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Implementation of Electronic Student Worksheet Based on Guided Inquiry Learning Model on Chemical Equilibrium Material to Improve the Students' Creative Thinking Skills

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ABSTRACT

The research purpose is to determine the Electronic Student Worksheet (E-SW) validation results, the implementation of learning, the activities of students, the learning outcomes of creative thinking skills, the realm of knowledge, and students' responses. Furthermore, research focuses on guided inquiry learning models to improve students' creative thinking skills. The research population was senior high school students. The sample in the research was 36 high school students. This research model uses One-Group Pretest-Postest Design to collectto collect the data using observation and test methods. The data analysis technique consisted of two stages: the n-gain value test and the independent sample t-test manually. The first stage of the test for the N-gain value test in students obtained medium and high criteria. The second stage of the independent sample t-test showed significant changes between before and after learning. The results showed that the guided inquiry learning model on chemical equilibrium material could improve the creative thinking skills of high school students.

INTRODUCTION

Nowadays, in the Covid-19 pandemic outbreak, the education system is forced to conduct distance learning media, which the educators should master. It becomes the solution to cope with the time, location, distance, and cost difficulties during face-to-face learning. The 21st century education aspired the students to foster their skills in various fields, especially creative thinking skills in technology. This potential is undoubtedly very profitable in the 21st century competition (Cucinotta & Vanelli, 2020). Good skills in the 21st are strongly linked to the four pillars of life, which cover learning to know, learning to do, learning to be, and learning to live together (Muslikah, 2012). It is claimed that the 21st century competence demands the students to possess the learning and innovation skills (critical and creative) to achieve global skills of ways of thinking, mastering technology, and as citizens of the world so that the learning-emphasis education is needed to find out their potential (Imawanty & Fransiska, 2019; Ramdhani, 2017; Sudarsana, 2016). Creative thinking skill is one of the learning objectives achieved at school. This skill is also required in chemistry learning (Nahadi et al., 2015).

The preliminary research was done at senior high school 1 Gedeg Mojokerto in class XI Science 4 revealed that 70% of the students found chemistry hard to understand, and 75% thought that the chemical equilibrium material was difficult. Due to many complex

words to understand and the formulas they considered difficult to answer the questions since they focused on memorizing over understanding. It led them to have low creative thinking skills (Aftriani, 2018; Kristen, 2017). It was also supported by preliminary research conducted by Aini (2020) that the students' skills four components of creative thinking skills were low. Chemical equilibrium material was closely related to the life we live in. Thus, it was necessary to form creative thinking skills on chemical equilibrium material to solve them in a creative way of thinking. According to Idrisa (2014), creativity refers to the ability to express various possibilities to solve a problem. Creative thinking consists of 4 components, (1) Fluency is the skill to generate various ideas, (2) Flexibility is the skill to analyze the problem from different points of view, (3) Originality is the skill to provide original ideas from oneself, (4) Elaboration is the skill to detail the answer (Septi et al., 2016).

The guided inquiry model is used to train students' creative thinking skills. Sulastri (2019) argued that teaching the students with a guided inquiry learning model helped them convey the ideas find a concept. According to Wahyudi and Supardi (2013), the guided inquiry learning model helped the students learn and gain knowledge by finding their way. These statements were in line with Nurnawati (2012), who stated that the students were active in learning activities, improved creative thinking skills (scientific attitude), and learning outcomes.

Currently, the learning system is done online (Praherdhiono et al., 2020). Online learning is the potential to let the students learn anytime or anywhere. The teacher and students interact through several virtual learning platforms such as Electronic Student Worksheet (E-SW) and video conferencing. According to Iswara et al. (2015), everyone's learning outcomes were obtained from direct experience such as various realities of the environment, artificial objects, demonstration, moving or still images and video recordings, visual symbols, verbal or abstract symbols in words. The use of learning media in the teaching and learning process generates new desires and interests, motivation, and stimulation of learning activities and even brings psychological effects to the students (Arsyad, 2012). Hence, innovative media is needed to help the students understand the material given.

