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Influenced of Discovery Learning Model Assisted by iSpring Presenter on Students HOT Literacy Redox Reactions

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Abstract: *This research aims to determine the influence of the discovery learning model assisted by iSpring presenter media which is greater than the conventional model on students' chemistry literacy HOT abilities and aspects of developed HOTS literacy abilities. Three classes of class X pupils from SMAS Imelda Medan made up the study's population. Thirty students each from classes X MIA 2 and X MIA 3 made up the research sample. Nineteen multiple-choice questions made up the test instrument used in the study Hypothesis testing used the right-hand t test with the research results obtained by the value* $t_{count} > t_{table}$ *(2.243 > 2.002) meaning that Ha was accepted and H0 was rejected, which means that the influence of using the discovery learning model assisted by iSpring presenter media on students' chemical literacy HOT abilities had a greater impact than using the conventional model. on redox reaction material with an N-Gain value of 0.75 (75.03%). Besides that, the HOT literacy skills acquired through the iSpring presenter media-assisted discovery learning paradigm were demonstrated in C5 reasoning with an 87.94% percentage in the redox reaction material.*

Keywords: *discovery learning model; iSpring presenter media; HOTS literacy; redox reaction*

INTRODUCTION

In the 21st century, students are deemed competent of addressing problems if they are able to analyze them and apply what they have learnt to novel circumstances. Higher order cognitive skills are the term used to describe this capacity. Thinking abilities pertaining to the ability to generate, analyze, and assess different aspects and problems are known as Higher Order Thinking Skills (HOTS). HOTS tends to value reasoning above memorization of formulas and facts (Nurina & Retnawati, 2015).

Applying new or existing knowledge and manipulating data to solve problems in novel circumstances are prerequisites for this competence (Priyasmika & Yuliana, 2021). HOTS problems are those whose resolution entails more than just applying a formula directly, giving rise to complex issues that necessitate interpretation and arduous work to develop ideas for conclusions (Badjeber & Purwaningrum, 2018). Scientific literacy, which includes elements of the scientific method that pertain to problem-solving abilities, is closely associated with this cognitive ability (Yuriza et al., 2018).

Because technology is advancing so quickly, scientific literacy has become a crucial component of education to help people better handle the problems of globalization (Fuadi et al., 2020). Scientific literacy is the capacity that people must possess in order to perform scientific tasks, apply ideas, and use science to solve problems that arise in daily life (Sutrisna, 2021). People who possess scientific literacy are therefore aware of opinions regarding the fundamental ideas that underpin technological and scientific thought, how that knowledge is acquired, and whether it is backed up by empirical evidence or theoretical arguments (OECD, 2019).

Chemical literacy has emerged as the primary educational objective and is an integral component of scientific literacy (Muntholib et al., 2020). According to (Imansari et al., 2018), students must possess chemical literacy in order to comprehend the abstract ideas of chemistry in general. Apart from that, who possess chemical literacy will benefit from learning chemical content by observing the chemical occurrences they encounter on a daily basis (Fahmina et al., 2019).

For students to learn how to locate something by conducting actual research and creating findings, the discovery learning paradigm is the best option. When the discovery learning approach is used to teach, students' HOTS abilities can improve. The ability to process the information acquired through learning is just as important as acquiring theoretical knowledge (Siregar et al., 2023). In order to facilitate learning and enhance students' scientific literacy and critical thinking abilities, educators must be proficient using technology (Sulistyaningrum et al., 2023). iSpring Presenter is one technology-based learning tool that can be utilized. A program called iSpring Media Presenter can convert Power Point-compatible presentation files into Flash (Nasution & Jahro, 2023).

Given the above description and phenomena, education that can help students develop their high literacy abilities is necessary so they may examine how knowing chemistry relates to their everyday life. In this instance, using the iSpring Presenter media-assisted discovery learning strategy is required to enchance students' chemical literacy HOTS skills in redox reaction content.

LITERATURE REVIEW

A. Discovery Learning Model

Multiple experts define the discovery learning model. The discovery learning model is a way of presenting material where students are conditioned to discover for themselves the concepts, principles, and problem solving that must be mastered to achieve learning objectives (Tuski et al., 2023). Apart from that, another definition put forward by (Sudarmanto et al., 2021) discovery is defined as a teaching procedure to understand concepts, meanings, and relationship through an learning, students must play an active role in organizing themselves to find a solution to a concept or principle and the knowledge that accompanies it will produce meaningful knowledge (Dita & Syafriani, 2022).

