Terakreditasi S4 sinta Science and Technology Index

pISSN 2685-0761
eISSN 2685-0850

JURNAL INOVASI PEMBELAJARAN KIMIA
(Journal of Innovation in Chemistry Education)
https://jurnal.unimed.ac.id/2012/index.php/jipk
email: Jinovpkim@unimed.ac.id

Recieved : 17 June 2024
Revised : 7 October 2024
Accepted : 26 October 2024
Publish : 31 October 2024
Page : 220 – 226

The Effect of the iSpring - Assisted PBL Model on Students' Literacy HOTS on Reaction Rate

Seli Cornelya Marantara Tambunan[1]* and Marini Damanik[2]

[1,2]*Chemistry Education Study Program, Universitas Negeri Medan, Medan*

**Email: sselicor@gmail.com*

***Abstract*:** *Every student is enforced to master scientific literacy in everyday life because this literacy is relevant to students' ability to related issues about science and their ideas as citizens. This research aims to analyze students' HOTS literacy scores using the PBL model with the assistance of iSpring Presenter media on reaction rate material to the hypothesized value of 70 and to present the aspects of HOTS literacy that are experiencing the most progress. This research used a One-Group Pretest-Posttest design. Based on test validation, 20 questions out of 22 valid questions were used (12 questions on the C4 aspect of reasoning, 6 questions on the C5 aspect of reasoning, and 2 questions on the C6 aspect of reasoning). Data analysis shows that the N-Gain value meets the high criteria, namely 70.03%. Hypothesis test analysis shows that ha is accepted or exceeds what was hypothesized (70), the t_{value} is 6.96, and the t_{table} is 2.03 which is outside the ho acceptance area with a two-party test. As well as the results of the analysis of the HOTS aspect of literacy that was most developed in this research was the C5 aspect of reasoning with a percentage of 73.44%.*

***Keywords*:** *problem based learning; iSpring presenter; HOTS literacy; reaction rate*

INTRODUCTION

Education has a very important role in ensuring the evolution and survival of the nation, this is because education is a vehicle to improve and develop the quality of human resources. One of the problems that exists and is faced in the scope of education is the problem of weak learning processes resulting in a lack of student understanding of learning so that it results in low student learning outcomes (Suaib et al., 2022). In the 21st century, developments modernization and globalization have had a tremendous impact. One of the visible impacts in education is that it requires students to identify, understand and solve problems around them independently. Apart from that, the impact felt by Indonesian society from modernization and globalization is the low thinking ability of students (Sinuraya et al., 2024).

Every student is required to master it scientific literacy in everyday life because it is true literacy is related to students' abilities connecting issues about science and their ideas as a society in everyday life. One of the educational challenge of the 21st century is that Students are expected to master and apply it Higher Order Thinking Skills through the 4Cs (critical thinking and problem solving,

communication, collaboration, and creativity) (Marpaung & Suyanti, 2023).

Teachers are considered as a big factor and determine the achievement of learning and have a very important role in encouraging students to be able to think and solve problems through various teaching innovations. Teachers' knowledge of literacy HOTS and its teaching strategies is the key to achieving a goals in education. For that, teachers must be have a good readiness and competently in order to guiding students to develop their higher-level thinking skills through learning activities and the presentation of real daily life problems. A teacher cannot only focus on the development of assessment instruments, without understanding and implementation in learning (Badjeber et al., 2020).

The PBL model allows students to identify problems, find causal relationships and apply concepts that fit the problem. The PBL model can train students' thinking skills for solve real problems faced. Students' thinking skills in solve science problems are indispensable to practice their HOTS (Royantoro et al., 2018). The PBL model allows students to identify problems, find causal relationships and apply concepts that fit the problem. This process is reach out by students through discussions so that they can express their opinions and ideas in their groups (Panggabean et al., 2022).

