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Influence of Canva Based on Guided Inquiry on Students' Critical Thinking Ability and Chemical Literacy

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Abstract: *The rapid development of science and technology in the 21st century also signals that education or schools are expected to be able to produce graduates who have critical thinking skills and scientific literacy skills to be able to adapt to various challenges in 21st century life. This research aims to analyze the influence of the application of model-based Canva media guided inquiry towards students' critical thinking abilities and chemical literacy. The sample in this study were students or cadets of class The instruments used in this research were critical thinking ability tests and chemical literacy ability tests on organic compounds. The research data were analyzed using the one-way MANOVA technique. The results of the research concluded that: (1) there is an influence of the application of Canva media based on a partial guided inquiry model on students' critical thinking abilities; (2) there is a partial influence of Canva media based on the guided inquiry model on students' chemical literacy abilities; and (3) there is an influence of Canva media based on the guided inquiry model simultaneously on students' critical thinking skills and chemical literacy skills.*

Keywords: *Canva Media; Guided Inquiry; Critical Thinking Ability; Chemical Literacy*

INTRODUCTION

The development of modernization and globalization in the 21st century has had a tremendous impact on various areas of life, including education. The 21st century is also marked by the rapid development of science and technology, which also signals that education is faced with various increasingly complex challenges so that education is also expected to be able to produce graduates who have complete abilities to be able to adapt to various challenges in life (Yuliati, 2017). The fact that cannot be denied today is that the main goal of the education system is to teach students how to think, such as logical thinking and critical thinking which are basic skills in everyday life. The ability to think critically is one of the abilities that everyone needs, considering that nowadays science and technology are developing very rapidly. If students are not equipped with critical thinking skills, it is likely that students will not have the ability to retrieve, process and use the information they have in facing the challenges of everyday life. Critical thinking skills are cognitive skills used to identify, interpret, conclude, explain, analyze and evaluate material. Students' critical thinking abilities

can be improved through continuous practice (Purnami et al., 2021).

Critical thinking ability is one of the skills needed to be ready to face challenges in the 21st century. This skill facilitates students to be skilled at complex and systematic thinking to find solutions to problems (Hartono et al., 2022). A student's critical thinking skills determine how students think rationally, argue, classify, interpret, so that critical thinking skills will enable a student to learn and communicate in discussions more easily (Harahap et al., 2020).

Massive changes in information technology have also become a challenge in the education system where the learning process must be adapted to current technology to maximize student participation in learning activities (Purba et al., 2019). The success of learning in the 21st century cannot be separated from the factor of openness to information known as literacy or information literacy, namely the ability to use language and more specifically activities. Activities are very important because they can help improve student achievement (Chasanah et al., 2020).

In the 21st century, literacy skills are not only limited to the ability to read, listen, write and speak orally, but more than that, literacy skills are emphasized on literacy skills that are connected to each other in the digital era like today. In the era of digital literacy where the flow of information is very abundant, students need to have the ability to select relevant sources and information, find quality sources and assess sources from the aspects of objectivity, reliability and up-to date (Septikasari & Frasandy, 2018).

Chemistry is included in the science family, so chemical literacy is part of scientific literacy. Scientific literacy is multidimensional in its measurement aspects, namely science content, science process, and science application context. (Riyadi et al., 2018). Scientific literacy is a main topic in the world of education that must be developed so that students have the ability to compete in the

21st century. Every student is required to master scientific literacy in social life because this literacy is related to students' ability to connect issues about science and their ideas as citizens. Scientific literacy is focused on building students' knowledge so they can apply scientific concepts meaningfully, think critically and make balanced and adequate decisions on problems that have relevance to students' lives. Scientific literacy is also needed for the development of collective interaction skills, self-development through a communicative approach, and to demonstrate understandable reasoning and persuasively express arguments in social scientific problems (Marpaung & Suyanti, 2023).

Chemical literacy is related to how students can appreciate nature by utilizing the science or chemistry and technology they master. People who have chemical literacy understand basic chemical concepts, can explain phenomena and solve problems in life using their understanding of chemistry, understand chemical innovations in social life and have an interest in chemistry. (Wahyuni & Yusmaita, 2020). Chemical literacy can be used as a forum for students to practice critical thinking where students relate it to everyday phenomena (Riyadi et al., 2018).