According to the definition given above, the discovery learning model is a process for learning activities that teachers employ to enable students to actively participate in the process of learning concepts, principles, and problem-solving techniques through analytical investigations. This allows students to discover knowledge that is relevant to their learning objectives. Each learning model has a syntax and learning steps that must be implemented. Based on the application of the discovery learning model, there are six steps that must be carried out (Nuraeni, 2022), namely: stimulation, problem identification, data collection, data processing, verification, and generalization.

B. Higher Order Thinking Skills

Higher Order Thinking Skills is the ability to connect, manipulate, and use student's knowledge and experience to think critically and creatively in solving a problem (Harta et al., 2020). Based on the description of the definition above, it can be concluded that HOTS is a high-level thinking ability that students have to solve a problem based on new implications for manipulating ideas and information that is appropriate to their cognitive domain. Bloom stated that HOTS consist of the ability to analyze, the ability to synthesize, and the ability to evaluate. Then it underwent revision by Anderson at the HOTS level to become the ability to analyze, the ability to evaluate and the ability to create (Wasis et al., 2020).

C. Chemical Literacy

Chemical literacy refers to a person's ability to understand and apply chemical knowledge in everyday life. In this case there are 3 (three) main aspects namely understanding the aspects of knowledge, awareness, and application of chemistry in everyday life effectively ande precisely. The knowledge aspect is related to students' ability to understand phenomena and material related to chemistry. The awareness aspect means that students are aware of the importance of chemistry in life. The aspect off applying chemistry in everyday life is related to students' ability to apply the knowledge they have gained about chemistry and solve problems in real life (Alviah et al., 2020).

D. HOTS Literacy

Literacy abilities measured based on the PISA framework are in accordance with the HOTS indicators based on Bloom's Taxonomy. Bloom's Taxonomy is used as a method in developing learning objectives and as an indicator in measuring students' literacy thinking abilities. The relationship between the HOTS indicators according to Bloom's Taxonomy and the PISA framework is that both require the ability to analyze, synthesize/evaluate and develop/create for high-level thinking abilities.

E. Learning Media

Interactive multimedia-based learning medium, of course a program or software is needed that supports its development and implementation. There are many programs or software that can choose to create interactive multimedia, one of which is iSpring Presenter. According to (Irhasyuarna & Yulinda, 2022) iSpring Presenter is a software that is operated to create learning media by containing various media aspects such as audio, visual, and audio-visual. The device used is integrated with Power Point and can be collaborated with several supporting devices so that the resulting media becomes more interesting and interactive.

METHODS

The research used in this research is a one-group pretest-posttest design, namely a research design that includes a pretest before treatment and a posttest after treatment. This research was carried out the Imelda Medan, which is located at Jl. Bilal Ujung No.25, Pulo Brayan Darat I, Kec. East Medan., Medan City, North Sumatra. This research was carried out from January to March, even semester of the 2023/2024 academic year. The population in this study were all class using sampling techniques. The sampling technique used in this research was a purposive sampling technique based on recommendations from chemistry subject teachers as well as consideration of students' ability levels and activities in the learning process. The test instrument used is an objective test in the cognitive domain with a presentation of 30 multiple choice questions with 5 answer choices for each question on redox reaction material to obtain data on students' chemical literacy HOTS abilities in the form of a pretest and posttest with five answer choices (A, B, C, D, and E) where one answer is the correct answer and the other four answer choices are distractors. Each correct answer is given a score of five and an incorrect answer is given a score of zero. The level of understanding of the test is arranged based on Bloom's taxonomy in the cognitive domain starting from the level of knowledge (C-4) to synthesis (C-6). Data analysis used several consisting of hypothesis testing using the N-Gain formula, prerequisite on normality test and homogenity tests.

RESULT AND DISCUSSION

Based on student learning outcomes data collected in this research and tabulated test results, the pretest and posttest scores obtained to determine students' HOTS literacy abilities were obtained by data tabulated in Table . so an increase in HOTS literacy (N-Gain) was obtained by 75.03% for the experimental class and 66.8% for the controll class. Tables 1 can be presented as follow:

Table 1. N-Gain test calculation results

Data Class	N-Gain Total	% Enhancement	Interpretation
Exp	22.51	75.03	High
Control	20.06	66.86	Medium

Figure can be presented as follow:

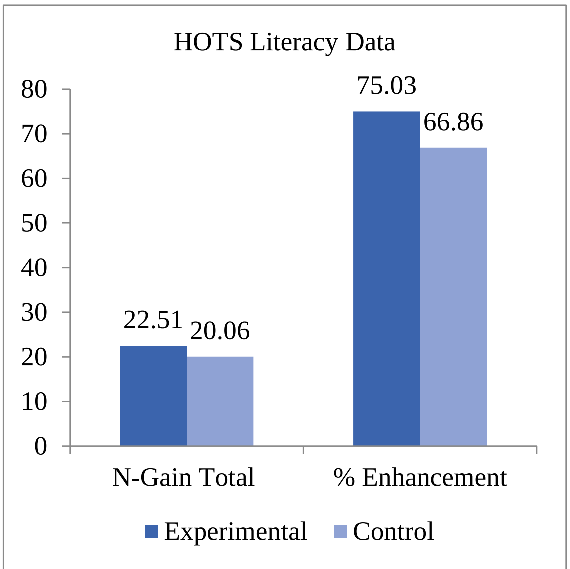

Figure 1. Diagram of the average value of pretest and posttest HOTS literacy

Calculation of the N-Gain data normality test, pretest-posttest in the experimental class and control class using the Chi-Square test at the real level α = 0.05 with the Chi-Square criterion $(X^2)_{count}$ < $(X^2)_{table,}$ then it is declared normal and presented in Table 2 as follow:

Table 2. Normality test result

Data Class		$(X^2)_{count}$	$(X^2)_{table}$	Description
Exp	*Pretest*	3.26	11.07	Normal
	Posttest	7.86		Normal
	N-Gain	9.60		Normal
Cont	*Pretest*	3.86		Normal
	Posttest	5.19		Normal
	N-Gain	9.68		Normal

According to the test criteria, namely accepting samples from a normally distributed population if the Chi-Square $(X^2)_{count}$ < $(X^2)_{table}$. Based on Table 2, the pretest experimental class Chi-Square $(X^2)_{count}$ < $(X^2)_{table,}$ (3.26 < 11.07), posttest data with the criterion $(X^2)_{count}$ < $(X^2)_{table,}$ (7.86 < 11.07), and N-Gain normality has the criterion $(X^2)_{count}$ < $(X^2)_{table,}$ (9.60 < 11.07). So it is concluded that the pretest, posttest and N-Gain data in this study are normally distributed at a significance level of 0.05. Likewise, the pretest control class has criteria $(X^2)_{count}$ < $(X^2)_{table}$ (3.86 < 11.07), posttest data with criteria $(X^2)_{count}$ < $(X^2)_{table}$ (5.19 < 11.07), and N-Gain normality has the criteria $(X^2)_{count}$ < $(X^2)_{table}$ (9.68 < 11.07). So it is concluded that the pretest, posttest, and N-Gain data in this study are normally distributed at a significance level of 0.05.

The homogeneity test was caried out using Fisher's test at a significance level of α = 0.05 with the test criteria F_{count} > F_{table} so the data was declared homogenous. By obtaining data as in Table 3 presented as follow:

Table 3. Homogeneity test result

Data Class	F_{count}	F_{table}	Description
Pretest	1.00	1.86	Homogenous
Posttest	1.02		Homogenous
N-Gain	1.07		Homogenous

It can be seen that from the students' pretest-posttest and N-Gain data, $F_{table} > F_{count}$ is obtained so it can be concluded that the data above is homogenous. Once it is known that the data is normally distributed and homogenous, a hypothesis test can be carried out using a statistical test, namely the right-hand t test. This test was carried out to determine whether the hypothesis in this study was accepted or rejected. The test criteria is if $t_{count} > t_{table}$, meaning the null hypothesis (H_0) is rejected and the alternative hypothesis (H_a) is accepted. The following hypothesis test calculation results can be followed in Table 4:

Table 4. Hypothesis test calculation results

Data Class	t_{count}	t_{table}	Description
N-Gain	2.243	2.002	H_a accepted

The table of calculation results above shows that if $t_{count} > t_{table}$ (2.243 > 2.002) so that H_0 is rejected, which means Ha is accepted, therefore it can be concluded that students who are taught using the discovery learning model assisted by iSpring Presenter media are greater that students who are taught using conventional models on redox reaction material.

Figure can be presented as follow:

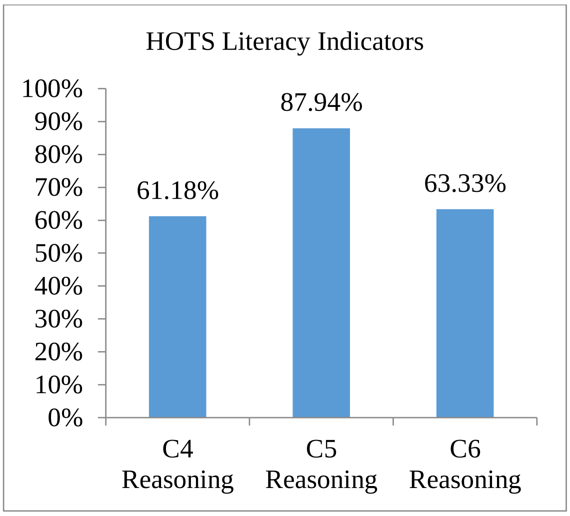

Figure 2. HOTS aspects of developed literacy

HOTS aspect of the literacy shows that the HOTS aspect of student literacy that is developed is the C5 reasoning aspect with a greater percentage than C4 reasoning and C6 reasoning. Based on the calculation of the HOTS literacy percentage for each indicator, it was found that the percentage of questions with the C4 reasoning indicator was 61.97%, the C5 reasoning indicator was 87.94%, and the C6 reasoning indicator was 61.67%. The developed HOTS literacy aspect can be seen from each normalized N-Gain calculation, 19 HOTS literacy question item used during learning, starting from level C4 reasoning 61.97% with 9 question items, C5 reasoning 87.94% with 8 question items, and C6 reasoning 61.67% with 2 question items. The calculation results show that through the discovery learning model assisted by iSpring Presenter media, the most developed aspect of literacy is C5 reasoning with the highest percentage, namely 87.94%. this result is because in learning students tend to be more active in evaluating and analyzing problems that arise around them. In C6 reasoning has the lowest percentage because this can happen due to the number of the questions and the duration of working on the questions being different. By calculating the percentage for each indicator, can get a picture of the students' developed HOTS literacy abilities.

As according to Tuski et al., (2023) states that the effectiveness of using the learning model can be seen from the results of calculating the N-Gain value. Based on the results of the N-Gain calculation, it is in the high category which means that the use of the discovery learning model in redox reaction material is effective in improving students' chemical literacy HOTS abilities. This is in line with Siregar et al., (2023), research that learning using the discovery learning model allows students to gain their own concepts or knowledge that they previously did not know, not through notification, some or all of it was discovered by themselves. In finding concepts, students make observation, classify, make conjectures, explain and draw conclusions to find several concepts or principles so that the learning outcomes obtained are higher as evidenced by an increase in the average student score. Application of the discovery learning model both in teaching and development of teaching materials can improve learning achievement, learning outcomes, critical thinking skills, and students' science skills (Kurniawan & Jahro, 2021).

According to Winarni et al., (2020), using the discovery learning approach can enhance student activities and learning outcomes related to redox reaction content. Students' efforts to find their own understanding of the content make learning more meaningful and the material is remembered longer. The goal of the discovery learning strategy is to foster dynamic and creative learning environments where students gather information independently (Agustina et al., 2023). Students' passion for learning to solve issues and comprehend how science is applied in daily life increases with the level of student group involvement and ideas employed in research (Viniasari et al., 2022).

This research is corroborated by Khaerudin et al., (2023), who stated that the use of learning models and technology advancements by teachers enhances students' critical thinking skills in the context of redox reactions. The implementation of the discovery learning approach is more successful and efficient when supplemented by creative media, specifically iSpring Presenter. Research conducted by Santi & Guspatni, (2022) also elicited a favorable reaction from students regarding the enhancement of their critical thinking skills. Nasution & Jahro, (2023) asserted that the utilization of iSpring Presenter media in chemistry education enhances students' higher-order thinking abilities (HOTS) by offering quiz questions that facilitate the refinement of their understanding of the learning material. Research by Irham et al., (2024), demonstrates that employing a discovery learning model facilitated by interactive media enhances student learning outcomes and engagement. This finding aligns with the study by Munthe & Suyanti, (2024), which indicates improvements in students' higher-order thinking skills (HOTS) in chemistry. Consequently, educators and prospective teachers are encouraged to utilize learning models that incorporate interactive media. The findings underscore the significance of employing innovative, technology-assisted learning methods to enhance student engagement and academic performance, particularly in chemistry education, which incorporates C3, C4, C5, and C6 cognitive reasoning skills. This approach facilitates the development of students' Higher Order Thinking Skills (HOTS) literacy.

CONCLUSION

The following conclusions were drawn from the study's findings and the discussion that followed. Students who were taught redox reaction material using the discovery learning model with the use of iSpring Presenter media had higher HOTS reading skills than those who were taught redox reaction material using traditional approaches. This is demonstrated by the t-test findings where $t_{count} > t_{table}$, specifically 2.243 > 2.002, and the N-Gain value in the experimental class of 0.75 or 75.03%, but in the control class it is 0.67 or 66.86%. The C5 reasoning component is the HOTS component of cognitive literacy that was created in this study using the discovery learning methodology with help from iSpring Presenter media. The percentage findings for the C5 reasoning aspect (87.94%), C4 reasoning aspect (61.97%), and C6 reasoning aspect (61.67%) demonstrate.

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