

# The Exploration Study of Teachers' Knowledge and Ability on Application of Critical Thinking and Creative Thinking Skills on Learning Process in Elementary School

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**Abstract:** 21st century and industrial revolution 4.0 need learning activity which is present high-order thinking skills consist of critical thinking and creative thinking. But the problem in Banjarmasin city elementary schools, teachers have low-quality ability to make an instructional design based on critical thinking and creative thinking. This research wants to describe the knowledge, ability to prepare learning materials, ability to teach, and make an evaluation based critical thinking and creative thinking skills on elementary school teachers in Banjarmasin city. This research uses a quantitative method combined with descriptive analysis. The subject of this research is 200 persons elementary school teachers in Banjarmasin city. The result shows that just 24.25% from samples, understand and know about the critical thinking concept and 20.5% understand and know about the creative thinking concept. Just 39.5% of samples are using critical thinking and creative thinking skills in their lesson plan. About 43.1% of samples present learning activity based on critical thinking and creative thinking skills and more just 19.09% of the range of samples understand and give an evaluation based on critical thinking and creative thinking skills. This result can be used to take the best way to improve elementary school teacher ability.

**Keywords:** teachers' knowledge, teachers' ability, critical thinking, creative thinking, learning process

## 1. INTRODUCTION

Learning process on 21st century and industrial revolution 4.0 need activity which is present high order thinking skills consist of critical thinking, problem-solving, culture and environment awareness, communication, lifelong learning, self-management, new literation such as technology literation and many more, creative thinking, innovation skill, collaboration with other person and leadership (Hasratuddin, 2014; Istianah, 2013; Suparman, 2015). The latter cannot be achieved without the contribution of various stakeholders.

The future human resources must face more challenges like information maker skills, high order thinking skills, communication, and collaboration (Dhanapal & Lim, 2014; Suriansyah, 2018). On other hand, Bialik (2015) mentioned the key issues in the 21st-century learning framework: skill, knowledge, metacognition, and character. We must concern to make learning activity

which is a practice that skills, so the learning outcome is not just oriented to cognitive skills. One of the most important skills in 21st-century learning is critical thinking. Ennis (2011) mentioned critical thinking is reasonable, reflective thinking that is focused on deciding what to believe or do.

We can conclude that critical thinking can think systematically, students can show their argument and evaluate their decision exactly. On other hand, Ennis (2011) explained that critical thinking is focused on the sense of something being done consciously and towards an objective. A vital goal of critical thinking skills is to help a person make the right and best decision of their life.

Other views on critical thinking presented by Baron and Stenberg (Mahmuzah, Ikhsan & Yusrizal, 2014) state that critical thinking is focused on making what is believed to be done. This definition is a combination of five basic things in critical thinking, namely practical, reflective, reasonable, trust, and action. While Santrock (Kowiyah,

2012) says critical thinking is to understand the meaning of the problem deeper, to make an open mind to various approaches and views, and to think reflectively and not just accept statements and carry out procedures without knowing and significantly evaluating.

The learning of critical thinking skills is said to work when it meets the indicators as presented by Ennis (2011) the critical thinking indicators are organized in five large activities as follows: giving a simple explanation, which focuses questions, asks and answers the question of an explanation; Building basic skills, which consist of considering whether a source is trustworthy or not and considering an observation report; To conclude or consider the result of deduction, to induce or to consider the outcome of induction, and to make and determine the value of judgment; Provides further explanation, which consists of identifying terms and descriptive as well as dimensions, and identifying assumptions and regulating strategies and techniques, which consist of determining actions and interacting with others.

Ennis (2011) also give us signposts in implementing a critical pattern of thinking for students both in class and in everyday life, which is: searching for clear statements from each statement; Making excuses; Trying to be well-informed; Using sources that have the flexibility and mention it by considering the situation and condition as a whole; Trying to stay relevant to the main idea; Given its original and fundamental interests; Searching for alternatives; Behaving and thinking openly; Take a position when there's enough evidence to do something and look for as many explanations as possible.

The next skill to be developed is creative thinking. Forrester et al (Djidu & Jailani, 2016) state that creative thinking skills can teach students to come up with lots of ideas and arguments, ask questions, search for arguments truths, even enable students to be open and responsive to different perspectives. Along with Forrester's claims, the chemist also proclaims (Apino & Retnawati, 2017) that creativity is the ability to present new ideas and apply them to problem-solving. Creativity has an increasing of fluency, novelty, and originality in thought. The next indicator is having a curiosity, is fond of asking questions, and is keen to pursue new experiences.

Another opinion mentioned by treffinger (Djidu & Jailani, 2016) creative thinking ability concern with Fluency, which is the ability to generate ideas, ways, Suggestions, questions, ideas, or answers fluently at a given time in precisely and latent quality; Flexibility, that is, includes the ability to express ideas, the answers or questions that vary from the point of view that the ideas or answers come from different angles by changing the way they approach or think; Originality, which is the ability to express phrases, ideas, or ideas to solve problems or to create a random, unique, new combination of parts or elements that no one else would think of; Elaboration, which is the ability to enrich, develop, add, define, or quantify the details of objects, ideas, central ideas or

situations to be more attractive and metaphorical thinking, is the ability to use comparisons or analogies to make new connections.

Reflecting on the skills that students should have, raises a big question about how with the competency of today's elementary school teachers? teacher competence should be enhanced because elementary school teachers should be able to keep up with technological developments, it has new literacy capabilities with literacy aspects of data, technology literacy, and humanism or human resources, the ideal teacher has digital competence and can answer the tech-based learning barriers for information and communication and must be free from "technology-stutter" disease (Agusta, Setyosari & Sa'dijah, 2018).

