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TRANSFORMATION OF THE STUDENTS' INQUIRY CAPABILITY THROUGH MINDMAP EDUCATIVE BY USING GAME OBSERVATION NORMATIVELY (MEGONO) LEARNING MODEL

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ABSTRACT

This classroom action research was conducted to analyze the development of the students' inquiry abilities in science learning by a learning model of mindmap educative by using game observation normatively (Megono). The study was conducted in three cycles. In each cycle, the students were divided into five groups, each groups consisted of seven students. Each group was mandated to observe and to analyze the images/photos. After the image observations, they were asked to discuss, write and compile the information into a concept map. One of the students was act as a representative of the group in a game of observation. Data were obtained through the pre-test, post-test, and observation by the observers as well as from the photo and video recording. The results showed that the students' inquiry ability increased by 63.27% at the end of the cycle. At the initial conditions, the ability of the student was low (0.49). After the first cycle, it increased to 0.63 (medium), and then increased to 0.68 (moderate) on the second cycle, and finally it increased to 0.80 (high) in the third cycle. The average increase in every aspect was 68.59%. The highest inquiry capability was achieved in aspects of reasoning amounted to 89.29 (very high). It was suggested to use the observation games fairly and needed more time adjustment to obtain higher learning outcomes.

Keywords: inquiry, Learning model, MEGONO, mindmap.

INTRODUCTION

National education system expects that the learning activities must develop the self-potential and curiosity of learners. Also, it should provide a learning experience that is supported by an active atmosphere, systematic and planned educational process. According to the rule No. 20 year 2003 of National Education System, education is a conscious and deliberate effort to create an atmosphere of learning and the learning process; therefore the learners are actively developing their potential to have the spiritual power of religion, self-control, personality, intelligence , noble character, and skills. By these self-potentials their soul can give the benefit for the mankind.

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The process of learning is a reciprocal relationship between teachers and students. In science, the learning required to develop their potential is a learning that grow and develop the ability of inquiry (inquiry skills) in the form of scientific processes, skills, reasoning, inquiry and problem resolution. Therefore, the ability of inquiry is seen as the key competencies to face the challenges of life and it serves as the curriculum standards of science education in the United States since 1996 started from the basic education level (Kuhn & Pease, 2016).

In class VIII A SMPN 1 Paninggaran, inquiry capability is one issue that needs to be solved urgently with the emergence of some cases. In the learning process, as much as 77.14% of the students were lack the independence and they were highly dependent on teachers to solve the

problems and to understand concepts. Moreover, 91.43% of students were not able to conclude or finding a concept, has a low learning retention. Furthermore, 74.28% of students were not able to design the experiments and they were having the difficulty on interpreting the student' worksheet independently. This condition was caused by the unavailability of the learning models that evokes inquiry capability in class VIII A SMPN 1 Paninggaran. In fact, in some cases it was found that basically, students had a pent inquiry capability that has not been developed properly. Students often expressed their thoughts when the conclusions/results of the analysis and investigation almost correspond with a confirmation from the teacher.

Inquiry capability is a skill and the logic units that can deliver the students to the scientific processes and scientific thinking (Pedaste et al., 2015). In some cases, the ability of inquiry is the development of an additional discovery with the mental processes that have a higher level in the form of asking questions and answers invention, linking the discovery with the other discoveries, and compare it with the findings of other students (Mulyasa, 2008). Therefore, the ability of inquiry is intimately associated with process skills and attitudes of science students that includes the student's ability to identify, to formulate questions and hypotheses, to predict, to plan and to carry out experiments, to collect and to analyze data, to interpret, to communicate and to present the results, and also to draw conclusions (Maeots et al., 2008; Harlen & Jelly, 1997).

Inquiry capability is a basic aspect of the development of dimension of cognitive, psychomotor and affective as well as problem solving. The wider effects of the development of inquiry capability is a major increase in cognitive abilities (cognitive priors), a scientific attitude, understanding and mastery of concepts, motivation, and critical thinking skills (A'yun et al., 2015; Kuhn et al., 2003; Kurniawati et al., 2014; Margiastuti et al., 2015).

The inquiry capability can thrive through the application of learning strategies that were able to construct knowledge and enable students in a series of learning activities that emphasize the process of critical thinking and analysis to seek and find their own answer to the problem in question (Sanjaya, 2006). According to Muslich (2008), the ability of inquiry will thrive in learning situations that emphasize skill development and involvement of the student to seek and find their own, foster self-confidence, open their intelligence and develop creativity, giving freedom to the students to take the initiative and act, encouraging students to think intensively and to formulate their own hypotheses, and the process of interaction as a student-centered learning.

