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ENHANCING STUDENTS' HIGHER ORDER THINKING SKILLS IN SCIENCE THROUGH INSTAD STRATEGY

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Abstract. *This research aimed to examine the effectiveness of the INSTAD strategy in comparison to other teaching strategies such as Inquiry, student team's achievement division (STAD), and lecture method, to reduce the gap of higher order thinking skills between Upper Academic (UA) and Lower Academic (LA) groups of students.The research partipants were 136 7th grade students in total, which consisted of two groups of 36 UA and 36 LA students. The students were selected through a stratified random sampling from 27 Public Junior High Schools in Surakarta, Indonesia. The treatment classes were determined through an intact group. The research design employed pre-test-post-test non-equivalent control group of quasi experiment. The higher order thinking skills were measured by essay test sheet as an instrument. Data were analysed by utilizing ANCOVA with the pre-test score as the covariate. The findings revealed that INSTAD have optimally improved higher order thinking skills in comparison with the Inquiry, STAD, and lecture method. INSTAD's were proven able to reduce the gap of higher order thinking skills between UA and LA students rather than Inquiry, STAD, and lecture method as teaching strategies.*

Keywords: *higher order thinking skills, inquiry-based learning, student team's achievement division, INSTAD strategy.*

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Introduction

The world has entered a disruption era. The main characteristics of this era are the rapid and unexpected pace of information and innovation in all fields of human living. Higher order thinking skills is arguably necessary to survive the disruption era. As Swestyani, Masykuri, Prayitno, Rinanto, and Widoretno (2018) contented that higher order thinking skills serve as a generator for the delivery of innovations in all fields, as well as a filter of information banalities. Students who are able to survive in the disruption era are the students who are skill full in analyzing, evaluating, and creating the needed information or knowledge to improve their living capacity (Campbell, Okey, Quitadamo, Kurtz, Paul, Nosich, & Rathburn, 1993).Higher order thinking skills in the field of education play a strategic role in helping students to construct the knowledge and information learned by students, which in turn are improving student's achievement. Some studies assure that students' higher order thinking skills are positively correlated with their learning achievements (Tanujaya, Mumu, & Margono, 2017).

Higher order thinking skills are defined as the students' skills in evaluating ideas and choices for decision-making (Apino & Retnawati, 2017). The aspects of higher order thinking skills include the skills of analyzing problems, of evaluating problems, and of creating arguments. The aspects of analyzing are the abilities to break down the material into parts and determine how the parts are interconnected. The indicators for the analyzing aspects are composed of organizing, showing, and distinguishing components or parts. Aspects of evaluating are the abilities to make decisions, to express opinions, or to judge based on certain criteria. The domain indicators of evaluating comprise of judging, concluding, contrasting, criticizing, interpreting, and deciding something. The aspetcs of creating are the abilities to rearrange the elements into new structures or produce new products. Indicators of the realm create the skills of planning, designing, formulating, and formulating hypotheses (Edwards & Briers, 2000; Fensham & Bellocchi, 2013).

A significant number of researches demonstrated that students' higher order thinking skills in Indonesia are in a poor condition (Khasanah, Sajidan,

Sutarno, & Prayitno, 2017). The 2015 PISA (Program for International Student Assessment) survey had placed the Indonesian students' higher order thinking skills at the rank of 62 out of 69 evaluated countries. The ratings were indifferent to the results of the PISA survey in previous years. The PISA data in 2000 placed Indonesian students at 38th rank out of 41 countries being investigated. In 2003 Indonesian students were ranked 38 out of 40 countries surveyed. In 2006 Indonesian students were ranked 50 out of the 57 countries surveyed. In 2009 Indonesian students were ranked 60 out of the 65 countries surveyed (OECD, 2016).