The skills that teachers must-have in the 21st century are also described by the Akyol & Garrison (2011) that teachers should have the ability to understand child development and learning, to have the ability to develop a child's perspective, to have the ability to commend, to provide comfort, make the question and give the response to children, to have leadership and to master problem-solving skills, to have a good word and sentence mastery and the ability to capture ideas of children, to have the ability to develop learning that targets one by gadgets that are capable of developing children's abilities. So that the ideal teacher should be constantly studying and developing himself through various strategies, thereby reducing knowledge, skills, social skills, and personality differences.

Teacher development today should lead to a commitment to successfully planting skills in the 21st century, and teachers will also be required to think systematically to construct learning tools and materials that support 21st-century skills and the industrial revolution 4.0, teachers are required to master the material and media and technology to promote the success of the learning process, to embrace autonomy in the task, to make scientific work and research an expertise tool, to always respond to changes and become a professional society. This skill is a requirement and special directive to teachers with varying degrees of education, with no exception than elementary education.

But the fact that the ground is poor conditions. The 2015 study of PISA (the program for international student assessment) pointed to the accomplishment of a child of Indonesia ranked only 69 of 72 countries. This product is promoted by the TIMSS study (trends in international mathematics and science study), Indonesian students rank 36 out of 49 countries in scientific thought skills. The results demonstrated by these two international bodies of employment should be of concern to all those in the educational world. The achievement which remains a concern is shown by the results of the Indonesian assessment Human Development Index (HDI).

The responsible party and contributing to Indonesia's international achievements are those who are directly

facing the students. The quality of the teacher is not yet specific, but the facts in the field over the past few years indicate less than satisfactory results. In research conducted by Santoso (2013), showing the results of the entire study sample of only 2 (2) teachers with competence to achieve the highest level of rank iv b, this was apparently because many teachers were unprepared to meet the set criteria for acquiring credit Numbers particularly in the field of scientific writing. This shows that teachers never conduct a class action research that functions to improve the quality of learning and reflect the learning process that has been performed.

This research reinforcing the notion that teachers at an elementally high school are still not optimal. Meanwhile, Retnawati, Kartowagiran, Arlinwibowo, & Sulistyarningsih (2017) his research show that on professional development more than 90% of teachers have not written scientific articles, scientific research, articles in journals and magazines or newspapers yet, 82.5% of teachers have never prepared research proposals and did research that is due to incompetence and motivations that are not as high as they used to be.

Similar results were shown by Goethals research (2013) that found that poor quality teachers occur in certified professionals through teacher certification. The rating of certification to elementary school teachers does not guarantee the quality of the learning process that they produce, the learning and output that they produce are below performance standards, and it also shows that teachers in cities perform higher quality than those in the schools in the rural areas. A similar discovery was made by Mokhtar, Tarmizi, Ayub, & Nawawi (2013) that primary school teacher in the suburbs had a greater burden of teaching, she was slow to get information about educational development, had little opportunity to improve her profession. Whereas the teacher who taught in the district city area taught according to the burden of regulations and had a great opportunity to improve his competence and professionalism.

Efforts have been made and continue to improve the quality of learning that is conducted by elementary and integrated teachers. Ranging from the top 4 teacher competencies to mastery of skills of the 21st century. The problem that still embodies the low quality of learning is the teacher's ability to package learning with an innovative, creative, effective, fun, 21st-century craft model. Teachers are still comfortable with the practical learning process of using even a simple learning model without using a model of learning that can motivate students to learn and potentially develop the students' potential. Further Agusta & Noorhapizah (2018) on their research show that the learning process of one of the primary schools in the city of Banjarmasin is still a transfer of knowledge and has not developed students' creativity. The same has been expressed by Pratiwi (2018) that the elementary school in the city of Banjarmasin still has not developed the student's independence in learning. The

same condition has been expressed by Fauzi (2018) that the learning process at an elementary school in Banjarmasin still makes cognitive use the primary requirement.

Preliminary research results on the field are found that most teachers still use a simple set of learning tools without regard to the attainment of high-level thinking skills in both the design of learning activities and the evaluation. Most teachers carry out the learning process in a practical way and have not yet implemented innovative study models loaded with high-thought skills, which cause the learning process to be monotonous and tend to bore students quickly in the learning process. Teaching is still a transfer of science and has not yet put students as a learning center or center of learning. This situation gives impacts to students' participation in a listening learning process, recording materials, problem exercise, occasionally using group discussion and work but not yet oriented investment of cooperative skills. This kind of learning process has certainly not developed a student's advanced thinking ability. Also concerning is the evaluation activity, which only emphasizes the achievement of the cognitive realm, not yet fully achieves affective and psychological assessment (Agusta, Setyosari & Sa'dijah, 2018; Agusta, Noorhapizah, 2018; Norfuad, Suriansyah, 2019; Aqli, Suriansyah, 2018; Fahlivi, Asniwati, 2018; Yundiapi, Aslamiah, 2018; Nenestalia, Aslamiah, 2018; Sholehah, Asniwati, 2017; Nurmala, Suriansyah, 2017).

According to the foregoing, industry has begun to identify the ability of the teacher as a starting database to determine the direction of teacher competency following the demands of 21st-century education and industry 4.0, Researchers are interested in doing this research because at present there is no concrete data and no clear picture of how perception and ability to harness critical thinking and creative thinking skills especially in Banjarmasin city. This research will explain deeply how teachers perform in the learning process and answer the big question of whether an elementary school teacher in Banjarmasin city is prepared to develop student skills needed by future communities. Therefore, researchers look forward to carrying out a study on the title "the exploration study of teachers' knowledge and ability on the application of critical thinking and creative thinking skills on the learning process in elementary school on Banjarmasin city".