Among the learning models that can be conditioned by the learning situation, mindmap as a learning model is in accordance with the characteristics of the concepts of science that able to develop appropriate skills to potential and inquiry capability (Balim, 2013). This is supported by the characteristics of the concepts of science as a series of concepts in synergy with each other. Skills needed in a particular concept require the ability on other underlying concepts. Therefore, mindmap is an appropriate strategy to construct knowledge and skills in a balanced manner.

Mindmap is a visual technique that describes the organization of the mind, memory development and problem resolution. This technique is used to interpret the content as much as possible specific and more abstract knowledge by organizing them into a network or a linear diagram associated with symbolic elements or verbal. In lessons, helpful mindmap to organize the knowledge, skills and abilities are more comprehensive. Besides functioning as a knowledge constructor, mindmap is a tool or a way to acquire the knowledge of students. It is based on the cognitive theory by Ausubel which of meaningfulness in learning (meaningful learning), which encouraged the teachers to know the concepts that have been owned by the students (Novak & Gowin, 1985). In lessons, mindmap can be applied for a variety of purposes including investigating the various things that have been known to the students, to learn how to learn, uncover misconceptions, and can be used as an evaluation tool.

Balim research results (2013) found that the mindmap technique used in the study could significantly improve the ability of inquiry, academic development, and retention of knowledge of students. Supported by the research results of Dhindsa et al. (2010), it was found that the cognitive abilities of students had improved by a conditioned learning through constructivism approach using visual mindmap on science topics. Their cognitive abilities were higher than students who taught by using traditional teaching that emphasizes the transmission of knowledge from expert teachers to students.

The development of student inquiry capability by a comprehensive mindmap approach is obtained through the activity of students in meaningful relationships between concepts expressed in the form of propositions, hierarchy and cross linkages (Novak & Musonda, 2001). Proposi-

tions are two or more concepts linked by words or elements in a semantic unit. The proposition is valid if it uses the common words or the right elements. Hierarchy is a common technique on concept drafting from a general concept to be more specialized and from inclusive to less inclusive. A more inclusive concept is placed on top and the less inclusive concepts laid out below, as well as a general concept is placed on top, while the concept is more specifically laid out below. Hierarchy is valid if the placement is in a correct order. The cross linkages is a significant association between a concept with one hierarchy with another concept in other hierarchies. Cross linkages is valid if it uses the conjunction or the right elements in linking the two concepts in a different hierarchy. Thus, students who apply mindmap can organize concepts based on the meaning and relationship between the components that had been developed in many dimensions of learning (Novak & Gowin, 1985). This condition will increase when the mindmap is constructed with the use of illustrations in the mindmap, elaboration of visual form of images, tables, charts, maps, flow, elements of line and color that helps the brain's neurons to construct, activate the thinking process and acts as well as increasing cognitive memory of up to 32% (Holliday, 2000; Toi, 2009).

As part of a cooperative learning model, mindmap is effectively solve the learning problems and may increase its effectivity when collaborated with other techniques. In some studies it was found that the influence of cooperative learning was increased when a collaborative strategy is done with methods or other approaches into a new learning model. The research reports from Joyce & Calhoun (2009) showed that an increase of academic ability reached 30% to 90% when cooperative learning model of collaboration with the inductive method of picture word inductive model. Syahrir research results (2011) stated that the jigsaw cooperative learning collaborated with team game tournament was effectively enhance the learning motivation and mathematical ability of students.

The learning model of Mindmap educative by using game observation normatively (megono) is the development of more comprehensive constructivism mindmap collaborated with a small scale team game tournament (TGT). The constructivism mindmap is a development of modern mindmap involving the student learning activity and an innovation in the use of illustrations, interpretation of the concept, diagram, colors, elements, and symbols to build students' knowledge independently (Dhindsa et al., 2010; Novak & Musonda, 2001). In findings by Maeots et al. (2008) suggested that the game simulation can significantly improve the aspects of inquiry capability. Supported by the results of Amin (2015) which stated that the tournament learning method had improved the students' performance and their motivation to learn physics.