In implementing the creative thinking to students, the researcher gave E-SW with sub-material of factors that affect chemical equilibrium. E-SW, which is in line with the learning system during the pandemic, is known as online learning or e-Learning. E-SW contains a guided inquiry learning model. So that the educator was given several ready-to-discuss problems with students; then, he guided them to figure out the solution to these problems (Anam, 2015). The research purpose is to determine the results of the E-SW validation, the implementation of learning, the activities of students, the learning outcomes of creative thinking skills, the realm of knowledge, and students' responses.

RESEARCH METHOD

Before conducting the research, the researcher granted permission to research at Senior High School 1 Gedeg Mojokerto. After getting permission, the researcher set the meeting with the chemistry teacher to discuss the classes, students, and schedule taken for research.

Participants

This research took place at Senior High School 1 Gedeg Mojokerto during the odd semester of the 2020/2021 academic year. As many as 36 students of class XI-MIIA 4 were taken as the subjects among other classes of XI MIIA as population. The research was done on Chemical Equilibrium, with a sub-chapter of factors that affect the shift in the direction of equilibrium and its role in daily life.

Instrument

Research instruments were used to collect more complete data and information. They were also used for measuring the value of the variables studied (Sugiyono, 2012). The following was the research instruments used:

a. Validation Questionnaire of the lesson plan
b. Observation sheet of learning implementation
c. Observation sheet of the students' activities
d. Test of creative thinking skills
e. Test of the knowledge domain
f. Students' responses sheet

Research Design

The research design used was in line with Sugiyono (2012), who pointed out that one group pretest and posttest design was a technique used to determine the effect before and after giving the treatment. The pretest and posttest single group design was as follows:

Notes :
O1: The results of students' creative thinking skills before the treatment
X: The given treatment
O_2: The results of students' creative thinking skills after the treatment

Procedures

This research went through 3 stages: preparation, implementation, and data analysis.

a. Preparation Stage

Several steps were already executed before doing the research activities. This stage involved:

1. School Observation
2. Problem analysis and proposal arrangement
3. Lesson plan-making
4. Research instruments arrangement
5. Lesson plan and research instruments review
6. Lesson plan and research instruments validation

b. Implementation Stage

The implementation stage, done by researchers during teaching activities, was in line with the syntax of the guided inquiry learning model to train students' creative thinking skills. Its sequences were as follows:

1. Administering *pretest* (O_1)
2. Teaching the students by implementing a guided inquiry learning model

3. Observing the learning implementation
4. Observing the students' activities
5. Administering *posttest* (O_2)
6. Observing the students' responses

According to Arends (2012), there are six stages of guided inquiry learning. There is a relationship in each of these stages with the indicators of creative thinking skills listed in Table 1.

Table 1. The relationship between the stages of guided inquiry learning and creative thinking.

The Stages of Guided Inquiry Learning	Teacher Behavior	The Indicators of Creative Thinking Skills
Phase 1: Getting the attention and delivering the process of inquiry	The educators guided the students during the learning activities	-
Phase 2 : Given the inappropriate certain inquiry problem or case	The educators gave a problem or case which was different from the concept	Creative Skill *Fluency*
Phase 3: Asking the students to formulate the hypothesis	The educators guided the students in formulating the hypothesis	Creative Skill *Fluency*
Phase 4: Asking the students to collect the data in verifying the hypothesis	The educators asked the students how they collected the data to verify their own hypothesis	Creative Skill *Flexibility* and *Originality*
Phase 5: Drawing conclusions	The educators supported the students to draw conclusions and make a generalization	Creative Skill *Originality* and *Elaboration*
Phase 6: Reflecting on a certain problem and implementing the thinking process	The educators asked the students to implement the way of thinking and reflect it to daily lives	-

c. Data Analysis Stage

This stage was conducted after collecting the data during the implementation stage. Analyzing the data was useful to determine the level of success of the researcher in implementing a guided inquiry learning model on the students' creative thinking skills. The analysis obtained from this stage were as follows:

1. Analysis of learning implementation
2. Analysis of the students' activities
3. Analysis of the student's creative thinking skills
4. Analysis of the students' knowledge domain
5. Analysis of the students' responses

Data Analysis

Data analysis techniques were used to draw conclusions by answering the research problems. Data analysis techniques used in this research were as follows:

a. E-SW Validity

Before giving the E-SW of guided inquiry learning model on the chemical equilibrium factors material to establish the students' creative thinking skills of class XI, the learning model was validated by three lecturers of the Chemistry Department at FMIPA Unesa. It was important to determine the validity of E-SW used later on during the research. E-SW was possible to be applied if the value obtained reached the "valid" and "very valid" criteria (Adaptation Riduwan, 2015).