The purpose of this research is to describe the field's reality of planning, carrying out, and evaluating the learning process of critical thinking and creative thinking at elementary school teachers in a city of flooding Banjarmasin. More detailed research of this has a purpose to know: (1) the knowledge of elementary school teachers in Banjarmasin about critical thinking and creative thinking skills concept; (2) the ability of elementary school teacher in Banjarmasin to prepare learning materials that develops critical thinking and creative thinking skills; (3) the ability of elementary school teachers in Banjarmasin city to present learning activity containing critical thinking and creative thinking skills; and (4) the ability of

elementary school teachers in Banjarmasin to make an evaluation based on critical thinking and creative thinking skills.

## 2. METHOD

This research will describe the field fact of the knowledge of a public elementary school teacher in Banjarmasin to develops critical thinking skills and creative thinking skills, the ability of a teacher to prepare lesson plan containing critical thinking and creative thinking skills, the ability of a teacher to present learning activity containing critical thinking and creative thinking skills and teachers. To achieve the goal of this research uses descriptive quantitative methods. Descriptive means that this method is used to illustrate and describe the fact that is currently underway during research and can make an exact interpretation (Moseley, Baumfield, Elliott, Gregson, Higgins, Miller, & Newton, 2005). Descriptive methods can provide phenomena descriptions, indicate relationships, test hypotheses, make predictions, and get implications for a problem that you would like to solve (Suparlan, 2005). Meanwhile, the quantitative meaning is that the kinds of data that are collected and worked through theoretical structure calculations to build research models and hypotheses, and require quantitative and statistical testing (Hartono, 2004).

This research uses a teacher's knowledge of critical and creative thinking skills variables, the ability to prepare and perform critical and creative thinking skills on learning activity. The population of this research is all public-school teachers in the city of Banjarmasin, which were 2,642 persons in 201 elementary schools. Samples in this research should qualify teachers who teach in a public elementary school. Schools and teachers at the public school received benefits and benefits from the state and had

similar opportunities for career development; (2) teachers who have experience at school for at least 5 years. A period of 5 years is credited with teaching ability enough to know the issue and conditions of students; (3) teachers at school who have implemented curriculum 2013 throughout the class. The sample in this research stands at 200 persons.

The data-collection techniques use in this research are observation, interviews, and documentaries. Observations in this research are done in structural observation techniques. Observation guidelines in this research include charging instruments that are check-listed to assess the entire lesson plan. Deep checklists use electronic instruments containing the implementation of the learning process. An instrument is a descriptor teaching sequence descriptor in each indicator performed by the teacher. According to a draft issued by the general government.

The next method is interviewing, the interview techniques used in this research are interviews with guidelines for interviews. Before the interview is done, a guideline for the interview will contain the framework and Outline that will be asked in the interview process. This interview has the intent that the interview process is not tied to the interview guidelines on the subject of research but can also be enhanced and developed according to the circumstances and circumstances on the ground (the interview guide below, Table 1).

Interviews are conducted with 200 persons elementary school teachers and 200 person teachers in an elementary school located in a public elementary school in Banjarmasin. The goal of this interview is to gain data on the teacher's knowledge of critical thinking and creative thinking skills concept. The last method used is documentation. Documentation is compiled by the lesson plan, the learning process that is carried out in the classroom, and the teaching materials that are used by teachers.

**Table 1 Questionnaire grid**

Aspect	Description	Number of Content	Number of questions
Knowledge Thinking Skills	The concept of learning uses critical thinking skills	4	1-4
	The concept of learning uses creative thinking skills	6	5-10
Higher Order Thinking Skills on Lesson Plan and Lesson Activity	The form of activity that trains critical thinking skills. Activities indicators: <ul style="list-style-type: none"> <li>• Focus questions, analyses arguments, ask questions and answer about an explanation or challenge.</li> <li>• The ability to sum up an idea or a solution.</li> <li>• Interpreting facts or conclusions or logical statements based on information provided.</li> <li>• Evaluate, differentiate between strong and relevant arguments and weak or irrelevant arguments.</li> </ul>	4	1-4
	An activity that trains creative thinking skills. Activities indicators: <ul style="list-style-type: none"> <li>• Generate an idea of a new solution (<i>Novelty</i>).</li> <li>• Generate a whole bunch of ideas in words, pictures or actions (<i>Fluency</i>).</li> <li>• Generating all kinds of ideas flexibility (<i>Flexibility</i>).</li> <li>• Results in less obvious ideas but it's unusual or unique (<i>Originality</i>).</li> <li>• Develop, add or decode an idea (<i>Elaboration</i>).</li> <li>• Sense the problem or an issue, think abstractly (<i>Abstractness</i>).</li> </ul>	6	5-10

Sources: Silver & Pittsburgh (1997); Treffinger, Young, Selby & Shepardson (2002); Plucker (2004); Munandar (2009); Putra, Irwan & Vionanda (2012)

The instruments used in the study include questionnaires, observation sheets, interview manuals, and documentation to facilitate data collection. The instrument used to collect the data in this research is made up of two components. The sequence used in collecting data has to be valid and reliable. Therefore, need to conduct an instrument test. The trial is conducted with about 50 elementary school teachers.