The mindmap which was integrated in the quantum learining could improve the communication skills (Adhitama et al., 2015). The findings of Paykoç et al. (2004) stated that the mindmap with the group problem solving could improve the critical thinking skills. Moreover, supported by the research results of Pangestuti (2015), it was stated that mindmap collaborated with the team game tournament (Remap-TGT) was able to increase students' interest in reading biology textbooks to 76.90%.

METHODS

The research object of this class action was a class VIII A in SMPN 1 Paninggaran with 35 students consisting of 14 male students and 21 female students with an average attendance rate of science subjects in the first semester of the school year 2015/2016 amounted to 97.86%. Based on the analysis of class condition in VIII A SMPN 1 Paninggaran, the carrying capacity of schools and curriculum gained an average by 2.2, whereas the carrying capacity was 2.2, and the complexity of science was 2.1, and the scoreof science minimum completeness target was 73,1.

According to the socio-economic conditions, the majority of students of class VIII A in SMPN 1 Paninggaran came from families with a livelihood as farmers, laborers, drivers, and small traders. A total of 22.86% or 8 students had parents as teachers or civil servants, and as much as 6 students or 17.16% of students were not living with their parents because their parents were migrated.

The research location was a school located in the highlands of Pekalongan district and bordering with the Banjarnegara district. The school environment was surrounded by residential areas, hills, heterogeneous forest, pine plantations, clove, and tea. A total of 514 students or 96.74% of students came from villages around the school in a district that consists of 14 villages, and as many as 17 students or 3.26% came from villages in Kali Bening Banjarnegara district, which borders the district of Pekalongan.

Research procedure used in this study was a classroom action research (action research) using Kemmis cycle model and Mc Taggart as

shown in Figure 1. The implementation of a research was carried out by two stages included pre-action stage and action stage. At the pre-action stage, the preliminary data were collected by inventoring the learning problems in class VIII A in SMPN 1 Paninggaran by consultation with the principal, curriculum assessment and planning the action. In the action stage, it was carried out the learning modification to the three cycles of learning. Each cycle was included in 4 steps, i.e. planning, action, observation, and reflection. In this study, megono was applied in the topic of digestive system in human.

Planning of the first cycle was performed by examining the basic competencies, competency standard, constructing the syllabi and Megono-based lesson plans, preparing the observation and evaluation instruments, setting up the equipments/materials, setting the place, and held the discussions with observers about the manner and process of data collection. The action stage was performed by dividing students into into 5 groups, each group consisting of 7 students. Each student in the group was asked to analyze the images/ photos. After that, they were asked to discuss and to write their thoughts on a media that had provided, to compile them into a mindmap. In addition, each group was given the opportunity to communicate by posting at an agreed place. Each group explored and assessed the results of other groups. The next phase, each group selected one of the students as a representative of the group in a game of observation.

Data were obtained through a pre-test, post-test, observation of the observers, as well as from the documentation of the photo/video. Indicators of success learning were if: (a) students' attendance reached 100%; (B) at least 90% of students showed the attention on Megono in the form of: active participation, curiosity, passion in the concept of conflict, like the challenge of making the mindmap, trying to complete the task to completion, following the observation game with enthusiasm; (C) at least 70% of students showed a progress in their inquiry capabilities include: curiosity, hypotheses and predictions, compile and execute an experiment, reasoning, finding and concluding, and roblems solving; (D) they were able to interpret the students' worksheet in group work, does not depend on teachers or other groups, capable of displaying mindmap, to study/comment on the work of other groups, and exceeded levels of difficulty in making mindmap, as well as appearing in game observation; (E) more than 80% of students were satisfied with the learning measured by: completing the task on time, they were able to communicate the mind map, independent, creating programs in the constructing the mindmap, and they did not feel burdened with the task of mindmap; (F) reached the level of classical motivation through questionnaires votes for 75 out of 100; (G) one of the students were able to reach a value of 100 in the cognitive assessment; (H) at least 75% of students achieved the mastery level with 73 scores; (I) achieving an average value grade in the assessment of cognitive learning outcomes, amounting to 75 out of 100.