Critical thinking skills and scientific/chemical literacy skills are one of the abilities needed to prepare graduates who are able to compete and adapt to changing times, especially in facing various challenges of globalization and modernization in the current 21st century. The learning process should also be directed at educating students to have adequate knowledge about the subjects they study accompanied by the ability to think critically, communicate and collaborate in making careful decisions, and the ability to solve problems (Sutiani et al., 2021).

However, the reality shows that students' critical thinking skills and scientific/chemical literacy are still very low. This also happened at the Buana Bahari Private Shipping Vocational School in

Medan. As a result of the initial study, it was found that there were still many class The Minimum Completion Criteria for chemistry lessons set by the school is 75.

The low level of students' critical thinking skills and chemical literacy is partly due to teachers' teaching methods which are still teacher-centered and lack of training of students' critical thinking skills and scientific/chemical literacy. This is as explained (Sianturi & Panggabean, 2019), that the learning process up to now still provides teacher dominance (teacher centered) and does not provide access for students to develop independently through discovery in their thinking processes. Further according (Panggabean & Purba, 2021), explained that in the learning process, especially science learning, students tend to memorize concepts, theories and principles without interpreting the process of their acquisition. As a result, students become less trained to think and use their reasoning power to understand natural phenomena that occur or when facing problems.

The learning process is basically a communication process that involves conveying a message (material) from the introducer (teacher) to the recipient (student), and in the process of conveying the message a medium is needed so that the message can be received well. The use of innovative and constructive learning media in reconstructing students' knowledge, critical thinking skills and chemical literacy is something that needs to be considered by a teacher. The use of media in learning allows students to learn better and can increase student activity and memory according to the goals to be achieved (Purba et al., 2021).

Learning is also assistance provided by teachers so that the process of acquiring science and knowledge, mastering skills and habits, as well as forming attitudes and beliefs in students occurs (Gaol & Darmana, 2022). Therefore, a teacher must be more innovative and creative in planning and designing an interactive learning process to be able to help,

guide and train students' critical thinking and chemical literacy skills in solving existing problems.

One alternative that can be applied to train and improve students' critical thinking skills and chemical literacy skills is to apply guided inquiry-based media using the Canva application. The guided inquiry learning model is a learning model that refers to the activity of investigating existing problems using scientific skills in order to seek explanations. The role of the teacher in this model is as a guide and facilitator so that students have the freedom to explore their abilities to the maximum and the teacher guides students in the process of solving existing problems (Ningtias & Soraya, 2022).

Research conducted by Lestari et al (2019), shows that the guided inquiry model influences students' reflective thinking abilities. Further research by Charolina et al (2021), shows that the guided inquiry learning model influences students' critical thinking abilities. Research Ningtias & Soraya (2022), shows that there is a positive and significant influence of the guided inquiry model on students' mathematical communication skills. Research conducted by Djam'an et al (2023), shows that the application of the guided inquiry learning model has an effect on the critical thinking abilities of students in the medium and high self-esteem categories. Further research (Wahyuni et al., 2023), shows that the guided inquiry learning model has an influence on students' problem solving abilities.

The Canva application is an online design program that provides various tools such as presentations, resumes, posters, flyers, brochures, graphics, infographics, banners and other types available in it. (Sadriani et al., 2023). Using Canva makes it possible to develop media including web-based interactive teaching materials, this application can also be combined with audio video so that it can increase interest for students. (Ramadani et al., 2023). This application can also be used online without having to

download it first so it doesn't require a lot of storage space on the computer. Apart from that, the final result can be in the form of a link that students can share and access for studying in the classroom or studying online at home (Mariska & Rahmatina, 2022). Using this application can also increase creativity, providing various illustrations, templates and typefaces to support creativity in designing (Putri et al., 2023).

This research aims to determine and analyze the effect of applying Canva media based on the guided inquiry model on students' critical thinking skills and chemical literacy skills on the main material of Organic Compounds in class XII of the Buana Bahari Private Vocational School, Medan.