The data of validation results were analyzed on the formula (1):

$$Validity\ Percentage = \frac{The\ Total\ of\ Scores}{The\ Criterion\ Score}\ x\ 100\% \quad (1)$$

Then, the result was interpreted in Table 2.

Table 2. The validity criteria of validation results.

Percentage	Criteria
0% - 20%	Invalid
21% - 40%	Less Valid
41% - 60%	Valid Enough
61% - 80%	Valid
81% - 100%	Very valid

(Adapted from Riduwan, 2015)

b. Analysis of Learning Implementation

The implementation of the guided inquiry learning model was observed during the learning activities taught by the teacher according to the lesson plan (Insani, 2018). There were three observers who filled out the observation sheet. This observational data was analyzed based on the criteria of teacher's ability value in managing the learning. The formula (2) was used to assess the values of the implementation of the learning process.

$$\%\ \text{implementation} = \frac{\sum observed\ score\ aspect}{\sum\ the\ total\ of\ score\ aspect} \times 100\% \quad (2)$$

The obtained values were converted to the criteria listed in Table 3.

Table 3. The criteria of learning implementation.

Range	Criteria
0% - 20%	Poor
21% - 40%	Less
41% - 60%	Moderate
61% - 80%	Good
81% - 100%	Excellent

(Adapted from Riduwan, 2015)

c. Analysis of Students' Activities

The students' activities were descriptively analyzed to determine what they did during the learning process. It aimed at showing the number of students' activities related to the creative thinking skills in the learning process (Uswatun, 2018). Three

observers did the monitoring every 3 minutes during the learning process. The obtained data were analyzed by the formula (3):

$$\text{The scores of Students'Activities: } \frac{emerged\ activity\ frequency}{\sum\ the\ total\ frequency\ of\ activity}\ x\ 100\% \quad (3)$$

(Arifin, 2012)

d. Analysis of Creative Thinking Skill

The guided inquiry learning model influenced the students' creative thinking skills both in pretest and posttest in line with the assessment rubric. This rubric covered four components of creative thinking skills: Fluency, Flexibility, Originality, and Elaboration. The score of creative thinking skills was calculated using the following formula:

$$\text{The Score of Creative Thinking Skills} = \frac{the\ total\ of\ obtained\ scores}{the\ total\ scores}\ X\ 100\% \quad (4)$$

The students' criteria on creative thinking skills were then related soon after the value was figured out, as presented in **Table 4**.

Table 4. The assessment criteria on the test results of creative thinking.

No	Value Range	Category
1	0% - 20%	Not creative
2	21% – 40%	Less creative
3	41% – 60%	Creative Enough
4	61% – 80%	Creative
5	81% - 100%	Very Creative

(Adapted from Riduwan, 2015)

After calculating the scores, two stages were done to determine the guided inquiry learning model's effect on train students' creative thinking skills. The first stage was intended to calculate the gain index value. This gain index calculation was to determine the increase in the ability of students' learning outcomes. The formula to determine the gain index value was as follows:

$$N - gain\ = \frac{postest\ scores - pretest\ scores}{maximum\ scores - pretest\ scores} \quad (5)$$

The N-gain level criteria obtained as shown in Table 5:

Table 5. The criteria of N-gain value.