To test the properties of instruments and content of this instrument. This validity test was done by a pre-existing correlation technique held by Pearson by cracking Numbers as follows. Validity calculations of the instrument are calculated using the help of the SPSS 21 application. While validity results can be seen by comparing those found on the corrected column the total correlation with the value-table for a total of 30 people trying out samples and a degree of significance of 5% is

0.361. Based on the suggestion, an item is said to be valid if the value of the reenactment is greater as well as positive marks of 0.361.

The second instrument used is an observation sheet with the purpose of a guide in conducting observation of all matters related to problems at the location of the research. The following is an observation instrument lattice (Table 2). The next instrument is an interview that is set out with this grid which contains a list of questions that will be used for researchers as they interview the community that was turned into an informant in this research once identified by the definitions of each variable (Table 3), then drawn up indicators that are used as a reference to making lattice. The second instrument used is an observation sheet with the purpose of a guide in conducting observation of all matters related to problems at the location of the research.

**Table 2 Observation Grid**

Aspect	Description	Number of Content	Number of questions
Planning	Plan to organize teaching materials.	3	1-3
	Plan class management.	5	4-8
	Plan the use of media and teaching resources.	2	12-13
	Plan the student achievement assessment for the sake of teaching.	2	14-15
Implementation	Plan the organization of teaching materials.	3	1-3
	Plan class management by including scientific elements of work.	2	4-5
	Includes learning indicators that lead to the emergence of critical thinking and creative thinking skills.	1	6
	Brings out the attainment of critical thinking and creative thinking skills for the purpose of learning.	1	7
	Plan an activity that invites students to ask questions and answer challenges or problems in the initial activity.	1	8
	Plan activities that direct students to give opinions and comment on the opinions of others in the initial activity.	1	9
	Plan activities that give students the opportunity to seek succour of a problem in the central activity.	1	10
	Plan activities that direct students to make statements of logical and reasonable solutions in the core activity.	1	11
	Plan activities that direct students to distinguish between strong influences or irrelevant actions in the core activity.	1	12
	Planning activities that direct students to correct statements given to others if there is error in the core activity.	1	13
	Plan activities that give students opportunities to give new problem-solving ideas and are not like other friends ( <i>Novelty</i> ).	1	14
	Plan activities that give students an opportunity to generate a large number of ideas in words, pictures, or actions ( <i>Fluency</i> ).	1	15
	Plan activities that give students opportunities to generate flexible kinds of ideas ( <i>Flexibility</i> ).	1	16
	Plan activities that give students the opportunity to produce unique ideas ( <i>Originality</i> ).	1	17
	Plan activities that give students the opportunity to develop, add or expound ideas with a logical explanation ( <i>Elaboration</i> ).	1	18
	Plan the use of media and loaded teaching resources that are sharpening critical thinking and creative thinking skills.	1	19
	Plan assessments by incorporating critical thinking and creative thinking skills.	1	20
	Using a learning model and worksheet that has critical thinking and creative thinking skills.	1	21
	Communicating with students.	5	22-26
	Demonstrating activities before students explore or practice.	3	27-29
Encouraging and promoting student engagement in teaching.	4	30-33	
Demonstrating mastery of subjects and relevance.	2	34-35	
Organizing time, space, materials and teaching equipment.	3	36-37	
Evaluation	Conducting student achievement evaluations in the teaching process.	3	1-3

Sources: Silver & Pittsburgh (1997); Treffinger, Young, Selby & Shepardson (2002); Plucker (2004); Munandar (2009); Putra, Irwan & Vionanda (2012)

**Table 3 Interview Instrument Grid**

Variable	Indicator
Knowledge of thinking skills	The learning which containing critical thinking skills according to indicators. The learning which containing creative thinking skills according to indicators.
Lesson plan	Drafting and make lesson plan.
Learning process	Classroom management. Uses media and learning resources. Uses learning methods.
Evaluation	The kind of assessment in learning activities. Communicates assessment results.

The following is an observation instrument lattice. The last instrument is documentation. Documentation is used as support of data results of observation and interviews, done research on some of the school's documents or records. This method is used to obtain information about the learning materials is used by teachers, lesson plans, and syllabus, the school profile. The tests of questionnaire use the formula alpha from Cronbach is that is Analysed using application SPSS 21.0.

$$r_1 = \left( \frac{k}{k-1} \right) \left( 1 - \frac{\sum s_i^2}{s^2} \right) \quad (1)$$

The retirement instrument tests are intended to detect the consistency of a gauge, or in other words, they have consistency when used repeatedly at different times and the result is the same. While to test the levels of reliability of the questionnaire is used Cronbach's alpha coefficient test (formula 1). The questionnaire is said that reliable if it has a coefficient alpha score over 70 (Nunnally, 1979; Azwar, 1986). To make easy on count we use the statistic software SPSS 15. A score of 1 to 5 is a scoring choice of any statement. That is, if the respondents for one statement select the answer to 5, then the answer score is 5. If the respondents take the number 1 then the answer score is 1, so on and so on. So, if the respondents answered the overall statement given, then the indexes score between 30 and 100.

Collecting data of the research about knowledge, planning and evaluating critical thinking, and creative thinking skills using questionnaires, interviews, and documentaries. The questionnaires used are Likert scale make available alternatives that have an answer score from 1 to 5, which is Shared with the responders to answer or fill by teachers as respondents. Avoid the subjectivity of responders to questionnaires, the questionnaire is first explained that statements given do not affect his status as teachers, and are asked to identify.

Observation is used to probe data about the teacher's performance, the observation sheet is filled out by the principal as the supervisor of the responders who had the job inherent in the daily task of having the authority to grade the teacher's performance in the learning under him. The scoring about a teacher's performance in this research uses an observation sheet whose assessment was filled out by the principal with a score yes = 1 and no = 0.