LITERATURE REVIEW

Learning Media

Media is an intermediary or messenger from the sender to the recipient of the message (Sadiman et al., 2018), as well as any tools that can be used as messengers to achieve teaching objectives (Djamarah & Zain, 2016). Learning media is a teaching aid for teachers to convey material, increase students' creativity and attention in the learning process (Harahap et al., 2022). The use of media in learning allows students to learn better and can increase student activity and memory according to the goals to be achieved (Purba et al., 2021). The presence of media in learning is quite important, because the ambiguity of the material can be helped by presenting media as an intermediary, even the complexity and abstractness of the material can be simplified and concretized with the presence of media.

Guided Inquiry Learning Model

The inquiry learning model is one of the learning models that can be applied to improve 21st century skills, such as critical, creative, communicative and collaborative thinking abilities. The target of implementing the inquiry learning model is optimal student involvement in learning activities. The guided inquiry model is a learning model that is

carried out with students learning more actively while the teacher only becomes a facilitator. Then, through direction and guidance from the teacher, students carry out investigations and discoveries to solve problems regarding questions or problem formulations using critical thinking skills and making observations to arrive at conclusions. (Charolina et al., 2021).

The guided inquiry learning model is a learning model that refers to the activity of investigating existing problems using scientific skills in order to seek explanations. The role of the teacher in this model is as a guide and facilitator for students to gain the freedom to explore their abilities to the maximum and the teacher guides students in the process of solving existing problems. (Ningtias & Soraya, 2022). The guided inquiry learning model is a student-centered learning model. Teachers provide opportunities for students to find information to answer questions related to the problems given (Djam'an et al., 2023).

In this model the teacher gives directions about the procedures that must be carried out from the beginning to the end of the activity, so that students who think slowly or who have low thinking abilities are still able to follow the ongoing learning process (Lestari et al., 2019). The guided inquiry learning model can increase learning activities so that teachers and students can be active in communicating the material taught scientifically (Deliana et al., 2018).

Canva Application

The Canva application is an online design program that provides various tools such as presentations, resumes, posters, flyers, brochures, graphics, infographics, banners and other types available in it. (Sadriani et al., 2023). Using Canva makes it possible to develop media including web-based interactive teaching materials, this application can also be combined with audio video so that it can increase interest for students (Ramadani et al., 2023). This application can also be used online without having to download it first so

it doesn't require a lot of storage space on the computer. Apart from that, the final result can be in the form of a link that students can share and access for studying in the classroom or studying online at home (Mariska & Rahmatina, 2022).

Canva contains various features that can be used to create various designs, besides that it is also one of the many applications that can be used to design and publish work online. This Canva application can be used for various visual design purposes for learning media. Using this application can also increase creativity, providing various illustrations, templates and typefaces to support creativity in designing (Putri et al., 2023). Canva can be easily accessed via smartphone or PC and its easy use can help teachers more easily and save time in designing teaching materials and make it easier for teachers to deliver lesson material. (Ceria et al., 2022).

Critical Thinking Ability

Critical thinking skills are one manifestation of higher order thinking abilities. Critical thinking can be defined as a person's attempt to check the truth of information using evidence, logic and ordinary awareness (Jahro et al., 2021). Critical thinking is not only an element of ability (cognitive), but also must pay attention to attitudes towards critical thinking. Critical thinking is reflective thinking that makes sense and focuses on the process of making decisions about what to do or what to believe (Nurhalimah et al., 2021).

Critical thinking is the ability to interpret, analyze and evaluate ideas, information and arguments in making decisions (Djam'an et al., 2023). The aim of critical thinking in the learning process is to direct students to have a structured and intelligent way of thinking in organizing and arranging concepts to solve problems (Wartini, 2021).

The ability to think critically usually begins with a person's ability to criticize various phenomena that occur around him,

assess it from the perspective he uses, then position himself, from an inappropriate situation to a situation that is in his favor. (Sugiyarti et al., 2018). Students' critical thinking abilities can be improved through continuous practice (Purnami et al., 2021).

Scientific/Chemical Literacy Ability

Scientific literacy is a crucial skill needed in today's digital era, because there are many problems related to knowledge and technology, as well as empowering people to make personal decisions and participate in the formulation of public policies that have an impact on their lives (Naila & Khasna, 2021). Scientific literacy is the ability to utilize scientific knowledge, formulate questions, and draw conclusions based on scientific evidence. Scientific literacy is seen as the ability to participate in scientific issues and ideas as a reflective society (Nugraha, 2022). Scientific literacy is defined as the ability to use scientific knowledge, identify questions and draw conclusions based on facts to understand the universe and make decisions about changes that occur due to human activities (Sutiani et al., 2020).