Based on the data presented above, it is urgent to seek for alternatives in reducing the gap of higher order thinking skills between the UA and LA students in Indonesia. The gap of higher order thinking between UA and LA students has been caused by the variations of individuals' ability to their intelligence even though they are in the same age group and in the same class (Prayitno, Corebima, Susilo, Zubaidah, & Ramli, 2017). Students' higher order thinking skills proficiency is not only determined by the factors of academic abilities but also is influenced by the students' given learning duration. The gap of higher order thinking skills between UA and LA students could be narrowed, if LA students are given a sufficient amount of time to learn (Prayitno & Suciati, 2017). Unfortunately, all students in Indonesia are having the same learning time allocation. Thus, the gap between UA and LA students higher order thinking skills is unavoidable.

Higher order thinking skills could be improved through activities that require students to conduct deductive and inductive thinking simultaneously (Zhou, Guo, Liu, Wang, & Ma, 2010). Through deductive and inductive thinking practices students become accustomed to analyzing, evaluating, and creating arguments by relying on theoretical truths that can be accounted for as well as testing whether theoretical arguments are supported by a strong empirical evidence (Probosari, Sajidan, Suranto, Prayitno, & Widyastuti, 2017). Learning strategies, that are adaptable to students' condition, are strategies that adopt the work of scientific methods such as Inquiry. The steps of Inquiry strategies are developed based on the steps of scientific methods (Öztürk, 2016), so that the Inquiry strategies are potentially capable of improving students' higher order thinking skills. Several studies had confirmed that Inquiry strategies have been proven improving students' higher order thinking skills (Sriarunrasmee, Suwannatthachote, & Dachakupt, 2015). Other studies also had shown that the use of competitive learning strategies such as Inquiry strategies is unable to minimize the learning achievement gap between UA and LA students (Prayitno & Suciati, 2017). It is argued that the gap of higher order thinking skills between UA and LA students could be scaled down, by the teaching strategy called cooperative-based learning (Slavin, 1980). Cooperative-based learning such as student team's achievement divisions (STAD) could be used in optimizing the scaffolding of UA students to become LA students through discussions, tutorials, and mutual learning activities among students (Rahmani, Abbas, & Alahyarizadeh, 2013). The optimal scaffolding leads LA students into their proximal development zone so that learning achievement gaps including higher order thinking skills between UA and LA students could be minimized (Azizah, Masykuri, & Prayitno, 2018).

The integration of Inquiry-based learning and STAD (INSTAD) is of urgency to minimize the gap of higher order thinking skills between UA and LA students. Implementation of Inquiry that are not integrated with the STAD is assumed to be ineffective for minimizing the gap in higher order thinking skills, since the Inquiry are less effective in facilitating scaffolding as well as STAD. Implementation of STAD without being integrated to Inquiry is less effective to train students' higher order thinking skill, as STAD do not emphasize on work of scientific method which has been potent to train higher order thinking skill. The INSTAD have the beneficial character of both Inquiry and STAD. Inquiry characters are able to drill students' higher order thinking skills more effectively (Baron, 2013). STAD characters are able to optimally facilitate scaffolding so that it is considered effective to minimize the gap of higher order thinking skills between UA and LA students (Slavin, 1980). INSTAD are considered more effective to minimize the higher order thinking skills gap between UA and LA students, compared to Inquiry, STAD, and lecture method.

INSTAD learning stages are described as follows: (1) Students are divided into heterogeneous groups based on their academic abilities. Each group is comprised of 5 UA and LA students. At this stage, the rules of group recognition are presented to the students. The group recognition rule refers to the STAD group recognition rules; (2) The teacher presents the Inquiry problem; (3) The students in the heterogeneous groups formulate the problem, formulate the hypothesis, design the experiment, experiment, and summarize the Inquiry results; (4) The students present the work Inquiry on class discussion session, (5) The students are participating in individual tests, and; (6) The teachers calculate the difference in the value of individual tests on the previous material with the material being studied. The difference in value is used as the basis for determining the contribution of individuals in the group. Individual contributions are used as a basis for group recognition (Prayitno, Corebima, Susilo, Zubaidah, & Ramli, 2017; Yusnaeni, Corebima, Susilo, & Zubaidah, 2017).