Value Range	Category
G ≥ 0.7	High
0.3 ≤ G < 0.7	Moderate
G < 0.3	Low

The second stage was done to determine t-test under the following circumstances:

1. Research Hypothesis
   Ho : There was no significant difference between the students' creative thinking skills both before and after learning
   Ha : There was a significant difference between the students' creative thinking skills before and after learning.
2. Statistical Hypothesis
   Ho : the mean scores (before/pretest) = the mean scores (after/post-test)
   Ha : the mean scores (before/pretest)) ≠ the mean scores (after/post-test)

3. Testing Criteria

Gain the t-count by using the formula (6):

$$t = \frac{\delta}{\frac{Sd\delta}{\sqrt{n}}} \quad (6)$$

Notes :

δ = mean deviation (the sample difference before and after)
Sdδ = standard deviation of δ (the sample difference before and after)
n = the number of samples
DF = n-1

In data analysis, t-count and t-table values were tested over the 2-sided graph. Ho was accepted if the t-count was around -2.03011 and 2.03011; it meant that there was no significant difference both before and after learning. However, Ho was rejected if t-count was seen on the right or left, which meant that there was no significant difference before and after learning.

e. Knowledge Domain analysis

Analysis of students' learning achievement toward the knowledge realm was done by analyzing the pretest and post-test results on chemical equilibrium material, especially on the sub-chapter of factors that affect the shift in the direction of chemical equilibrium. The questions of pretest and posttest were in the form of multiple-choice with a scoring system of 1 for the right answer, while 0 for the wrong answer. The score obtained from the learning result of the knowledge realm was analyzed by using the following formula:

$$\text{The score of knowledge learning outcomes} = \frac{obtained\ correct\ score}{maximum\ score} \text{ x } 100\% \quad (7)$$

Then, the calculation toward the gain index value was carried out. This calculation aims to know the improvement of the students' learning achievement. The formula to determine the value of the gain index is as follow:

$$n - gain = \frac{postest\ score - pretest\ score}{maximum\ score - pretest\ score} \quad (8)$$

After getting the score, there were two follow-up stages to know the effect of the guided-inquiry learning model to train the students' creative thinking skills. The first stage was carried out calculations to determine the value of the gain index. The second was conducting t-test. The calculation was the same as the analysis done in determining the creative thinking skill mentioned before.

f. Analysis of the students' responses

The analysis of students' responses was obtained through the questionnaire that had been distributed. The questionnaire contained students' perceptions toward the ongoing learning in which the guided-inquiry learning model was implemented. The questionnaire was composed referring to the Guttman scale. The criteria of the Guttman scale can be seen in Table 6.

Table 6. Guttman scale criteria.

Answer	Score
Yes	1

No	0

The students' responses were analyzed with a quantitative descriptive by describing each question. It was calculated using the following formula:

$$\text{Percentage of Student Responses} = \frac{\sum Yes\ answer}{\sum\ respondent}\ x\ 100\% \quad (9)$$

The data of the students' responses were also analyzed by using a qualitative descriptive. The responses obtained positive results if the percentage was ≥ 61%.

RESULTS AND DISCUSSION

The implementation of the guided-inquiry learning model E-SW aimed at training creative thinking skills to the students. It was tested to 36 students at SMAN 1 Gedeg Mojokerto. The learning process by using E-SW was distributed through google classroom as an assignment, zoom meeting as a media for online communication between the teacher and the students, pretest and posttest of creative thinking, and knowledge domain was sent through a google form. The result of this research and the discussion obtained were explained as follow:

Validation Result of E-SW

Before conducting the research, the learning devices and research instruments were validated by three lecturers of the Chemistry Department of the Faculty of Science of UNESA. The validation was needed to know the validity of the learning devices and research instruments. The LAPD was composed based on a guided-inquiry learning model with several stages. Besides, the LKPD was arranged to train the students' creative thinking skills. The appropriateness of the LKPD content with the component of creative thinking based on Figure 3 is as follow:

a. fluency in the hypothesis and experiment
b. flexibility in the research problems, hypothesis, and data analysis.
c. Originality in the variable, experiment steps, conclusion and application
d. Elaboration in the tools and materials, research problems, conclusion, and application

The validation result toward the sample of E-SW is presented in **Table 7**.

Table 7. Sample of LKPD validation result.