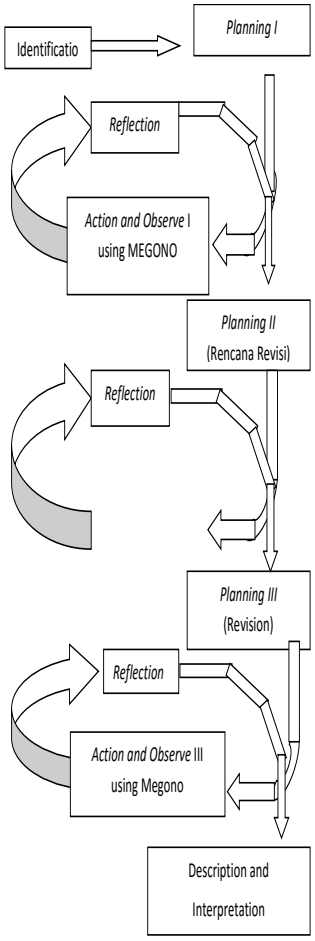

Figure 1. Research procedure conducted in Class VIIIA of SMP N 1 Paninggaran

RESULTS AND DISCUSSION

Research results

Based on the research and analysis of the data, it was obtained that through three cycles of Megono learning model, the students' inquiry capabilities were improved from 0.49 to 0.80 as shown in Figure 2. The mean average was increased in every aspect of the inquiry by 68.59%.

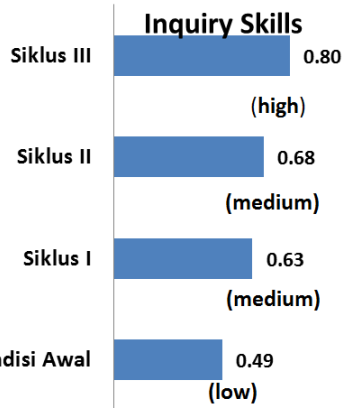

Figure 2. The development of students' inquiry capabilities through Megono learning model in each cycle

Based on Figure 2 it is found that the inquiry capability is increased significantly during each cycle of Megono action learning model. In the first action cycle, Megono learning model was able to improve students' inquiry for 28.57% of the initial state. Results of reflection on the first cycle induced the development of inquiry capability in students; therefore, in the cycle of action II the capability was increased by 38.78% from the initial conditions. Also, the result of reflection in cycle II was able to improve the inquiry in cycle III by 63.27% from the initial conditions.

The development of student inquiry capability was also marked by a shift in the percentage of students heading to high category mode and decreasing the percentage of students who were in a lower category on every aspect of inquiry capability. This condition was achieved after the performance of three cycles of Megono learning model as shown in Table 1. It is known that in the first cycle, the average number of students who have high category in the inquiry capability was 24.05%, while in the second cycle; the number of students who achieve high category was 67.14%. As for the third cycle, the number of students who achieve a high category was 88.09%.

After finished three cycles of Megono learning models, it was found that there were no students with the low ability in five aspects included hypotheses and predictions, designing and carrying out experiments, reasoning, finding conclusions, and solving the problems. As for the aspects of the development of curiosity, 5.72% of the students were still in low capability condition.

Through Megono learning model, every aspects of the inquiry capability of students had increased as shown in Figure 3.The ability

Tabel 1. Percentage of students in every aspect of inquiry capabilities development through Megono learning model

Inquiry Skills		**Persentase Siswa**		
Siklus I		**Siklus II**	**Siklus III**	
Curiosity	High	24.31	54.28	77.14
	Medium	51.43	22.86	17.14
	Low	24.26	22.86	5.72
Hypothesis and prediction	High	48.57	82.86	94.28
	Medium	31.43	5.72	5.72
	Low	20.00	11.42	0
Doing experiment	High	8.57	34.29	85.71
	Medium	88.67	57.14	14.29
	Low	2.86	8.57	0
Logical thinking	High	25.71	100	100
	Medium	57.15	0	0
	Low	17.14	0	0
Finding/ conclusion	High	11.43	80.00	97.14
	Medium	62.86	11.43	2.86
	Low	25.71	8.57	0
Problem solving	High	25.71	51.43	74.29
	Medium	60.00	37.14	25.71
	Low	14.29	11.43	0

of inquiry that significantly improved was the ability to think logically by 89.29 score, whereas the smallest one was the ability to build by 72.86 score. According to the results, it can be stated that the Megono learning model was effectively improving the students' inquiry capabilities.