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A number of studies on improving students' higher order thinking skills through the use of instructional strategies had been done, albeit it's emphasized on the utilization of an established single learning strategies such as Inquiry-based learning, project-based learning, and other learning strategies (Akinoglu, 2008). On the other hand, the use of single competitive learning strategies is less effective to minimize the gap of higher order thinking skills between UA and LA students, as scaffolding does not work optimally on competitive based strategies (Prayitno, Corebima, Susilo, Zubaidah, & Ramli, 2017). Based on the background presented above, a research examining whether or not INSTAD's has capability in narrowing the higher order thinking skills gap between UA and LA students, compared to the Inquiry, STAD, and lecture method is crucial.

Problem of Research

PISA data demonstrates that higher order thinking skills of students in Indonesia are of concern. The poor condition is related to students' relatively substandard higher order thinking skill and gaps of higher order thinking skills between UA and LA students. The implementation of inquiry learning had proven to be able to improve students' higher order thinking skill, but lacking abilities in narrowing the gap of higher order thinking skills between UA and LA students. The root of this problem is the uniform learning time allocation for both UA and LA students. The problem could be solved by implementing tutorial as a learning strategy for substituting a sufficient learning time for LA students. INSTAD defines as an inquiry-based learning strategy which is enforced with a cooperative strategy peer tutorial that is potential to improve students' higher order thinking skills and to decrease the gap of higher order thinking skills between UA and LA students.

Methodology of Research

General Background of Research

This research employed quasi-experiment pre-test-post-test, non-equivalent control group design. During the experiment, students were distributed in eight treatment classes, each of which was two treatment classes of INSTAD, Inquiry, STAD, and lecture method. In each treatment class there were an equal distribution of UA and LA students. The division between the two classes for each treatment were intended as a replication in the experiment. Before and after the treatment, students were given pre-test and post-test regarding their higher order thinking skills. The pre-test scores were regarded as the covariate to control the factor variation of students' higher order thinking skills. Teaching as treatments were given for as many as 5 times with duration of each treatment 6x40 minutes. The research design is visualized in Table 1.

Table 1. Research design.

Group	Intact Class	Pre-tests	**Experimental Variable**	Post-tests
G1	Class1	HOTS	X1YI	HOTS
G2	Class2	HOTS	X1Y2	HOTS
G3	Class3	HOTS	X2Y1	HOTS
G4	Class4	HOTS	X2Y2	HOTS
G5	Class5	HOTS	X3Y1	HOTS
G6	Class6	HOTS	X3Y2	HOTS
G7	Class7	HOTS	X4Y1	HOTS
G8	Class8	HOTS	X4Y2	HOTS

X1= INSTAD X2= Inquiry, X3= STAD, X4= Lecture method. Y1= Upper academic (UA) Students Y2= Lower academic (LA) Students. HOTS = Higher Order Thinking Skills.

Sample of Research

The population of this research was 8.262 seventh-grade students from 27 Public Junior High Schools in

Surakarta, Indonesia.As many as four tops and lowest rank schools were selected as sample of this research by applying stratified random sampling to 27 public secondary schools in Surakarta. The research participants were 17 UA and 17 LA students from the four selected schools, or as many as 136 students in total as the sample of this research. The classification of upper and lower school rank was based on the inputs of average national Elementary School exam scores of the students' prior entering the Junior High School. Intact group technique had been utilized to determine the treatment classes by initially examining the equality of classes in each school as samples. The class equality test referred to the scores of their national exam when the students were in elementary school. The equivalence between treatment classes was tested by ANAVA. The results showed that the score was not significantly different with $p = 0.114$, so the selection of the treatment class was conducted randomly.