Learning media for a teacher functions like a hoe for a farmer is something that must exist to reach the goals. The multimedia that based learning media that teacher can use is iSpring presenter. The multimedia-based learning media that can be used is iSpring presenter. ISpring Presenter is a learning software that is unified or integrated with Microsoft Power Point software (Firdha & Zulyusri, 2022).

LITERATURE REVIEW

A. Problem Based Learning

The Problem Based Learning model is a learning that accentuate the process of full student entanglement to be able to find the material learned and connect it to daily life. PBL also encourages students to arrange their own knowledge, grow higher skills, train student independence, and can growth student confidence (Janah et al., 2018). The steps in implementations the PBL model are: student orientation to the problem, guiding individual, organizing students to learn, and group investigations, presenting the work, developing students creativities, do analyze and evaluating the problem solving process (Rahmadani, 2019).

B. Instructional Media

Learning media is one of various factors that have an important role in the learning process. In learning, teachers usually use learning media as an intermediary in delivering material so that it can be understood by students. Learning media can make learning interesting and interactive. Interesting learning will make students' positive attitudes towards learning materials and the learning process increase (Wulandari & Surjono, 2013). The special criteria that are often used to determine suitable and appropriate learning media according to Rudi Susilana and Cepi Riyana (2008: 73) is ACTION which is an acronym for Access, Cost, Technology, Interactivity, Organization, and Novelty (Adnyana & Suyanto, 2014).

C. Ispring Presenter

iSpring Presenter is a device that combines several supporting software so that the packaged media contains a more attractive display accompanied by audio visuals along with power point slides and there are various types of evaluations so that students can be directed to focus more and be invited to interact with others. With the use of iSpring Presenter, learning media is able to make learning time effective and the delivery of material can be more interesting and clear. The convenience offered by iSpring Presenter in addition to easy-to-use features is that there is a trial version. To make it simpler to use, iSpring Presenter is combined with HTML (Hypertext Markup Language) 5 technology so that it can be accessed via mobile devices from anywhere (Rahmawati et al., 2022).

D. HOTS Literacy

The success of 21st century learning knowledge (creativity, critical thinking, communication and collaboration), of course, cannot be outcast from the factors of openness to information known as literacy or information literacy. Literacy is more than the ability to read, write, speak, and use language. Literacy is the capability to use language and more to its activities. Activities are very significant in teaching process because they can guide student to improve learning achievement (Simamora, 2022). According to the Organization for Economic Co-operation and Development (OECD), TIMMS, and PISA, HOTS is defined as the ability to implement the theory, skills, and values to reason and think to solve problems, make decisions, and capable to create something innovative. The operation of high thinking skills for students is very important, considering the development of the times with various extraordinory challenges (Kristiyono, 2018). Literacy is the capability to use language and more to its activities. Chemical literacy refers to an individu capability to comprehend and apply thus chemical knowledge in daily life. In this case, there are three main aspects, namely understanding the aspects of knowledge, consciousness, and the application of chemistry in daily life accordingly and effectively. Chemical literacy can be a means of training students' higher level thinking skills by associating it with everyday life (Riyadi et al., 2018). In HOTS literacy itself, there are 9 indicators of ability that are measured, namely: identifying information and data, using information and data, producing explanatory models, distinguishing questions that can be researched scientifically, formulating hypotheses, making predictions, analyzing data, interpreting data, and drawing or presenting conclusions (Hadi et al., 2021).

METHODS

The type of research used is experimental research. The research design used is One Group pretest-posttest Design. The population in this study is all students of class XI Science of SMA Kartika I-2 Medan and the sample used in this research is class XI Science 1 for the 2023/2024 school year as many as 32 students. The technique research is the purposive sampling technique. The instrument for data collection is a test question sheet of 10 multiple-choice questions for each pretest and posttest.

RESULT AND DISCUSSION

Based on student learning outcome data collected during the study and has been tabulated, the average sample from pre-test, post-test, standard deviation, and sample variant data is obtained as shown in Table 1.