Indicators	E-SW 1 (%)	E-SW 2 (%)	E-SW 3 (%)
The materials are relevant to the guided inquiry learning model	90	90	90
The suitability of E-SW contents with the model syntax of guided-Inquiry learning	90	90	90
The suitability of E-SW with the components of students' creative thinking skills	80	80	80

Based on Table 7, the E-SW used had met the eligibility criteria because each component had reached a percentage of 61%, which was in the range of 80% - 100% and was categorized as a feasible and very feasible category. The research tools and instruments were said to be suitable to be used if they met the percentage of 61%-80%

and were very feasible if they met 81%-100% (Riduwan, 2015). The learning theory that supports media use in the learning process is called Ausubel's learning theory. To bridge new information or ideas with the subject matter that students have learned, a connecting tool in meaningful learning theory called advance organizer is needed.

Implementation of the Guided Inquiry Learning Model

The analysis of the implementation of learning aimed at determining the teaching process by teachers at the time of the application of the guided inquiry model, which is in line with the syntax. This analysis also aimed at showing that the teachers had trained creative thinking skills during the learning activities. Three observers conducted the analysis toward the teachers regarding the implementation of learning by using an observation sheet constructed. This observational data was analyzed referring to the score criteria of teachers' ability in carrying out the learning process based on Table 8.

Table 8. Criteria of the implementation of the syntax guided inquiry learning model.

Value Range	Category
0 – 0.8	Poor
0.9 – 1.6	Less good
1.7 – 2.4	Good enough
2.5 – 3.2	Good
3.3 – 4.0	Excellent

(Riduwan, 2015)

The syntax of the guided inquiry learning model proposed by Arends (2012) was used in this research.

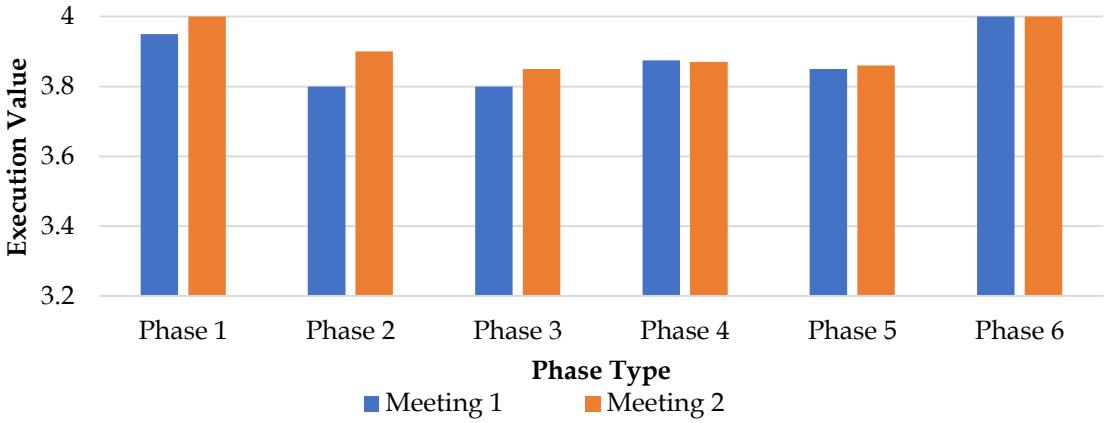

Figure 1. The implementation of the guided inquiry learning model.

This research was conducted for 2x90 minutes. Based on Figure 1 in phase one, which was getting attention and conveying the inquiry process, an average score of 3.9 and 4 was included in the excellent criteria. Phase two presented inquiry problems or events that did not match the average score of 3.8 and 3.9, classified as excellent criteria. The third phase was to invite students to determine the hypothesis then the same average score was gained as much as 3.8, which was included in the excellent criteria. The fourth phase was to invite students to collect data to test the hypothesis, than an average value of 3.8 was included in the excellent criteria. Phase five, namely formulating conclusions, obtained an average value of 3.8, which was included in the excellent criteria. Phase six was reflecting on a problem and applying the thought process to get the same average

score, 4, which was also included in the excellent criteria. Based on the description, it can be concluded that during the two meetings that have been implemented, it included excellent criteria so that the implementation of learning according to the Lesson Plan that has been prepared has been carried out very well (Sugiyono, 2012).