Chemistry is included in the science family, so chemical literacy is part of scientific literacy. Chemical literacy is related to how students can appreciate nature by utilizing the science, chemistry and technology they master. People who have chemical literacy understand basic chemical concepts, can explain phenomena and solve problems in life using their understanding of chemistry, understand chemical innovations in social life and have an interest in chemistry. (Wahyuni & Yusmaita, 2020). Chemical literacy can be used as a forum for students to practice higher level thinking where students relate it to everyday phenomena (Riyadi et al., 2018).

METHODS

This research is a type of quasi-experimental research conducted on two groups taken from several populations with two separate samples. One sample group was treated with Canva media based on a guided inquiry model (experiment), and another

group was given a direct learning model (control). The population in this study were all students or cadets of class 2023/2024. The sample in this study was 2 (two) classes, each with 26 cadets determined using the cluster random sampling technique.

The instruments used in collecting research data consisted of critical thinking ability tests and students' chemical literacy ability tests on Organic Compounds material for class The research data that has been obtained is processed and analyzed with the help of the SPSS program to answer the problem formulation, research objectives and hypotheses. The data analysis techniques used are descriptive analysis techniques and inferential techniques. Descriptive analysis techniques are used to describe data, namely the lowest, highest, average (mean) and standard deviation values. Inferential statistical techniques were used to test the research hypothesis, using the one-way MANOVA (Multivariate Analysis of Variance) analysis technique at a significance level of 0.05. Before testing the hypothesis, a prerequisite test is first carried out on the data using the normality test and homogeneity test.

RESULT AND DISCUSSION

Description of Research Data

The data in this research is data on students' critical thinking abilities (CTA) and chemical literacy abilities (CLA) on the main material of Organic Compounds in class XII.

Table 1. Description of research data

Class	Data	N	Average	Std. Deviation
Experiment (A1)	CTA	26	85.38	8.462
	CLA	26	84.04	8.720
Control (A2)	CTA	26	79.62	6.300
	CLA	26	77.50	8.631

Table 1 shows the critical thinking abilities (CTA) of experimental class (A1) students who applied the Canva media based on the guided inquiry model, obtaining an average score of 85.38 ± 8.462; Meanwhile, for data on chemical literacy (CLA) abilities of experimental class (A1) students, an average score of 84.04 ± 8.720 was obtained.

Meanwhile, for control class (A2) students who applied the direct learning model, the average value of students' critical thinking skills (CTA) was 79.62 ± 6.300 and the average value of students' chemical literacy skills (CLA) was 77.50 ± 8.631.

Data Normality Test Results

The research data normality test, both CTA and CLA data, was analyzed using the one sample Kolmogorov-Smirnov test approach using the help of the SPSS program. Data is declared to be normally distributed if the probability value (Sig) is > 0.05, and vice versa.

Table 2. Data normality test results

Class	Data	Value K-S	Sig.	Criteria
Experiment (A1)	CTA	0.845	0.472	Normal
	CLA	0.897	0.396	Normal
Control (A2)	CTA	1.105	0.174	Normal
	CLA	0.973	0.300	Normal

Table 2 shows the results of the normality test for each group of data, obtaining a probability value (Sig) > 0.05. Thus, it was concluded that the critical thinking ability (CTA) data and chemical literacy ability (CLA) data for each class had a normal distribution of data or the data met the normality assumption.

Data Homogeneity Test Results

The research data homogeneity test was analyzed using the Levene's test approach and the Box's M approach (Barlett Test) using the SPSS program.

Table 3. Data homogeneity test results

	Levene's Test		Box's M Test		
Data	F	Sig.	Box's M	Sig.	Criteria
CTA	1.689	0.200	2.267	0.538	Homogeneous
CLA	0.013	0.909			

Table 3 shows the results of the data homogeneity test using both the Levene's test approach and the Box's M Test approach, obtaining a probability value (Sig) > 0.05. Thus, it is concluded that the variance between sample groups has a homogeneous variance or the research sample comes from a homogeneous population.