Instrument and Procedures

The students' high-order thinking skills in this research were measured by means of essay worksheet. Aspects of higher order thinking skills that were measured, included the skills of analyzing, evaluating, and creating. Indicators of an analysis skill include organizing, showing, and distinguishing parts. Indicators of an evaluation skill comprise of skills of assessing, concluding, contrasting, criticizing, interpreting, and deciding. Indicators of a creating skill include the skills of planning, designing, formulating, and proposing hypotheses (Edwards & Briers, 2000; Vijayaratnam, 2012). In order to maintain the logical validity of the higher order thinking skills test, before a test item was developed, the researchers initially prepared a test replica by considering the accuracy of the subject matter indicator and the accuracy of the aspects of higher order thinking skills. High-order thinking test sheet includes a scoring rubric to ensure the objectivity of marking. Three experts, who assessed the accuracy of the subject matter and the accuracy of the higher order thinking skill dimensions, examined the validity of high-order thinking test sheet. Expert judgment results revealed that higher order thinking test sheet was a valid category. The reliability test was measured by using Cronbach's alpha formula and showed a high category with a reliability index of .78.

The research treatments employed four different strategies: INSTAD, Inquiry, STAD, and lecture method. INSTAD were departing from research conducted by Prayitno, Corebima, Susilo, Zubaidah, and Ramli (2017). Further, the Inquiry adopted from a study conducted by Pedaste et al. (2015). In addition, STAD employed was based on Slavin (1980). Conventional strategy chosen was the varied lecture methods. All of the INSTAD, Inquiry, STAD, and lecture method as the learning strategies applied on this research were developed by the researchers and were assessed for feasibility by three learning science experts. The feasibility of the learning strategies chosen was assessed from the accuracy of its learning steps and the achievement of the learning objectives. Expert judgments claimed that learning strategies chosen had met the requirements. Before conducting the research, there were partner teachers who were trained to apply the learning strategies to be further implemented during the experiment. The training aimed at ensuring the accuracy and consistency of partner teachers in implementing learning strategies during the experiment. During the experiment, three observers were involved to assess the consistency of partner teachers' learning strategieis implementation in the classroom.

Data Analysis

ANCOVA was employed for the data analysis with a pre-test score as a covariate. Before the ANCOVA test, parametric statistic test was done in the form of data normality test and homogeneity of the variant test. Data normality was examined by Kolmogorov Smirnov test. The results of normality data test of high-order thinking obtained pre-test data .086 and post-test .216, which were larger than alpha value .05, It was concluded that the data did not deviate from the normal distribution. The homogeneity of variants was examined through Levene's test. Homogeneity test of the data from higher order thinking skill test was .141 bigger than alpha .05, so it can be concluded that the variants among data group were homogeneous. Difference significance of variable average value was examined by the LSD test. The statistical calculation used SPSS version 16.0 at a significance level of .05.

Results of Research

The results of the ANCOVA test on the students' higher order thinking skills during the treatment of learning strategies, academic ability, and the interaction of learning strategies and academic ability are visualized in Table 2 below.

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Table 2. Influence of strategies, academic ability, and interaction on high-order thinking skills.

Data Source	Sum of Squares	*df*	Mean Square	*F*	*p*
Corrected Model	19774.389a	8	2471.799	53.004	.0001
Intercept	37936.666	1	37936.666	813.499	.0001
Pre-test	390.589	1	390.589	8.376	.004
Learning strategy	16521.040	3	5507.013	118.090	.0001
Academic	1875.101	1	1875.101	40.209	.0001
Learning strategy * Academic	451.241	3	150.414	3.225	.025
Error	5922.508	127	46.634		
Total	624979.520	136			
Corrected Total	25696.897	135			

a. R Squared = .770 (Adjusted R Squared = .755)

Based on the learning strategies source of Table 2, it is obtained $p = .0001$, so, it could be concluded that there is a highly significant influence from the learning strategies towards the students' higher order thinking skills. The analysis of differentiation result of the learning strategy towards the students' higher order thinking skill through LSD test was at $p = .05$, as visualized in Table 3 below.

Table 3. LSD test result of learning strategies variation on students' higher order thinking skills.