The results of data analysis showed that students were able to follow the learning process well. In contrast, before applying this guided inquiry learning model was given, students tended to be passive in learning and used student-centered learning. In the given learning process, students succeeded in being active in learning using guided inquiry in which the teacher's role was only as a facilitator. Updates on the learning model are needed to improve the quality of learning. It is in line with Prayogi (2017) that the application of inquiry provides many opportunities for students to develop and improve creative thinking skills by accommodating aspects of knowledge, motivation, and thinking skills. Students' activeness in learning can be trained to find solutions to any given problems so that student-centered learning is very effective in learning. One alternative learning model that is in line with student activity to acquire higher-order thinking skills is inquiry (Madhuri et al., 2012). It is in line wit's theory (Arends 2012) that teachers can improve students' understanding by providing scaffolding so that students become independent learners to achieve their goals.

Student Activities

The purpose of observing student activities was to analyze student activities during the learning process. In addition, the analysis of student activities also serves to observe students' behavior in practicing creative thinking skills during learning. These student observation sheets were given to 3 observers Then, student activities were carried out every 3 minutes. The activity sheets were arranged according to the predetermined inquiry learning syntax. Student activities that appeared during learning activities indicated that students had practiced creative thinking skills—learning activities at meetings 1 and 2, each carried out for 90 minutes.

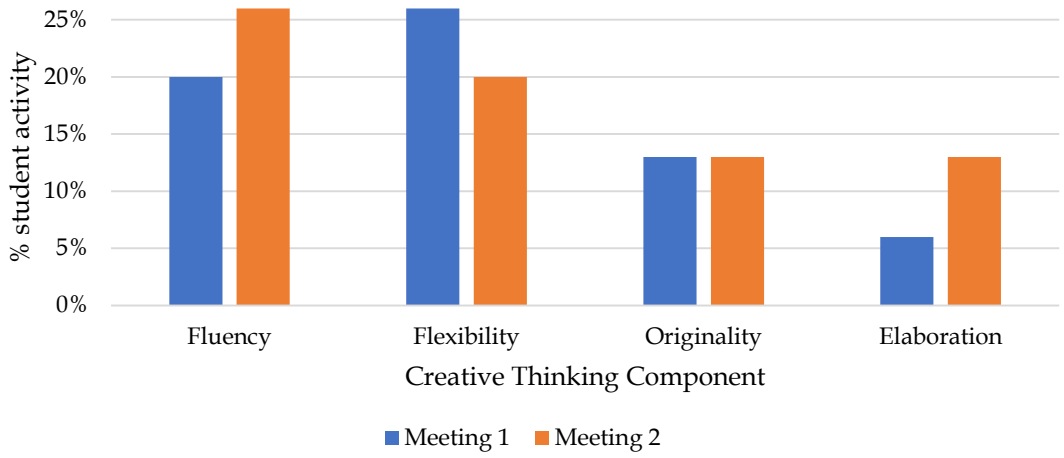

Figure 2. Percentage of activities with creative thinking components.

Based on Figure 2, students have practiced creative thinking skills during learning. The following is a breakdown of the time to practice creative thinking skills in each component. Students have practiced fluency thinking skills by 23%, flexibility thinking skills by 23%, originality thinking skills by 13%, and elaboration thinking skills by 11% during learning. Based on these data, it can be seen that when students practice their

thinking skills, fluency and flexibility > originality > elaboration. The results of data analysis obtained can be stated that students were able to analyze and solve a problem based on their creative ideas Besides, the students were able to categorize an object or problem according to daily life (Setiawan et al., 2014). Student activities, when trained in creative thinking skills, affected learning outcomes; higher learning outcomes were obtained if students had high creativity compared to students who had low creativity (Sulistiyono et al., 2017). Vygotsky's theory (Arends 2012) states that intelligence can develop from new and confusing experiences and resolve differences by associating new knowledge with prior knowledge and constructing new meanings.

Creative Thinking Skills

The components of creative thinking analyzed in this study were Fluency, Flexibility, Originality, and Elaboration. The four components have been trained to students through E-SW (Electronic Student Worksheet), compiled using a guided inquiry learning model. Table 9 shows the results of the students' creative thinking skills pretest.

Table 9. Creative thinking skills pretest results.