Data analysis procedures include descriptive data and inferential statistics. Descriptive analysts are used to answering research questions about the description and picture of the condition in the field of knowledge, planning, conduct, and evaluation of critical thinking and creative thinking elementary school teachers in a Banjarmasin city.

### 3. RESULTS

#### 3.1 *Teacher's Knowledge of Critical Thinking and Creative Thinking Skills*

To achieve teachers' results on knowledge about critical thinking and creative thinking skills is performed with a top-down indicator of critical thinking and creative thinking skills of 30 points of the question with four possible answers (Table 4). Each of those tests has the teacher's correct answer Numbers, divided by the total number of question times 100%. Based on the results of tests conducted on 200 teachers in this research, the data gained a percentage of teachers' understanding of critical thinking and creative thinking skills is different. All teachers have diverse notions of critical thinking and creative thinking skills. This shows that teachers have less ability to use critical thinking and creative thinking skills in all aspects of the learning process.

#### 3.2 *The Development of Critical and Creative Thinking Skills in Lesson Plan*

Based on observations analyzing the lesson plan, which was made by 200 respondents, an average of 39.5% for the appearance of every aspect of the teacher's creative thinking skills (Table 5). By looking at the RPP average percentage, which is around 39.5%, teachers do not plan to develop critical and creative thinking skills to a maximum (Table 6). Because if learning refers to a creative process it has to start with finding a problem, solving it to communicating (Munandar, 2009). Very clearly a gap is seen as an aspect of originality that is not at all developed. Very related novelty development to the aspect of fluency and originality.

The novelty will occur if the teacher develops fluency and flexibility (Evans, 1991). The more and varied answers a student's answer will likely appear, the more possible originality. From the table above (Table 7), teachers' ability to develop critical thinking and creative thinking skills in the lesson plan can be achieved by the analysis of

the indicator of its skills in lesson plans was made by teachers. The noticed statements are critical thinking and creative thinking skills that appear on the lesson plan component: indicators and purpose of learning; Early activity; mental activity; end Activity; Media and learning resources. Lesson plan as individual teachers analyzed, the

whole aspect of the incubation was converted into a percentage form. According to an analysis of the 200 lesson plan documents compiled by 200 teachers, the emergence of every critical thinking and creative thinking skill understudy is different.

**Table 4 Critical Thinking Knowledge Verification Result**

Definition of critical thinking	Verification Result
Focused questions, analyze arguments, ask questions and answer about an explanation or challenge	34%
The ability to concluded idea or a solution	23%
Interpreting facts or conclusions or logical statements based on information provided	21%
Evaluate, differentiate between strong and relevant arguments and weak or irrelevant arguments	19%
RANGE	24,25%

**Table 5 Creative Thinking Verification Result**

Definition of creative thinking	Verification Result
Generate an idea of a new solution ( <i>Novelty</i> )	21%
Generate a whole bunch of ideas in words, pictures or actions ( <i>Fluency</i> )	23%
Generate various types of participation flexibly ( <i>Flexibility</i> )	22%
Results in less obvious ideas but it's unusual or unique ( <i>Originality</i> )	17%
Developed, added or decoded an idea ( <i>Elaboration</i> )	29%
Sense the heart of a problem or a issue, thinking abstractly ( <i>Abstractness</i> )	11%
RANGE	20,5%

Sources: Silver & Pittsburgh (1997); Treffinger, Young, Selby & Shepardson (2002); Plucker (2004); Munandar (2009); Putra, Irwan & Vionanda (2012)

**Table 6 Critical and Creative Thinking Skills in Lesson Plan Verification Result**

Description	Verification Result
Plan to organize teaching materials	59%
Plan class management by incorporating the scientific element of work	54%
Incorporate learnings that lead to the emergence of critical thinking and creative thinking skills	32%
Brings out the attainment of critical thinking and creative thinking skills for the purpose of learning	41%
Plan an activity that invites students to ask questions and answer challenges or problems in the initial activity	82%
Plan activities that direct students to give opinions and comment on the opinions of others in the initial activity	78%
Plan activities that give students the opportunity to seek solutions of a problem in the central activity	52%
Plan activities that direct students to provide statements of logical and justifiable solutions in the core activity	33%
Plan activities that direct students to distinguish between strong argument or irrelevant argument in the central activity	33%
Plan activities that direct students to correct the statements that others give if there is error in the main activity	32%
Plan activities that give students opportunities to give new problem-solving ideas and are not like other friends ( <i>Novelty</i> )	31%
Plan activities that give students an opportunity to generate a large number of ideas in words, pictures, or actions ( <i>Fluency</i> )	75%
Plan activities that give students opportunities to generate flexible kinds of ideas ( <i>Flexibility</i> )	76%
Plan activities that give students the opportunity to produce unique ideas ( <i>Originality</i> )	11%
Plan activities that give students the opportunity to develop, add or expound ideas with a logical explanation ( <i>Elaboration</i> )	10%
Plan media used and action-charged teaching resources that hone critical thinking and creative thinking skills	5%
Plan assessments by incorporating critical thinking and creative thinking skills	6%
Using a learning model and worksheet with critical thinking and creative thinking skills	2%
RANGE	39,5%

Sources: Silver & Pittsburgh (1997); Treffinger, Young, Selby & Shepardson (2002); Plucker (2004); Munandar (2009); Putra, Irwan & Vionanda (2012)

The average percentage of coming up with critical thinking and creative thinking skills in the science lesson plan is 27% with less category. Of all the science lesson plans laid out, only 2 indicators of critical thinking skills are asking the questions and addressing challenges in initial activities and giving opinions and giving comments in

early activities. Whereas the creative thinking indicator that the teacher could appear at lesson plan is as much as 2 indicators: allowing students to produce a large number of ideas in words, pictures, or actions and allowing students to produce a wide range of ideas with flexible.