Strategy	Mean Pre-test	Mean Post-test	Gap	Corrected Mean	Notation
Lecture Method	16.091	50.995	34.904	50.899	a
STAD	15.702	61.288	45.586	61.336	b
Inquiry	16.047	74.438	58.391	74.358	c
INSTAD	15.486	78.805	63.319	78.933	d

Table 3 demonstrates that the students who were learning based on INSTAD had improved their higher order thinking skills than students who were given either Inquiry, STAD, and or lecture method throughout their learning process. Students who were given Inquiry in their learning process had achieved better higher order thinking skills than students who were given STAD and lecture method in their learning process. Students who were given STAD had improved higher order thinking skills than students who were given lecture method in their learning process. Students who were learning through lecture method had the lowest level of higher order thinking skill, compared to those who were given INSTAD, Inquiry, and STAD in their learning process. With regards to the gap of pre-test and post-test scores, it is evident that the students who were given INSTAD in their learning process had the best empowered higher order thinking skills, followed in sequence by Inquiry, STAD, and lecture method.

The source of academic ability on Table 2 showed $p = .0001$, thus it has become emergent that there are gaps between UA and LA students' higher order thinking skills. The result of differentiation analysis between the influences of the academic ability on higher order thinking skills is visualized in Table 4.

Table 4. The Average score of UA and LA students' higher order thinking skills.

Academic Ability	Mean Pre-test	Mean Post-test	Gap	Corrected Mean
Upper Academic (UA)	14.512	62.024	47.512	62.515
Lower Academic (LA)	17.151	70.739	53.588	70.248

Table 4 displays that UA students have a higher order thinking skill corrected mean score as 62.515, which is higher than the LA students with score of 70.248. This established that UA students have better higher order thinking skills than the LA students.

On Table 2, interaction source column of learning strategy and academic ability, it is obtained that $p = .025$, marking that there was no interaction between learning strategy and academic ability towards students' higher order thinking skills. The result from differentiation analysis between learning strategy and academic ability towards higher order thinking skills through advanced LSD test presents $p = .05$, as visualized in Table 5 below.

Table 5. Interaction between learning strategy and academic ability.

Strategy	AcademicAbilty	Pre-test	Post-test	Gap	Corrected Mean	Notation
Lecture method	Lower (LA)	15.484	44.118	28.634	44.248	a
Lecture method	Upper (UA)	16.697	57.872	41.175	57.550	b
STAD	Lower (LA)	12.977	57.957	44.980	59.020	bc
STAD	Upper (UA)	18.427	64.619	46.192	63.652	c
Inquiry	Lower (LA)	14.361	69.464	55.103	70.012	d
INSTAD	Lower (LA)	15.227	76.556	61.329	76.781	e
Inquiry	Upper (UA)	17.734	79.412	61.678	78.703	e
INSTAD	Upper (UA)	15.745	81.054	65.309	81.086	e

Table 5 displays that the higher order thinking skills of UA students who were learning with INSTAD did not have a significant distinction from LA students studying with the same strategy. Further, UA students, who were learning with Inquiry had a higher score than LA students who were also employing Inquiry, and when compared to both UA and LA students who were employing STAD and lecture method. INSTAD were proven able to minimize the gap of higher order thinking skills between UA and LA students. It also emerged that implementing INSTAD to LA students would make the LA students' higher order thinking skills equal with UA students who were given Inquiry. UA students who were given Inquiry had a better higher order thinking skill than LA students, who were given the same method of learning, and also when compared to both UA and LA students who were given STAD and lecture method as treatments during the experiment. It appeared that Inquiry was less effective to minimize the gap of high-order thinking skills between UA and LA students. LA students who were applying Inquiry had better higher order thinking skills than UA and LA students who were learning with STAD and lecture method. UA students who were applying STAD did not have a significant difference in terms of their high-order thinking skills from LA students who with the same treatment but had better score than UA and LA students who were applying lecture method. LA students, who were applying STAD, were not significantly different in terms of their high-order thinking skills from HA students who learned more by means of lecture method than LA students who learned by means of lecture method. UA students who were given lecture method have a better higher order thinking skill than LA students who were given the same method. With regards to the gap of pre-test and post-test scores, it can be stated that both UA and LA who were applying INSTAD have had more empowered higher order thinking skills than UA and LA students who were applying Inquiry, STAD, and lecture method.