Hypothesis Testing Results

Hypothesis testing was analyzed using the one-way MANOVA technique using the SPSS program.

Table 4. MANOVA test results

MANOVA	Data	F	Sig.	Criteria
Partial	CTA	7.776	0.007	Significant
	CLA	7.384	0.009	Significant
Simultaneous	CTA	5.689	0.005	Significant
	CLA			

Based on Table 4, several things can be interpreted as follows: (1) The results of partial MANOVA analysis for students' critical thinking ability (CTA) data obtained an F_{count} value of 7.776 with a probability value (Sig) of 0.007. Because the sig value. $0.007 < 0.05$, it is partially concluded that there is a difference in the average critical thinking ability (CTA) between experimental class and control class students. Thus, it is concluded that there is an influence of the application of Canva media based on the guided inquiry model on students' critical thinking abilities; (2) The results of partial MANOVA analysis for students' chemical literacy ability (CLA) data obtained F_{count} of 7.384 with a probability value (Sig) of 0.009 < 0.05 so it was partially concluded that there was a difference in the average chemical literacy ability (CLA) between experimental class students with the control class. Thus, it is concluded that there is an influence of the application of Canva media based on the guided inquiry model on students' chemical literacy abilities; (3) The results of simultaneous MANOVA analysis for students' critical thinking ability (CTA) and chemical literacy (CLA) data obtained F_{count} of 5.689 with a probability value (Sig) of $0.005 < 0.05$ so simultaneously (together) it was concluded that there was an average difference average critical thinking ability (CTA) and chemical literacy ability (CLA) between experimental class and control class students. Thus, it is concluded that there is an influence of applying Canva media based on the guided inquiry model simultaneously (together) on students' critical thinking abilities and chemical literacy abilities.

DISCUSSION

The results of the research show that the application of Canva media based on the guided inquiry model has a significant effect both partially and simultaneously (together) on students' critical thinking abilities and chemical literacy abilities. The use of media in learning allows students to learn better and can increase student activity and memory according to the goals to be achieved (Purba et al., 2021). Using Canva as a learning medium can help and make it easier for teachers to deliver lesson material (Ceria et al., 2022), and able to attract the attention and interest of students (Ramadani et al., 2023).

Students' critical thinking skills and chemical literacy can be improved if students are guided and accustomed to actively seeking and gaining understanding so they don't have to wait for what the teacher says. (Ulandari et al., 2019). The guided inquiry learning model is a series of learning activities that involve all students' abilities to search and investigate systematically, critically, logically, creatively and analytically so that students can formulate their own discoveries with full confidence.

The results of this research are in line with the research conducted Wulandari et al (2022), which shows that there is an influence of the guided inquiry learning model assisted by power point media on students' critical thinking abilities. Research by Ogegbo & Ramnarain (2022), shows that integrating interactive simulation technology into inquiry-based activities can increase students' in-depth knowledge of science concepts. Research result Nurmayani et al (2018), shows that the guided inquiry learning model has a significant effect on students' critical thinking abilities. Research by Wartini, (2021), shows that the application of the guided inquiry learning model can increase students' learning motivation and critical thinking abilities.

CONCLUSION

Based on the research results, it can be concluded that the application of guided inquiry-based Canva media has an influence on students' critical thinking abilities, where

the average critical thinking ability of students taught with Canva-based guided inquiry media (85.38±8.462) is higher than students taught with the direct learning model (79.62 ± 6,300). Apart from that, it turns out that the guided inquiry-based Canva media has a significant influence on students' chemical literacy abilities. This is proven by the average value of the chemical literacy abilities of students taught using guided inquiry-based Canva media (84.04 ± 8.720) which is higher than students taught using the direct learning model. Therefore, it can be stated that the application of guided inquiry-based Canva media has a simultaneous effect on students' critical thinking abilities and chemical literacy.

The results of this research also have the implication that to improve students' critical thinking skills and chemical literacy skills, teachers are required to be more creative and innovative in designing meaningful learning that can involve students in active learning, can guide, train and familiarize students. to be able to think critically and be able to choose. relevant and quality sources and information (literacy), one of which is the application of Canva learning media based on the guided inquiry model. Through the Canva learning media based on the guided inquiry model, you can help, guide and train students to improve their understanding, critical thinking skills and scientific/chemical literacy skills.

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