Number of Students	Criteria
4	Enough Creative
32	Less Creative

The treatment given to improve students' creative thinking skills is learning using the E-SW based on the guided inquiry model. Students were given a lesson for 2x90 minutes. Then students worked on posttest questions to determine the effect of the learning given. Table 10 shows the posttest results of 36 students. Based on Table 9, it can be interpreted that educators are lacking in training creative thinking skills so that the results of the pretest were less than satisfactory; it is in line with Putra's (2016) research.

Table 10. Creative thinking skills posttest results.

Number of Students	Criteria
5	Very Creative
31	Creative

Based on Table 10, it was analyzed that there was an increase in students' creative thinking skills after being given learning using the E-SW based on the guided inquiry model. It is in line with Putra (2016), who stated that being given a guided inquiry learning model can train students' creative thinking skills. Furthermore, there were two stages to determine the guided inquiry learning model's effect on train students' creative thinking skills. The first stage calculated the value of increasing n-gain for each component of creative thinking skills. An analysis of the gain index value calculation aimed to determine the increase in the ability of students' learning outcomes. The components of thinking skills analyzed consisted of fluency, flexibility, originality, and elaboration. Figure 3 shows the results of the calculation of the n-gain value of 36 students.

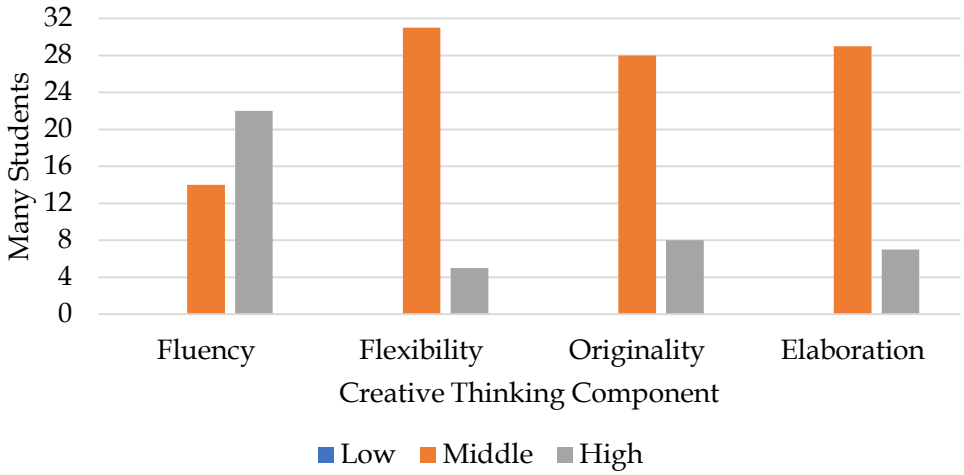

Figure 3. The value of the N-gain component of creative thinking.

Based on Figure 3, the increase in the value of n-gain in each component of creative thinking was good because the increase in the value of n-gain in each component of creative thinking was on average on medium and high criteria. Increasing the value of n-gain in the Fluency component, there were 14 students in the medium group and 22 in the high group. There were 31 students in the medium group and 5 in the high group in the Flexibility component. The Originality component consisted of 28 students in the medium group and 8 in the high group. The Elaboration component consisted of 29 students in the medium group and 7 in the high group. The results of the data obtained were in line with Wibowo (2015) statement that guided inquiry-based learning tools can improve creative thinking skills and work creatively with others. The second stage was to determine the t-test on each component of creative thinking skills. Table 11 shows the results of the t-test.

Table 11. The results of the t-test for each component of creative thinking skills.

Creativity Components	t-table	t-count
Fluency	2.03011	18.3087
Flexibility	2.03011	17.0701
Originality	2.03011	15.3432
Elaboration	2.03011	31.9237

Based on Table 11, the t-count value of all components of creative thinking was greater than the t-table. Since the t-count value was on the right or greater than the t-table, Ho was rejected, and Ha was accepted. Following the research hypothesis, there was a significant difference in students' creative thinking abilities between before and after learning. Therefore, it can be concluded that the guided inquiry learning model affected students' creative thinking skills. Smallhorn (2015) states that inquiry learning can increase students' opportunities to engage in inquiry-based activities and develop analytical and thinking skills. In addition, learning theory (Piaget in Astuti, 2013) states that learning focuses on the thinking process, not just the results, prioritizes the role of students in learning activities, and understands individual differences in the progress of its development.