Discussion

The source of learning strategy in Table 2 above infers that there is a highly significant influence between the variations of learning strategy towards students' higher order thinking skills. Further, Table 3 shows that students, who had been given INSTAD as a treatment, have the most improved higher order thinking skills than students who were given Inquiry, STAD, and lecture method. When compared, students learning with Inquiry had better higher order thinking skills than the ones who were learning with STAD, similarly, students learning with STAD had better higher order thinking skills than students who were given lecture method during the experiment. It is evident that students who had been given lecture method as a treatment have had the lowest score of higher order thinking skills than students who were being treated with other learning strategies.

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Lecture method is drawn to be a teacher-centered learning strategy. A teacher delivers the lessons orally to students, only to be interrupted by occasional questions. To a greater extent, the successfulness of the learning strategy has been stressed at students' ability to memorize knowledge transferred by their teacher (Prayitno & Suciati, 2017). Meanwhile, the empowerment of higher order thinking skills demands supplemental activities beyond mere memorizing, such as analyzing, evaluating, and creating (Murphy, Bianchi, McCullagh, & Kerr, 2013). As a result, the higher order thinking skills of students, who had been given lecture method, were the lowest among students who were given STAD, Inquiry and INSTAD as treatments.

STAD is a type of cooperative learning. It is able to foster positive dependence in peer-group learning (Apanovich, Bezdenezhnykh, Sams, Jääskeläinen, & Alexandrov, 2018). Learning steps on STAD require students to be accustomed to discussions, dialogues and arguments when completing tasks given by the teacher. The said activities require students to analyze, to evaluate and to create new ideas when constructing knowledge, so STAD has been proven to better empower students' higher order thinking skills than conventional strategies. Many studies confirmed that STAD has capability in empowering students' higher order thinking skills (Huang et al., 2017).

Inquiry learning has been highly associated with students' higher order thinking skills trainings. Steps on Inquiry are derived from scientific methods (Pedaste et al., 2015). The method was developed to test the truth scientifically, by conducting three steps of truth testing, which are *logico*, *hypothetico*, and *verification*. *Logico* tests knowledge deductively, resulting a hypothesis. The hypothesis then is being verified whether it is supported by empirical evidences or not (Pedaste et al., 2015). Students' higher order thinking skills could be exercised by practicing deductive and inductive thinking, as scientific methods (Wang & Jou, 2016). Through both logical thinking, students would be accustomed to analysing, to synthesize, to evaluate knowledge, and to construct logical arguments while at the same time testing the empirical evidences that supports the knowledge. The scientific method demands students to interpret, to analyse, to evaluate, to conclude, and to explain information more effectively (Zhou, Guo, Liu, Wang, & Ma, 2010). The finding indicated that students who were applying Inquiry have had better higher order thinking skills than students who were learning with other strategies.

It was found that students who were learning with the INSTAD have the most improved higher order thinking skills, compared with the students who were implementing Inquiry, STAD, and lecture method. INSTAD is an integration of both Inquiry and STAD as a learning strategy. INSTAD has characteristics of both Inquiry and STAD. One characteristic of Inquiry is that it demands students to engage in scientific method during classroom learning (Pedaste et al., 2015). The activity of scientific method exercises both deductive and inductive thinking practices, thus customized students in interpreting, analyzing, evaluating, summarizing, and explaining knowledge (Zhou, Guo, Liu, Wang, & Ma, 2010). In addition, the activity of scientific method has been proven effective to develop students' independence, as students were used to set up their learning objectives, planning strategies for achieving goals, and evaluating their goal achievement (Gholami et. al., 2016). The training of higher order thinking skills with INSTAD has capability in maximising STAD characheristics which are proven to empower the students' higher order thinking skills through discussions, dialogues and debates in a cooperative group setting. Furthermore, the characteristics of STAD in the INSTAD ensure the effective scaffolding activity from UA students to LA students, narrowing the gap of higher order thinking skills as LA students are supported to enter their proximal development zones (Prayitno & Suciati, 2017).