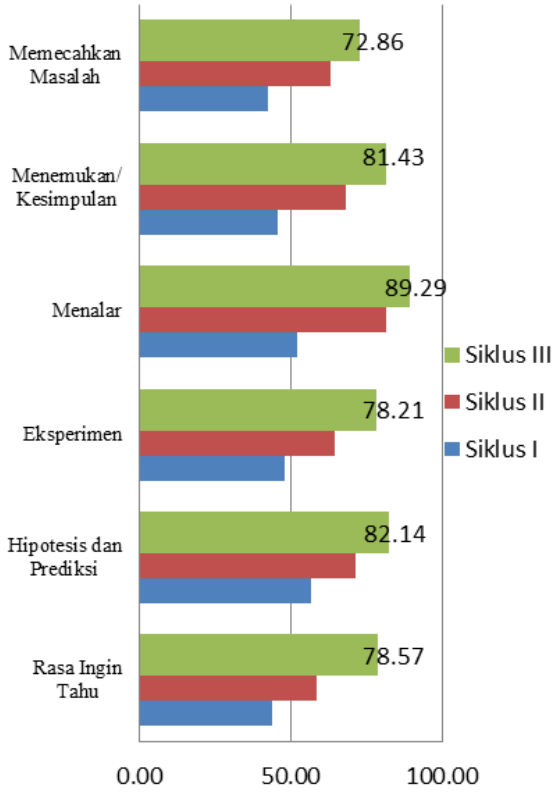

Figure 3. Achievement of each inquiry capability aspects in students through Megono learning model

Based on the observers' assessment and the analysis on the photos/videos and questionnaires showed that the development of inquiry capability achieved through Megono learning model was in line by the achievement of research indicators such as 100% students attended in each meeting, 95% of students had a concern in Megono learning model, 88.09% of students achieved an high level of inquiry capability after the third cycle, they were able to interpret the worksheet in group work, they could display the mindmap, also they were able to study/comment on the work of other groups, they coped with the difficulties in the construction of mindmap, they could actively and enthusiastically involve in the game observation, and 90% of students were satisfied with the learning. Moreover, the motivation level of students was high reached 81.38. Two students achieved 100 score in the cognitive assessment, while 82% of students achieved to master the basic competencies and the average score of cognitive assessment of all students was 78.

Discussion

Based on the analysis of the research findings, it was obtained that Megono learning model significantly improved the ability of students in six aspects of inquiry include curiosity, hypotheses and predictions, doing experiment, reasoning/ logical thinking, finding/conclusion, and problem solving. This was due during the approach of Megono learning model, students gained opportunities as learners to explore the widest in analyzing images/photos, and then arranged them into a mindmap in accordance with their cognitive thinking way. Megono learning model provided the advantages of conditioning the class atmosphere to think and to explore freely. This condition could support the discovery and problem solving, improved the discussion atmosphere, increased the development of science skills and a competitive atmosphere, and also encouraged motivation and confidence of students.

In each cycle of Megono learning model, students had six learning experience that includes: (1) analyzing the photos/images; (2) preparing the questions based on photos/images; (3) solving the problems through discussion; (4) developing the mindmap; (5) observing the results of other groups; and (6) reinforcing the concept through the game of observation.

When students analyzed the images/photos, they had to interpret the atmosphere of free thinking, to take initiative, and to analyze the relationship between photos/images. This condition encouraged the students to well understand the basic concepts of learning materials and ideas. In effect, the curiosity of students grew along with the ability to predict and hypothesize. In the next phase, when students prepared the questions related to photo/images, their ability of inquiry was growing. The students' curiosity, hypotheses and predictions were assimilated with memory comprehensively; therefore it could strengthen and encourage them to think independently and take the initiative. This was evidenced by the ability of students to prepare questions independently and did not coincide with the other students' questions related to the image/photo. Students were able to cope with the difficulties and were able to explore the concept as much as possible and to think optimally (Crouch & Mazur, 2001; Kuhn & Udel, 2003; Kurniawati et al., 2014; Marshall, 2007; Wasis, 2008).

At a later stage, the students had a discussion to solve the problem. Discussion method en-

couraged students to think inclusively, they were able to work together, they dared to express and to receive opinions, they were able to compare the hypothesis personally with another student, they were able to admit their wrong opinions, they could actively seek information from a variety of learning resources, they could optimize their mastery on concepts, they invented the concept, as well as accepting the presence of other people. By this condition, students were able to improve their inquiry and decision making capabilities (Gokhale, 2004; Krulik & Rudnik, 1996).