**Table 7 Critical and Creative Thinking Skills in Learning Activity Verification Result**

Description	Verification Result
Encourage students to ask questions and answer challenges or issues	71%
Direct students to give opinions and comment on the opinions of others	75%
Plan activities that give students the opportunity to seek solution of a problem like Giving students problems ordered from low to high level	31%
Plan activities that direct students to provide statements of logical, justifiable solutions or Asking students to think critically	72%
Plan activities that direct students to distinguish between strong argument or irrelevant argument in the central activity	52%
Plan activities that direct students to correct the statements that others give if there is error in the central activity	61%
Plan activities that give students opportunities to give new problem-solving ideas and are different not like other ( <i>Novelty</i> )	16%
Plan activities that give students an opportunity to generate a large number of ideas in words, pictures, or actions ( <i>Fluency</i> )	73%
Plan activities that give students opportunities to generate flexible kinds of ideas ( <i>Flexibility</i> )	72%
Plan activities that give students the opportunity to produce unique ideas ( <i>Originality</i> )	17%
Plan activities that give students the opportunity to develop, add or expound ideas with a logical explanation ( <i>Elaboration</i> )	18%
Plan media use and action-charged teaching resources that hone critical thinking and creative thinking skills	21%
Make practice with evaluation creating discussion groups, giving up to C3 questions	74%
using methods, techniques, or approaches which can improve critical thinking and creative thinking	28%
Using a study and worksheet model of critical thinking and creative thinking skills like problem-based learning model	29%
Making games followed by increasing the level of thinking Training by providing questions that contain high-level thinking process	11%
Learning habit and mentorship	12%
<b>RANGE</b>	<b>43,1%</b>

Sources: Silver & Pittsburgh (1997); Treffinger, Young, Selby & Shepardson (2002); Plucker (2004); Munandar (2009); Putra, Irwan & Vionanda (2012)

### 3.3 Development of Creative Thinking Skills in Execution of Learning

Each teacher develops every aspect of creative-thinking skills in varying amounts. Very little novelty aspect is developed in learning because when developing fluency, teachers do not encourage students to issue other answers as alternatives to developing flexibility. If flexibility is not developed, then originality will not appear.

Most teachers still cannot explain how to improve students' HOTS, either conceptually or operationally. The teacher's ability to bring out critical thinking and creative thinking in the implementation of learning is done by analyzing the learning process that is carried out through the study video footage the teacher did in the class by using videographer software. Based on the three study tapes, each teacher showed a different ability. If in the study implementation plan made mostly focus on 2 critical thinking skills indicators and 2 creative thinking indicators, it turns out that in the indirect learning process teachers have exercised that develops critical and creative thinking skills even though not all of the productivity is achieved.

Indicators that are raised in the learning process: Encourage students to ask questions and answer challenges or issues; Direct students to give opinions and comment on the opinions of others; Plan activities that give students opportunities to find solutions to a problem like giving students problems ordered from low to high level; plan activities that direct students to provide statements of logical, justifiable solutions or asking students to think

critically; plan activities that allow students to generate a large number of ideas in words, pictures, or actions (fluency); plan activities that give students opportunities to generate flexible kinds of ideas (flexibility); make practice with evaluation creating discussion groups, giving up to C3 questions.

But the most unfortunate is indicator using methods, techniques, or approaches which can improve critical thinking and creative thinking and use a study model and worksheet that has critical thinking and creative thinking skills like problem-based learning model Performed only fewer than 43,1% teachers. Yet this aspect should be mastered by a teacher because it has been studied from degree education to profession. The average percentage of the performance of critical thinking and creative thinking in learning is 43,1% with the low category.

### 3.4 The Teacher's Ability to Evaluate and Assess Critical Thinking and Creative Thinking Skills

The teacher's ability to create the problems of critical thinking and creative thinking skills for evaluating learning can be seen by analyzing the issues of teachers that are compiled by the lesson plan and evaluate issues that are given in the learning process (Table 8). Each one of these problems is seen whether or not there is a whole aspect of critical thinking and creative thinking skills and whether or not it has used cognitive problems category C3 that have been focused in this research as detailed in the Table 8.



**Table 8 Critical and Creative Thinking Skills on Evaluation Verification Result**

Description	Verification Result
Conducting interview with some students on the difficulty of HOTS problems.	12%
Measuring students' understanding on solving problems, constructing and finding solutions, and evaluating the outcomes	7%
Observing the effort of students in thinking and solving their problems, by themselves	3%
Analysing students' answers especially in the process of completing the answers	6%
Using written assessment and observation	14%
Conducting assessment of the process and final evaluation.	26%
Developing an instrument measuring high-level skills	25%
Using essays, assessing the process of finding solutions and stating final solution, interviewing students or assessing their presentations	31%
Giving continuous problems and observing the improvement	43%
Giving essays rooted on students' daily life problems	31%
Using assessment sheet, essay test, and open-ended problems	12%
RANGE	19,09%

Source: Retnawati, Djidu, Kartianom, Apino, Anazifa (2018)

The Table 8 above shows that the results of the analysis of the questions enclosed in the lesson plan and used in the learning process, the whole component of critical thinking, and creative thinking skills being converted into percentages. Based on an analysis of 200 documents of questions compiled by 200 teachers, can make questions and assessment include cognitive and creative thinking skills. The teacher group to make a question and assessment for evaluating the learning of 200 teachers studied differently and showed a very low percentage.