In the column of academic skills in the Table 2, it is obtained that $p = .0001$, then it could be concluded that there is a significant influence from academic skill variations to students' higher order thinking skills. Table 4 further confirms that UA students have had better higher order thinking skills than LA students.

The variations in students' academic skills could be described following Piaget's statement that the cognitive aspect of the students is gradually developed alongside with their age i.e. the sensory motor stage is developed between 0-2 years old, pre-operational stage is developed between 2-7 years old, while concrete operational stage is developed between 7-11 years old, and the formal operational stage is developed at the age of 11 years and over. Students' intelligence level could actually be higher, lower, or equal to their age, for example, there were a number of 10-year-old children who were able to finish 15-year-old children's assignments. On the contrary, is is evidenced that there were 15-year-old children who were not able to finish 10-year-old students' work. Regardless the fact that students in Indonesian schools within a uniformed biological age, they are having different age of intelligence, resulting students are being classified into upper, moderate, and lower academic students.

The academic success of the students is influenced by numerous factors, such as talents, perseverances, learning qualities, the abilities to receive lessons, and study time allocations. If factors of talent, persistence, and ability to receive lessons are normally distributed in students' skills, then students are being given the equal amount of quality lessons, number of lessons, and learning time, accordingly the students' learning outcomes will be distributed properly to

the normal curve (Azizah, Masykuri, & Prayitno, 2018). When compared, UA students have been more successful in learning than LA students (Prayitno, Corebima, Susilo, Zubaidah, & Ramli, 2017). The students who were participating in this research were normally distributed in talent, persistence, and ability to receive lessons, then the students were given the said treatments, resulting in a curve of normal distribution of higher order thinking skills. It is proven that UA students significantly have a better higher order thinking skill than LA students.

Table 2 displays the interaction of learning strategy and academic ability towars students' higher order thinking skills. In addition, Table 5 shows how STAD as a learning strategy has been able to lessen the gap of higher order thinking skills between UA and LA students. It also has been proven to be able to endorse effective scaffolding through UA student's tutorial towards LA students, promoting the equality of higher order thinking skill UA and LA students. Effective scaffolding is able to encourage LA students to enter their proximal development zones, narrowing the gap of students' higher order thinking skills (Azizah, Masykuri, & Prayitno 2018). The tutorials that were conducted by UA students had compensated the lacking study time allocation of LA students. It is argued that students' academic accomplishements have been highly influenced by the study time allocation given. UA students are arguably requiring less study time allocation that LA students to master their lessons, vice versa (Prayitno, Corebima, Susilo, Zubaidah, & Ramli, 2017). As a consequence, the tutorial from UA students during STAD learning strategy has been able to make LA students equate with UA students' higher order thinking skills.

Table 5 demonstrates the interaction between Inquiry as a learning strategy with academic ability, of which UA students had proven to be able to improve the higher order thinking skills than LA students during the treatment. As a learning strategy, Inquiry is less capable in narrowing higher order thinking skills between UA and LA students. During the treatment, Inquiry was implemented to the traditional groups. The group division had been randomized; creating possibilities that the groups formed had homogenous or heterogeneous academic skills. Inquiry activities in groups with homogeneous academic skills had resulted in ineffective scaffolding, as they have had equal academic skills (Damavandi & Shekari, 2010). On the other note, Inquiry activities in heterogeneous groups also found to be ineffective, as it was failed to create positive synergy. Traditional groups that implement Inquiry are strongly based on competition, so that students will naturally struggle to be the best in the group. UA students were reluctant to assist LA students by giving tutorials due to the fear that it hindered the efforts to be the best. As a result, the gap of higher academic skills between UA and LA students was unavoidable.

