a model through smartphone.

Tan (2003) explained that problem based learning (PBL) model as a power to support 21st century learning has some roles to facilitate to reach higher order thinking skills in the cognitive process such taking time enough to think and plan ("planful" thinking), generating ide and multi perspective (generative thinking), organizing, thorough, and systematic (systematic thinking), classification, logical analysis, and inference (analytical thinking), similarity, pattern, parallel, and lateral (analogical thinking), and holistic and helicopter (systemic thinking). PBL process in depth develops flexible and helicopter views to increase connectivity in thinking to prior knowledge, prior experience, real context, theory, other people perception, and connection with new fact and idea.

Sharan and Sharan (2009) explainded that cooperative learning model specifically group investigation facilitates students to work together conducting investigation and planning how to integrate and present observation and result untill evaluating with teacher. They explained in depth that group investigation model was reported helping students learn how to learn. Ellis and Feldman (2009) also noted that there was relation between cooperative and increase cognition and metacognition thinking skills.

When students should complete the conceptual task cooperatively and need to solve the problem, it needs logical and critical thinking, creative answer, and application. Discussion in the cooperative group to support expression orally skill, explaination, and presentation automatically related to cognitive activity to remain meaningfull way. The role of peer in the cooperative learning with diverse thinking order showed that there was different thinking way in solving problem and geting feetback in the group learning.

Arends (2008a) explains that direct instruction model as a teaching model has a role in factual and life skill achievement with procedural stages developed model by a teacher stage to stage. The major different between PBL and cooperative model is direct instruction model is not used to facilitate students to higher order thinking skill achievement and the model tends to teacher centered approach.

Joyce *et al.* (2009) noted that direct instruction process helps students to focus on an effort to show the complex skill who need high accuracy by teacher. This learning principal focuses on student performance conceptualizing (observable) to the objective and task to develop practical activity to fix the achievement in every task component to compose learning situation as a squence to fix skill transferred before learning advance skill.

Based on views about PBL, cooperative, and direct instructional models previously mentioned, we conclude that those three models can support higher order thinking skills and life skill achievement that represented in the developed ADIC model. A problem in the PBL model can support thinking process in cognition through problem solving activity. The thinking processes are planful thinking, generative thinking, systematic thinking, analytical thinking, analogical thinking, and systemic thinking, and develop connectivity thinking. Using cooperative learning model with diverse thinking order to demand is used to complete a conceptual task together, discuss, and solve the different problem. This needs logical and critical thinking, creative, and application. Expression orally, explaination, and presentation by students in group learning outomatically needs cognition activity.

The life skill achievment by students was reached through demonstration by a model, guided practice, and independent practice to support Agribusiness students' skills. The stages of the model can be seen on the syntax which covered; orientation and material review, demonstration by a model, guided practice, independent practice, and checking understanding and skill (Eggen and Dan Kauchak, 2012). Homework in this case is an effort to practice studends skill independently.

In brief, the ADIC model used in learning has roles to support higher order thinking skills achievement through analyzing, evaluating, and creating. Cognitive skills reached by students in group will find their own knowledge, planning an experiment, observation, making a report, discussion, feedback positively, concluding, and creating new shapes. The ADIC model used in learning supports life skills' achievement by observation and practice to gain life skills by using media in learning process.

5. CONCLUSSION

Students learning on limited trial showed that there was increasing score from 53.47 to 73.61 with HOTS score average as 76.14 and lifeskill score as 87.50. There was different result of learning showed between in experimental model and in control class in which the score was 66.45, with HOTS score average was 76.16 and life skill score was 86.71. The average score of experimental class was 76.32, with HOTS score average was 81.42 and life skill score was 89.92 from 19 students getting involved in control class. Based on limited trial and experimental model, it can be concuded that using the ADIC model in the Agribusiness learning supported students to attain higher order thinking skills and life skill in both the limited trial and experimental trial.

Funding: This study received no specific financial support.
Competing Interests: The authors declare that they have no competing interests.
Contributors/Acknowledgement: All authors contributed equally to the conception and design of the study.

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