The average percentage of a teacher's ability to problem and dissection critical thinking and creative thinking skills is 19,09% in very poor categories. This indicates that more than 80% of teachers have not been able to create problems and design devices that can measure critical thinking and creative thinking skills. The problems that are made tend to demand problems in conceptual mastery skills only. Most teachers already have an idea about appropriate instruments to assess critical thinking and creative thinking such as essays, observation of the problem-solving process, confirmation relying on observation and presentation, and scoring system.

#### 4. DISCUSSION

Industrial revolution 4.0 in the 21st century needs the future society who has more life skills to make innovation for a better future. It's been a challenge for education stakeholders to create an academic climate that leads to the development of life skills in the 21st century. The way starts from the curriculum revolution on the elementary school from KTSP to the 2013 curriculum. The most important component of this Curriculum is the development of higher-order thinking skills for the students. High order thinking skills has many skills to develop for the students, the most important skills are critical thinking and creative thinking. According to the

revised Bloom's taxonomy (Anderson & Krathwohl, 2001), critical thinking is implemented on more than three levels of cognitive aspects from analysis, creation, and evaluation. From that statement, the teacher must have the ability to make a lesson plan based on critical thinking and make learning design which leads to critical thinking skill development. But, if teachers can't make a lesson plan based on critical thinking skills, it will make teachers will have hugely difficult to apply and develop critical thinking skills in the learning process. It will be worse if there is not responsibility like socialization and training from the government to an elementary school teacher.

The findings of this research indicate that more elementary school teachers misunderstand about critical thinking and creative thinking. Some teachers assume that critical thinking is the learning process that is available in textbooks that are provided by the government. Another teacher assumes that critical thinking is the learning model and a method of learning. Based on the fact that some teachers still partially understand critical thinking and creative thinking skills, the teacher in this city needs deep training to socialize and introduce what is critical thinking and creative thinking and how to do the learning process based on critical thinking and creative thinking.

Moreover, the quality of training by the professional trainer to socialize critical thinking and creative thinking skills is very important so that every teacher can understand that skills and how to make a lesson plan and learning activity based on critical thinking and creative thinking skills. Retnawati (2015) mentioned that from her qualitative research about teachers' training and Curriculum 2013 socialization is still insufficient. Some problems are found on socialization and teacher training such as multiple perceptions and interpretations about the mind themes and socialization. Moreover, the time limit makes the teacher not have a perfect understanding and skills that will be implemented in their classroom.

The critical and creative thinking skills of each teacher group still do not meet the expected criteria. It's founded by the different educational backgrounds of teachers. The educational background that affected was the year of graduation, and where are their education from. It depends on the curriculum development that their university had. If the teacher's lesson plan is not based on critical thinking and creative thinking, the chances of learning activity being less to get success. Based on research by Gillies & Boyle (2009) that to develop creative thinking skills teachers must plan well. Moreover, Vidergor & Krupnik-Gottlieb (2005) mentioned That planning will determine the quality of learning that is done. The dominant teacher develops fluency through question and answer. Besides that, Warpala (2006) suggests that creative thinking can be developed by a divergent question. Because a divergent question is rarely, another aspect is less developed. Not all teachers plan presentations in the learning activity, elaboration development is also lacking. If well done, elaboration can be a tool for students to communicate his work in detail and detail (Retnawati, Hadi & Nugraha, 2016; Thompson, 2008)

Besides that, creative thinking is one of the important skills that become the orientation key to the success of education in the 21st century. There are two indicators that students should have to show, there is success in schools and they should make a positive contribution such as problem-solving and innovation to the society better future (Conklin, 2012). Therefore, creative thinking is important to be applied in a learning activity to make students ready to contribute to society. The next generation of society must have the skills to make more innovation in every side of life. The next generation of society must concern and respond to other societies and the issue of the environment (Agusta & Noorhapizah, 2018).

The reformation of teaching and learning to the modern and digital era needs responsibility and participation in every element of education. Ahmad (2014) from his research shows that there are two teacher perceptions about change in teaching and learning, there are positive perceptions and negative perceptions. First perceptions the teacher is pushed to change the habitual to everything that is needed on this era and make more innovation, second negative perceptions indicate teachers' not ready changes (Avargil, Herscovitz, and Dori, 2012).

The result of this research shows that teachers have realized what is the importance of critical thinking and creative thinking. Teachers' responsibility demonstrates that more teachers are not ready yet to make changes or improve their performance in the learning process. Although some previous research (Retnawati, et al., 2017) show that more teachers have difficult to applied learning activity based on critical thinking and creative thinking skills. On other hand, more teachers have difficulty implementing learning evaluation or assessment models based on critical thinking and creativity. It is similar to the results of this research which shows that teachers not ready

to make assessment-based critical thinking and creative thinking skills yet, but they believe in the importance of implementing critical thinking and creative thinking in teaching and learning. We hope their belief will foster the spirit of teachers to make innovation, reformation on their learning habit and change which in line with the positive perceptions of teachers towards the curriculum changes and also foster teachers' desire to innovate to support the implementation of the new curriculum (Ahmad, 2014).

To realize the importance of HOTS, teachers need to teach the skills to students. Designed learning activities should develop students' HOTS. Some research results indicated that it is necessary to alter traditional learning methods to innovative learning methods for learning HOTS. Those innovative methods are student-centered learning (Sumarmo & Nishitani, 2010), the use of constructivism, and the provision of opportunities to students for exploring their abilities during problem-solving activities (Apino & Retnawati, 2017; Djidu & Jailani, 2016a). Some models of learning that belong to innovative learning are problem-based learning (Djidu & Jailani, 2016b), project-based learning (Anazifa, 2017), discovery learning (Rochani, 2016), and creative problem solving (Apino & Retnawati, 2017).