Table 1. HOTS literacy data

HOTS Literacy Skills	Average Value	Standard Deviation	Sample Variance
Pretest	46.87	12.55	157.66
Posttest	81.87	9.65	93.14

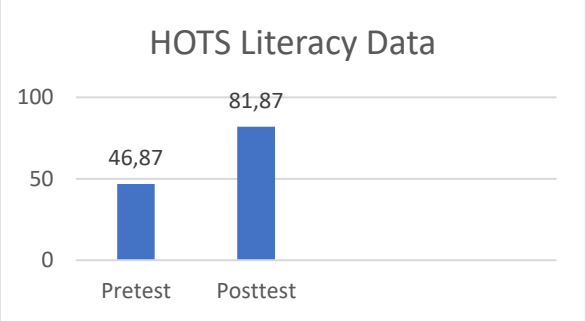

Figure 1. Diagram of the average value of pretest and posttest HOTS literacy

From the data, it can be seen that there is an increase in literacy HOTS in students. The post-test score can increase due to the treatment of PBL model learning with iSpring Presenter media. Thus, this treatment contributes to improving literacy HOTS learning outcomes.

The calculation of the normality test of pre-test and post-test data in grade 11 Science 1 using the Chi-Squared test at the real level $\alpha = 0.05$ with the criteria of Chi-Squared $(X^2)_{count} < (X^2)_{table}$ is declared normal as shown in Table 2.

Table 2. HOTS literacy ability normality test results

Data	t_{count}	t_{table}	Interpretation
Pretest	4.06	11.07	Normal
Posttest	10.62	11.07	Normal

From the Chi-Squared $(X^2)_{price} < (X^2)_{table}$, meaning that all samples are normally distributed.

At the final session, carry out the final test with a to find out students' HOTS literacy, data tabulation was obtained, then an increase in literacy HOTS (n-gain) was obtained by 0.7003 or 70.03% as seen in Table 3.

Table 3. N-gain calculation results

N	Total N-Gain	% enhancement	Interpretation
32	22.41	70.03%	High

The calculation of the normalized n-gain test results using the Chi-Squared test at the real level $\alpha = 0.05$ with the Chi-Squared criterion $(X^2)_{count} < (X^2)_{table}$ is declared normal. Based on the calculation of the normalized n-gain test, the n-gain data is declared normal with the price of Chi-Squared (X^2) calculated as $9.14 < (X^2)$ table is 11.07.

Once it is found that the data is normally distributed and homogeneous, hypothesis testing can be carried out using statistical tests, namely the one sample t-test (two-party test). This test was carried out to determine whether the hypothesis in this study was accepted or rejected. The test criteria if the $t_{count}t < -t_{table}$ 1/2 α and the $t_{count} > t_{table}$ 1/2 α is 0.05, meaning that the Ho is rejected and the Ha is accepted. As seen in Table 4, it shows that the $< -1/2\ \alpha_{table}$ and the $> 1/2\ \alpha$ so that Ho is rejected which means that Ha is accepted, therefore it can be said that the literacy HOTS of students with the treatment of the PBL model with iSpring Presenter media has increased, in other words, the literacy HOTS value is not the same as the KKM score that has been determined at 70.

Table 4. N-gain data normality test results

Data Posttest	t_{count}	t_{table}	Interpretation
$\bar{X}$ = 81.87 S = 9.65	6.96	2.03	Ha accepted

The developed aspects of literacy HOTS can be seen from each normalized n-gain calculation, 10 literacy HOTS question items used in learning, starting from the C4 level of reasoning 61.72% with 6 question items, C5 reasoning 73.44% with 3 question items, and C6 reasoning 56.25% with 1 question item.