Table 5 presents the equal ability of INSTAD to improve higher order thinking skills of both UA and LA students. INSTAD were able to lessen the gap of higher order thinking skills between UA and LA students. INSTAD has both Inquiryand STAD characters. STAD characteristics had enabled teachers to equate UA and LA students' higher order thinking skills. The implementation of Inquiry in traditional groups had resulted in the failure of narrowing academic skill gap between UA and LA students. On the contrary, the implementation of Inquiry in groups treated with STAD was proven to effectively equate UA and LA students' higher order thinking skills. Further, INSTAD found to be endorsing effective scaffolding, while fulfilling sufficient study time allocation of LA students in peer-group tutorials. The STAD character in INSTAD also demands students to assist one another, further supporting LA students entering their proximal development zone. The STAD characteristic in INSTAD provides an ideal time allocation for LA students, so the gap of higher order thinking skills between UA and LA students had been narrowed.

Table 5 also exhibits that INSTAD has become the best learning strategy in improving UA and LA students' higher order thinking skills, followed by Inquiry, STAD, and lecture method. It is evidenced that INSTAD has two impressive distinctions from other learning strategies. First, INSTAD has capability in equalizing UA and LA higher order thinking skills, which is lacking in both Inquiry and conventional learning strategies. Second, INSTAD has been proven to elevate students' higher order thinking skills effectively, which is lacking in both STAD and lecture method. The superiority of INSTAD is caused by the syntax integration between Inquiry and STAD, which are complementing one another.

Table 5 demonstrates how lecture method is more suitable to significantly improve higher order thinking skills of UA students, when compared to LA students. It is also found that lecture method is less capable in reducing gap between UA and LA students' higher order thinking skills. The method has placed teachers as the main reference during the learning process, while students are leaning on the lessons presented as the main source of information with small students' involvements. Lecture method seldomly includes students in discussions, ideas and insight exchange, so that students' reasoning skills are rarely exercised. Being conducted conventionally, scaffolding via peer-tutorials has never occurred in lecture learning strategy (Azizah, Masykuri, & Prayitno, 2018). Without endorsing scaffolding, lecture method had failed to push LA students entering the proximal development zone, resulted in the gap in higher order thinking skills between UA and LA students. While UA students significantly improve the higher order thinking skill, LA students failed to follow the lessons provided. Lecture method had failed to accommodate varied

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time allocation needed by different students. It is claimed that time allocation has become one of the major factors in study accomplishment, as UA students require lesser study time allocation compared with LA students (Amiruddin, Samad, & Othman, 2015). The uniform study time allocation in lecture method had resulted in the underdeveloped LA students' higher order thinking skills, while UA students significantly improve the skills.

Conclusions

The finding confirmed that the INSTAD have become the most optimal learning strategy for improving students' higher order thinking skills, when compared to Inquiry, STAD, and lecture method. It was also justified that students' academic ability has influence towards students' higher order thinking skills. It is maintained that Upper Academic (UA) students have better higher order thinking skills than Lower Academic (LA) students. Further, INSTAD learning strategy has proven to be able to narrow the higher order thinking skill gap between UA and LA students and has become the most advantageous strategy to elevate students' higher order thinking skills when compared to other learning strategies.

INSTAD as a teaching strategy has been proven effective in optimizing students' higher order thinking skills. Teachers, as a consequence, are under a compulsion to consider adopting the strategy in exercising students' higher order thinking skills in their classrooms. When enforcing the INSTAD strategy, LA students could be further empowered, thus become equal with UA students, if the teaching strategy chosen is also endorsing scaffolding through effective peer-group tutorials. A strong cooperative learning method, which takes advantages of scaffolding, either independently or integrated with other learning strategies, should be considered by teacher to elevate LA students' higher order thinking skills. The current conventional competitive based learning has led to higher gaps of higher order thinking skills of UA and LA students.

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