Knowledge Domain Ability

In addition to training creative thinking skills, this research also trained the realm of students' knowledge abilities. The instruments used were pretest and posttest sheets of knowledge domain abilities. The questions given were in the form of multiple-choice questions that asked about the concept of the factor of the direction of the shift in chemical equilibrium, as well as the relationship between the value of the equilibrium constant and the direction of the shift in the chemical equilibrium, after obtaining the pretest and posttest scores. Then it was tested using the increasing value of n-gain and t-test. The first stage was to calculate the increase in the n-gain value of students so that researchers can analyze the increase in learning outcomes of students' knowledge domain abilities after being given a guided inquiry learning model. Table 12 shows the results of the increase in the n-gain value of the knowledge domain of 36 students.

Table 12. The value of the n-gain of students on the ability of the knowledge domain.

Number of Students	Criteria
12	Moderate
24	High

Based on Table 12, the increase in the ability of the students' knowledge domain was good because the n-gain value was in the medium and high categories. So that the inquiry learning model can also be used to improve the ability of the knowledge domain of students, it is following Andriani (2018) which states that the implementation of the inquiry learning model, if implemented properly, is likely to help students obtain good learning outcomes as well. Using the guided inquiry model of learning following constructivism learning theory following the statement. The second stage tested the value of the t-test to determine the effect of the guided inquiry learning model on learning outcomes in the realm of students' knowledge.

Table 13. The results of the students' T-test on the ability of the knowledge domain.

The number of students	t-table	t-count
36	2.03011	25.9781

Based on Table 13, it is found that the t-count value of the students' knowledge domain was greater than the t-table. Because the t-count value was on the right or greater than the t-table, Ho was rejected, and Ha was accepted. By the adaptation of the research hypothesis, there was a significant difference in the ability of the students' knowledge domain between before and after learning. So it can be concluded that the guided inquiry learning model affected the ability of the knowledge domain of students. The guided inquiry model helped students understand the learning material and was also able to create discoveries so that students were no longer in the scope of telling doing learning but were encouraged to do science (Anam, 2015). Hapsari (2012), in constructivist learning, the addition of new knowledge is carried out by the students themselves, through the provision of stimuli in the form of problems from the real world that are relevant to the needs of students.

Student Response

Response analysis was based on the answers to the questionnaires that have been answered by students. This response questionnaire contained responses about the teaching and learning process that has taken place by applying the guided inquiry model. The questionnaire compiled referred to the Guttman scale on the Yes/No answer choices (Riduwan, 2015). The responses to learning activities were analyzed by distributing questionnaires and then analyzed using quantitative descriptive methods. The results of student responses gained positive results if the percentage obtained was 61% (Riduwan, 2015).

The student response questionnaires in this research were then tried to find its average so that they got a score of 97.83% of students happy during learning, had practiced creative thinking skills and understood the sub-material factors that affected the direction of the shift in chemical equilibrium. The guided inquiry learning model can improve students' creative thinking skills by using E-SW based on the positive responses that students have given. It is in line with the research of Idrisa (2014), which concludes that the use of the inquiry learning model significantly affects the students' creative thinking skills. It has a positive impact on students to improve their creative thinking skills so that the developed E-SW (electronic student worksheet) is suitable for use in learning. Higher-order thinking students can be trained by applying the inquiry learning model. (Syarqiy & Admoko, 2017). According to learning theory, learning is the result of the interaction between stimulus and response (Nahar, 2016).

CONCLUSION

The conclusion from the description of the analysis of the results and discussion of the research using the E-SW based on the guided inquiry learning model can improve students' creative thinking skills. It can be supported by increasing n-gain on the medium and high criteria. In addition, the t-test showed a significant change in students' creative thinking skills and the realm of knowledge between before and after learning. The learning was carried out for two meetings so that the researchers were less than optimal in practicing creative thinking skills. This research can be a reference for further research by adding meetings in learning and conducted in more than one senior high school.

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