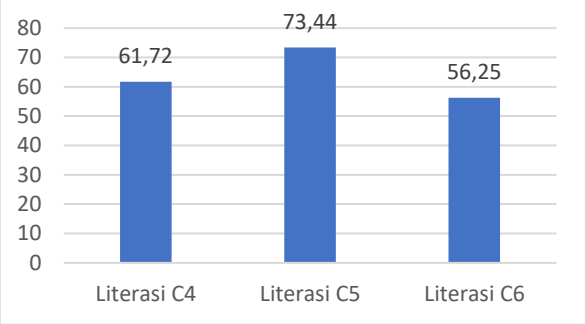

Figure 2. Percentage of HOTS literacy for each indicator

Teachers do not yet know HOTS capabilities in depth so the material taught by HOTS has not been developed much. A number of previous researchers revealed that the progress of HOTS based learning model is very efficient in improving the high-level thinking ability of the school student base (Sinulingga et al., 2023). The PBL is a learning model that served problems contextually so that it can encourage students to learn. In a classroom that implements PBL, students work in groups to figure out some problems based on real examples. This learning model gives the impression of challenging students to "learn how to learn" work in a discuss groups to discover a solutions to problems based on real examples (Satriani, 2017).

The application of this model provides space for students to practice critical thinking in the actual context of the real world and gain experience in dealing with realistic problems. This learning model is student-centered (student center) where the teacher only acts as a facilitator while students actively seek and solve the problems given both individually and in groups. Learning problem-solving, from the syntax of PBL steps can help students practice science literacy skills because every learning process from the beginning to the end students are enforced to be active and creative which uses real examples from the environment and the habits of the surrounding community are given to students with the aim that new knowledge can be easily accepted and

understood (Sanova et al., 2021). As in previous research conducted by Siti Muliana Tambunan which showed that the problem-based learning model is very useful as a learning model for finding and solving problems so that it can improve student learning outcomes. There was an increase in learning outcomes using a problem-based learning model between before and after being taught using problem-based teaching materials the result was 81.5, so the learning model was used (Tambunan et al., 2024)

Wahyuni's (2021) research results show that the using of iSpring media is able to improve learning results, and iSpring media provides more understanding to students which has a positive impact on their learning results. This is because iSpring learning media is more interactive and attracts students' attention. iSpring can insert various forms of media, such as videos, images, and questions so that the resulting learning media will be more interesting. In addition, with iSpring, presentations will be easier for teachers to display information through sound, images, movements and colors, thus creating an atmosphere that is not boring (Felentina & Kembaren, 2022). The PBL learning process relates a problem to a problem that is carried out independently. The purpose of using iSpring Presenter media is also to help in the learning process as an introductory medium. The Ispring application program can help educators make lesson material more interesting and clearly understandable by making it like a tutorial. The Ispring project is an application program that is often used in learning which is supported by the Power Point application directly using intelligent training learning techniques with a distributed layout that is not connected or web based. The application of this learning model and media is concluded capable to improve student learning outcomes also in the aspect of student literacy HOTS, supported by research conducted by (Salsabila & Nasution, 2023).

CONCLUSION

Conclusion the HOTS literacy score of students whom were treated using the PBL learning model assisted by iSpring Presenter media experienced an increase, in other words the HOTS literacy score of students was greater than the hypothesized value of 70. This is proven by the calculation results obtained in the t-test where $t_{count} > t_{table}$ which is 6.96 > 2.03452 whit an N-gain values of 0,7003 or 70.03%. Furthermore, the HOTS aspect of cognitive literacy was developed, namely C5 reasoning. This can be seen based on the percentage of each indicator of the HOTS lieration aspect obtained in the C4 reasoning aspect of 61.72% with 6 question items, C5 reasoning of 73.44% with 3 question items, and C6 reasoning of 56.25% with 1 question item. Therefore, the use of the PBL model assisted by iSpring media can imfluence students' literacy skills to increase. In this case it was also found that technological developments in learning had a positive impact on students' science learning abilities.