At the stage of mindmap construction, the students performed a comprehensive activity in thinking, acting and being. It is influential in various aspects of the inquiry, including hypotheses and predictions, doing experiment, logic thinking, finding/conclusion, and problem solving. These aspects evolve in line with the activity of students in thinking and decision-making to determine the propositions, hierarchy and cross linkages (Novak & Musonda, 2001). Furthermore, the observation on the results of other groups' mindmaps and game observation generated the inquiry capabilities and better concept understanding in students. They were encouraged to have an organized and repeated reinforcement and growing the conceptual skills (Dindhsa et al., 2010). The satisfaction of students was appearing in their expressions, their hands gestures and screams when they could finish the mindmap compilation during the game observation. Learning situation was getting better with their reflection in every cycle and it supported by the advice and idea from the observer. This led to the development of more advanced and excellent of student inquiry capability during cycle II and III. Their ability ended up in the third cycle by high category.

CONCLUSION

Megono learning model had significantly improved the ability of inquiry of students in class VIII A SMPN 1 Paninggaran. Inquiry capability of students increased from a low condition into a high condition, especially in the aspects of curiosity, stating hypotheses and predictions, designing and carrying out experiments, thinking logically/reasoning, finding and stating the conclusions and solving the problems.

In this study, it was found that most of the students stated that their group was more right than any other group in one particular activity. Therefore, it is suggested to the teachers, they have to carry out a more precise and justice principled during the class and also could conduct an on time learning activity.

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Appendix 1 The Grille and Questionnaire of Thinking Skills

Thinking Skills	Aspect	Score
Self Regulated Thinking	A. Realizing Mind Your Own Way	
	Consistent and accurate explain in detail a series of thinking used when faced with a task or problem and provides an analysis of how awareness of his way of thinking was evident from his appearance.	4
	Consistent and accurate explain how to think through tasks or problems and how awareness of the way he thinks it visible and appearance.	3
	Sporadic but accurately explain how to think through tasks or problems and how awareness of the way he thinks it is apparent from the appearance.	2
	Rare but accurately explain how to think through tasks or problems and how awareness of the way he thinks it appears from his appearance.	1
	B. Creating an Effective Plan	
	Consistent make the right destination, consider and take into account all the short-term goals that are considered necessary and make a detailed implementation time.	4
	Consistent making purposes, pay attention to short-term goals, and create a detailed implementation time.	3
	Sporadic making purposes, pay attention to short-term goals, and create a detailed implementation time.	2
	Rarely when working on making purposes, pay attention to short-term goals, and create a detailed implementation time.	1
	C. Realized and Using Resources You Need	
	Consistent display caution, detail to assess the resources required before starting the task. Repeat the resources available and consider alternatives. Anticipating the steps in a task that may be required as an additional source.	4
	Consistent assess the project to identify which parts require resources. Repeats of alternative sources to determine whether it is suitable for the project.	3
	Sporadic assess the project to identify the resources needed for the project, and often look for alternative sources.	2
	Rarely, if carried out to assess the project to identify the necessary resources and often seek alternative sources clear.	1
	D. Against sensitive Feedback	
	Consistent sensitive to diverse feedback. Always respond appropriately when approach deemed does not work well and look for advice and other sources of knowledge.	4
	Consistent attention to the main source of feedback and responses are varied, making adjustments when necessary correction. Listening to the advice of others.	3
	Sometimes noticed the main source of feedback and responses are varied, making adjustments when necessary correction, listen to the advice of others.	2
	Rarely when done, pay attention to the main source of feedback. Rarely respond and make adjustments when necessary corrections. Do not pay attention to the advice of others.	1
	E. Evaluation of Effectiveness Measures	
	Consistent repeat actions that have been done and the things that are considered useful, the evaluation of the impact of measures both short term and long term, finding good value in the lessons of success and failure.	4
	Consistent repeat the action and objective view reasonable, considering the short-term effects, and find lessons in his/her work.	3
	Sporadic repeat the action and objective view reasonable, considering the short-term effects, and find lessons in his/her work.	2
	Rarely repeats the action and objective view reasonable, considering the short-term effects, and find lessons in his/her work.	1