Results also indicate that most teachers do not know that teaching and learning based on critical thinking and creative thinking for the students can use various models of learning such as inquiry, discovery learning, project-based learning, problem-based learning, problem-solving, group investigation, Jigsaw, and many more. The result mentioned similar to the problems that show by PISA. The big problems were also mentioned by the learning activity and method that is used by teachers as one promotor to develop students' critical thinking and creativity. The result is related to the teachers' knowledge about critical thinking and creativity skills that are shown on the result of the questionnaire that is given to the teacher. The most teacher does not know exactly with critical thinking and creative thinking skills it takes effect with their teaching habit that is not using various learning models, they likely have not already been trained about implementing Curriculum 2013. Besides, they possibly do not get more information about learning models from teachers' textbooks or other references. However, teachers' knowledge of various learning models cannot be used as a standard for measuring teacher success in teaching based on critical thinking and creative thinking. Teachers also need to know about the activities in each particular model of learning so that it can improve their critical thinking and creative thinking ability. Teachers must pay attention to these activities (Retnawati, Kartowagiran, Arlinwibowo, & Sulistyarningsih, 2017).

More previous research, the implementation of students' high order thinking skills such as critical thinking and creativity can be carried out with some activities on learning model and method, such as outdoor learning and outbound (Agusta, Noorhapizah, 2018), group

investigation (Pratiwi & Sofiwati 2018), mind mapping (Fauzi, 2018) and providing opportunities to students for constructing their knowledge and improve their ability to analyze, evaluate, and create (Apino & Retnawati, 2017). On the other hand, improve students' critical thinking and creativity-based learning can we do with a learning design that contains an indicator of critical thinking and creative thinking skills.

This result wants to show a teacher's ability to make learning activity based active, innovative, creative, effective, and enjoyable. But the reality shows that most teachers have more domination and not maximizing the role of students in the classroom or teachers' centered learning. From this research, we know that most elementary school teachers' in Banjarmasin city have good less knowledge of teaching critical thinking and creative thinking on learning activity. The teacher's activity on the result of this research has mentioned less learning model implementation.

More instructional models contain critical thinking and creative thinking activities. However, more teachers are confused and have less knowledge about making a lesson plan, learning activity, and evaluation based on critical thinking and creative thinking skills. This shows an inconsistency between the knowledge of teaching critical thinking and creative thinking and knowledge of activities that can improve students' critical thinking and creative thinking. This result also indicates that the pedagogical and professional knowledge of the teachers on how to applied critical thinking and creative thinking of learning activity is still limited in terms of conceptual knowledge.

Besides the result of teachers' knowledge of critical thinking and creative thinking, making lesson plan based critical thinking and creative thinking, implementation critical thinking and creative thinking on learning activity the concerned result show that teachers' have less ability to evaluate to improve students' critical thinking and creative thinking skills. Measuring students' critical thinking and creative thinking is important because it helps know whether the purpose is achieved or not. Students' critical thinking and creative thinking can be measured through assignments and tests that are constructed based on the aspects and indicators of critical thinking and creative thinking. Assignments can be applied by constructing rubrics, but testing can be used with various types of tests, such as multiple-choice questions or essays.

Both assignments and tests have specifications for measuring students' critical thinking and creative thinking skills. Multiple choice is more appropriate for measuring analyzing and evaluating skills, whereas an essay is more appropriate for measuring creating skills. Besides, Watson, Collis, Callingha, and Moritz (1995) recommended open-ended questions to measure students' critical thinking and creative thinking ability followed by a scoring system. Other research conducted on 25 mathematics teacher candidates in Turkey came up with the findings that teachers still make mistakes in assessing students' thinking

ability in making a mathematical model of a given problem (Didis, Erbas, Cetinkaya, Cakiroglu, & Alacaci, 2016). They also showed that there are still many teachers who only assess students' thinking skills based on the outcome (only providing an assessment: true or false, good or bad, appropriate or inappropriate). Meanwhile, only a few students judge by observing the process of completion.

Based on the study by Didis et al. (2016), different results were found. Based on the analysis of teachers' response data, it can be concluded that teachers have less understanding about assessing students based on critical thinking and creative thinking ability. It can be seen from teachers' responses that measuring critical thinking and creative thinking can be carried out by constructing essays within contextual problems. assessments assessment only on the students' final answer but also on the process of its completion. This result is relevant to that of Altun and Akkaya (2014) that most teachers argue that the cause of students' low ability in answering questions such as PISA is that the students are unfamiliar with them. Teachers as respondents also provided recommendations that the evaluation of students' learning outcomes should be carried out by using essays and contextual questions. These suggestions show that teachers already know the appropriate types of questions to measure critical thinking and creative thinking skills. Some studies in some countries.

## 5. CONCLUSION

The result shows that just 24,25% from 200 samples that understand and know about the critical thinking concept and 20,5% understand and know about the creative thinking concept. Just 39,5% of samples are contained critical thinking and creative thinking skills on their lesson plan. About 43,1% of samples present learning activity based on critical thinking and creative thinking skills and more just 19,09% of the range of samples understand and give an evaluation based on critical thinking and creative thinking skills.

This result can be used to take the best way to repair elementary school teacher ability. We need cooperation from every element on education especially the government to make more activity to socialize and give deep training for our teacher about what and how to make learning activity based on critical thinking and creative thinking skills.

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