REFERENCE

Adnyana, I. G. M., & Suyanto, W. (2014). Penggunaan EFI scanner sebagai media pembelajaran untuk meningkatkan minat, motivasi, dan prestasi belajar siswa. *Jurnal Pendidikan Vokasi*, *3*(2), 192–209. https://doi.org/10.21831/jpv.v3i2.1601

Badjeber, R., Nursupiamin, N., Wicaksono, A., & Mufidah, M. (2020). Profil Pengetahuan Guru Sekolah Dasar tentang Higher Order Thinking Skill dalam Pembelajaran Matematika. *Al-Khwarizmi: Jurnal Pendidikan Matematika Dan Ilmu Pengetahuan Alam*, *8*(2), 133–144. https://doi.org/10.24256/jpmipa.v8i2.1519

Felentina, F., & Kembaren, A. (2022). Penerapan model problem based learning (PBL) berbantuan media iSpring pada materi larutan elektrolit

dan non elektrolit. *Educenter : Jurnal Ilmiah Pendidikan*, *1*(5), 523–529. https://doi.org/10.55904/educenter.v1i5.173

Firdha, N., & Zulyusri, Z. (2022). Penggunaan iSpring Dalam Pengembangan Media Pembelajaran Interaktif. *Diklabio: Jurnal Pendidikan Dan Pembelajaran Biologi*, *6*(1), 101–106. https://doi.org/10.33369/diklabio.6.1.101-106

Hadi, M. S., Izzah, L., & Paulia, Q. (2021). Teaching Writing Through Canva Application To Enhance Students' Writing Performance. *JOLLT Journal of Languages and Language Teaching*, *9*(2), 228. https://doi.org/https://doi.org/10.33394/jollt.v%vi%i.3533

Janah, M. C., Widodo, A. T., & Kasmui, D. (2018). Pengaruh Model Problem Based Learningterhadap Hasil Belajar Dan Keterampilan Proses Sains. *Jurnal Inovasi Pendidikan Kimia*, *12*(2), 2097–2107. https://doi.org/https://doi.org/10.15294/jipk.v12i1.13301

Kristiyono, A. (2018). Urgensi dan Penerapan Higher Order Thingking Skills. *Jurnal Pendidikan Penabur*, *17*(31), 36–46.

Marpaung, C. P., & Suyanti, R. D. (2023). Improving HOTS Literacy Using the PjBL Model with Crossword Puzzle Media on Reaction Rate Materials. *Jurnal Inovasi Pembelajaran Kimia (Journal Of Innovation in Chemistry Education)*, *5*(1), 62. https://doi.org/10.24114/jipk.v5i1.43678

Panggabean, F. T. M., Simanjuntak, J. S., Hutahaean, H. D., Purba, J., & Sutiani, A. (2022). Development of Problem Based Learning (PBL) Chemistry Learning Module on Solubility AND Solubility Products in Class XI SMA Negeri 15 Medan. *Jurnal Infokum*, *10*(5), 104–109. https://infor.seaninstitute.org/index.php/infokum/article/view/838

Rahmadani, R. (2019). Metode Penerapan Model Pembelajaran Problem Based Learnig (PBL). *Lantanida Journal*, *7*(1), 75-86. https://doi.org/http://dx.doi.org/10.22373/lj.v7i1.4440

Rahmawati, N. I., Ikashaum, F., Wahyuni, S., & Cahyo, E. D. (2022). Pendampingan Pembuatan Media Pembelajaran Interaktif Ispring Presenter Berbasis HTML 5. *Society : Jurnal Pengabdian Masyarakat*, *1*(2), 59–64. https://doi.org/10.55824/jpm.v1i2.75

Riyadi, T., Sunyono, S., & Efkar, T. (2018). Hubungan Kemampuan Metakognisi dan Self Efficacy dengan Literasi Kimia Siswa Menggunakan Model SiMaYang. *Jurnal Pendidikan Dan Pembelajaran Kimia*, *7*(2), 251–263.