Thinking Skills	Aspect	Score
Critical Thinking	F. Accurate and Seek Accuracy	
	Consistent attention to detail where appropriate, match the information on all important resource, recognizing inaccuracies quickly, and make the correction of errors, and clear.	4
	Consistent attention to detail, to test multiple sources, identifies and correct inaccuracies.	3
	Sporadic attention to detail, to test multiple sources, identifies and correct the inaccuracies.	2
	Rarely attention to detail, to test multiple sources, identifies and correct inaccuracies.	1
	G. Clearly and Seek Clarity	
	Consistent creating a complete and free work and confusing elements.	4
	Consistent key element creates jobs free from confusing elements.	3
	Sporadic key element creates jobs free from confusing elements.	2
	Rarely key element creates jobs free from confusing elements.	1
	H. Open-minded	
	Consistent overcome differences and divergent views and to consider alternative viewpoints in a fair and rational.	4
	Consistent aware of different views and always strive to consider alternative views.	3
	When aware of different views and sporadically sought to consider alternative views.	2
	Rarely aware of different views and infrequently seek to consider alternative views.	1
	I. Preventing Properties Impulsive	
	Consistent and carefully consider the situation if it needs further study before doing the work, if necessary, follow-up study, conducted detailed research before doing work.	4
	Consistent consider the situation if it needs further study before doing the work; if necessary, follow-up study, gather enough information before doing work.	3
	Sporadic consider the situation if it needs further study before doing the work; if necessary, further studies, sometimes gather enough information before doing work.	2
	Rarely consider the situation if it needs further study before doing the work; if necessary, follow-up study, did not gather enough information before doing work.	1
	J. Taking Attitude When No Warranty	
	Consistent take appropriate attitude towards the situation, the value of which is displayed and views are not revealed. In addition to providing strong evidence to support its position.	4
	Consistent take appropriate attitude towards the situation and the views were ignored. Always provide enough validation for his/her attitude.	3
	Sporadic take appropriate attitude towards the situation and a clear stance. Sometimes provide enough validation for his/her attitude.	2
	Rarely take appropriate attitude towards the situation and a clear stance. Rarely provide enough validation for his/her attitude.	1
	K. Noting feeling and level of ability of Others	
	Consistent shows insight to the feelings and the level of ability of others that appear when communicating. Always give positive impetus to such differences.	4
	Consistently shows ability to communicate with people of different feelings and knowledge and respect for the feelings, knowledge and abilities of others.	3
	Sporadic demonstrate the ability to communicate with people of different feelings and knowledge and respect for the feelings, knowledge and abilities of others.	2
	Rarely demonstrates the ability to communicate with people of different feelings and knowledge and respect for the feelings, knowledge and abilities of others.	1

Thinking Skills	Aspect	Score
Creative Thinking	L. In Constantly seek Completing Tasks Although the answer Could Not Anticipated	
	Consistent shows the seriousness of reaching a solution, get involved. and develop and use many approaches to keep seeking duties	4
	Consistent shows seriousness and approaches to keep seeking tasks.	3
	Sporadic shows seriousness and approaches to keep seeking tasks.	2
	Rarely demonstrates its seriousness and approaches to keep seeking tasks.	1
	M. Encouraging Self-Yourself to Try Something Not Sure Can Do	
	Consistent look for challenging tasks and tasks to complete to complete or to gain significant understanding.	4
	Consistent accept existing challenges and tasks to complete to complete a task or to gain significant understanding.	3
	Sporadic accept existing challenges and tasks to complete to complete or to gain significant understanding.	2
	Rarely accept existing challenges and tasks to complete or to gain significant understanding.	1
	N. Produce, Trusting, and Using Evaluation Standards for Work	
	Consistent generate personal standards for tasks that can raise the level of quality of the task and follow the standard in order to obtain the final product.	4
	Consistent generate personal standards for the task and follow the standard in order to obtain the final product.	3
	Sporadic generate personal standards for the task and follow the standard in order to obtain the final product.	2
	Rarely produces personal standards for the task and follow the standard in order to obtain the final product.	1
	O. Make a New Perspective Unlike the Perspective Generally	
	Consistent explore as many alternatives and resources that enable and analyze how the alternatives affect the results obtained. Alternative describes a variety but a very useful way to look at the situation.	4
	Consistent yield approach to the task and clicking analyzes how these alternatives affect the task. The alternative approach originally created as a student to complete the task.	3
	Sporadic generating approach to the task and clicking analyzes how these alternatives affect the task. The alternative approach originally created as a student to complete the task.	2
	Rarely produce and how to approach the task of analyzing how the alternatives affect the task. The alternative approach originally created as a student to complete the task.	1