Royantoro, F., Mujasam, M., Yusuf, I., & Widyaningsih, S. W. (2018). Pengaruh model problem based learning terhadap higher order thinking skills peserta didik. *Berkala Ilmiah Pendidikan Fisika*, *6*, 371–382. https://doi.org/10.20527/bipf.v6i3.5436

Salsabila, M., & Nasution, H. I. (2023). Pengaruh Model Problem Based Learning dan Discovery Learning Berbantuan Media ISpring Presenter Terhadap Hasil Belajar. *Jurnal Insan Pendidikan Dan Sosial Humaniora*, *1*(3), 26–33. https://doi.org/https://doi.org/10.59581/jipsoshum-widyakarya.v1i3.753 Pengaruh

Sanova, A., Afrida, A., Bakar, A., & Yuniarccih, H. R. (2021). Pendekatan Etnosains Melalui Model Problem Based Learning Terhadap Kemampuan Literasi Kimia Materi Larutan Penyangga the Use of Ethnoscience Approach Through Problem Based Learning on Chemical Literacy of Buffer Solutions Topics. *Jurnal Zarah*, *9*(2), 105–110.

https://doi.org/https://doi.org/10.31629/zarah.v9i2.3814

Satriani, A. (2017). Meningkatkan Kemampuan Berpikir Kritis Siswa Dalam Pembelajaran Kimia Dengan Mengintegrasikan Pendekatan Stem Dalam Pembelajaran Berbasis Masalah. *Prosiding Seminar Nasional Pendidikan IPA*, *1*, 207–213.

Simamora, K. F. (2022). Kemampuan HOTS Siswa Melalui Model PjBL Ditinjau dari Kemampuan Literasi Kimia Siswa. *Jurnal Inovasi Pembelajaran Kimia (Journal Of Innovation in Chemistry Education)*, *4*(1), 55. https://doi.org/10.24114/jipk.v4i1.33588

Sinulingga, J. S., Suyanti, R. D., & Sriadhi, S. (2023). Inquiry Training Based E-Module Development in Science Subjects To Improve Hots Literacy Ability of Class Iv School Students Base. *Sensei International Journal of Education and Linguistic*, *3*(1), 197–209. https://doi.org/10.53768/sijel.v3i1.127

Sinuraya, E., Susanti, N., Panggabean, F. T. M., & Rismawati, E. (2024). Analysis of Students' Scientific Literacy Abilities with Application Problem Based Learning and Discovery Learning Models. *Jurnal Inovasi Pembelajaran Kimia (Journal Of Innovation in Chemistry Education)*, *6*(1), 92. https://doi.org/10.24114/jipk.v6i1.57048

Suaib, N., Paputungan, M., Iyabu, H., Isa, I., Mohamad, E., & Kunusa, W. R. (2022). Perbedaan Model Pembelajaran Problem Based Learning dan Discovery Learning pada Materi Hukum Dasar Kimia terhadap Hasil Belajar Siswa di SMAN 1 Sumawa. *Jurnal Pendidikan Kimia Dan Ilmu Kimia*, *5*(2), 55–61. https://doi.org/http://dx.doi.org/10.31602/dl.v5i2.7875

Tambunan, S. M., Purba, J., & Panggabean, F. T. M. (2024). The Influence of Problem Based Learning and Media to Increase Student Interest and Learning Outcomes. *Jurnal Inovasi Pembelajaran Kimia (Journal Of Innovation in Chemistry Education)*, *6*(1), 120. https://doi.org/10.24114/jipk.v6i1.57337

Wulandari, B., & Surjono, H. D. (2013). Pengaruh problem-based learning terhadap hasil belajar ditinjau dari motivasi belajar PLC di SMK. *Jurnal Pendidikan Vokasi*, *3*(2), 178–191. https://doi.org/10.21831/jpv.v3i2.1600