

CHAPTER 1

INTRODUCTION

1.1 Problem Background

Education in this era has shifted from conventional education to 21st century education based on the principle of developing complete competencies in knowledge, skills, and attitudes. The development of technology and information has succeeded in changing the view of education to the point where it is necessary to adjust the curriculum and teaching methods in order to develop skills that are in line with future needs. Nowadays, education is applied with innovation, flexibility, and awareness of the needs of students in facing world development. The digital literacy is very necessary in this era of 21st Century Education, this is also a challenge in the education system. (Yusuf, 2023) In the implementation of the Merdeka curriculum, which is a curriculum that is a guide in this era, the ability that is very important and must be possessed by students is the HOTS ability (Handayani, 2023)

Science literacy is the ability to identify questions, formulate conclusions based on evidence using scientific knowledge in making decisions about nature and its changes through human activities. Learning in the science cluster, especially chemistry, is learning that requires the role of students to understand the concept. Students are encouraged to be active in finding out and this is related to science literacy (Dayelma et al., 2019).

In this era of 21st century education, science literacy is an essential skill and plays an important role in the world of occupation. Ulfa (in Budianti et al., 2024) revealed that science literacy plays a role in responding to hot global issues that occur in this era. Science literacy is not limited to theory but also the ability to explain scientifically and use scientific evidence in decision-making (Budianti et al., 2024).

Higher Order Thinking Skill or HOTS is the ability to think in cognitive science that relates the thought process in analyzing, evaluating, and creating. In Indonesia, students are still not able to analyze and apply the concept of solving a

problem. The students are only skilled in memorization but need attention and direction in applying the knowledge they have (Azwar & Jahro, 2023).

There are several basic elements in critical thinking, namely FRISCO: 1) Focus, which means being able to identify problems; 2) Reason, which means being able to express the logical reason for a problem; 3) Inference, which means being able to conclude a problem with the right reason; 4) Situation, which means being able to compare the problem with the current situation; 5) Clarity, which means being able to present an explanation of the argument that leads to a tested conclusion; and 5) Overlife, which means being able to observe, pay attention, study, and conclude something that has just been discovered (Djami & kuswandono, 2020).

HOTS or Higher Order Thinking Skill is also closely related to Bloom's taxonomic knowledge level. The HOTS questions refer to the application of Bloom's taxonomy at the C4-C6 level, namely analyzing, evaluating, and creating. In measuring high-level thinking ability, students were used to test their ability with questions based on supporting indicators in the Bloom taxonomy level 4-6. The test that was carried out previously made a grid that was in accordance with basic competencies. These questions will be the guidelines for determining the score of students' high-level thinking ability (Pratama et al., 2021).

Every three years, the Organisation for Economic Co-operation and Development knows that the OECD conducts an assessment aspect in the development of the world of international education, one of which is student science literacy in PISA (Program for International Student Assessment). Indonesia consistently follows this assessment, but the results obtained are always below international standards and even tend to decline (Asyhari, 2015). During 2000-2018, science literacy in Indonesia did not experience a significant increase, with an average score of between 393-396 while the average score of OECD member countries was 489 (Fuadi, 2020). The low science literacy ability of students in Indonesia is caused by the lack of learning activities that are still not oriented towards the development of science literacy. This is accompanied by several research results on low science literacy skills in several high schools in Indonesia. The results of the research on the analysis of science literacy abilities in Sungai City

were obtained that the average science literacy of students was 31.58 which showed that science literacy ability was in the low category. (Sutrisna, 2021). In other research Rahmadani et al (2022) obtain as many as 66% of SMAN 1 Kuripan students are in the low category of science literacy with the smallest average score of 23.89. Research by Zulanwari et al (2023) also found that as many as 46.26% of students are classified as low in the category of science literacy ability.

It is necessary to implement learning that is easy to understand and fun for students. The right models, methods, and media are needed to distribute the material properly to students. One of them is the display of interactive media as a source of student learning (Yustiqvar et al., 2019)

Chemical bonding material is one of the materials that is abstract and emphasizes theory. This material studies the ion bonds and covalent bonds of a compound. Although it is abstract, this material is very familiar to everyday life. Simple examples are table salt (NaCl) which is ionic bonded and sugar which is covalent bonded. That is why this material needs to be studied and understood in depth. In understanding science materials such as chemical bonds, it is necessary to understand and be able to HOTS literacy or good science literacy. This science literacy ability can be trained and developed by connecting concepts between concepts with the processes learned by students in daily life. Selecting the right learning methods and media for students will train four domains of science literacy, namely context, knowledge, competence, and attitudes (Adytia & Dwiningsih, 2018).

Imanda et al (2024) using the invention learning model as a student companion with a HOTS orientation to improve students' literacy skills and help students think critically in solving problems. This is because the application of the discovery learning model can help students understand concepts, meanings, and relationships through an intuitive process to reach conclusions.

Research by Khairani et al (2022) show the application of the discovery learning model has a significant influence on the improvement of student HOTS which is carried out through the application of a learning model that provokes students to reason critically, creatively, actively, and willing to collaborate.

In addition, the use of good teaching media also helps students in improving HOTS literacy skills. The delivery of teaching media or interactive teaching materials can make learning easier. This can happen because the use of interactive media or teaching materials is supported by several aspects such as text, video, animation, text, and graphics that support hands-on learning, helping students to be stimulated by seeing and listening directly to what they are learning (Husnah et al., 2019).

So to overcome the problem of low HOTS ability of students' science literacy on chemical bonding materials, it is necessary to apply a learning model that emphasizes the active involvement of students in the process of searching for concepts. One proper model is discovery learning, which gives students the opportunity to observe, question, try, reason, and deduce the concept of chemical bonds on their own. With this approach, students not only passively receive information, but practice processing information, analyzing the relationships between concepts, and applying them in solving more complex problems.

In addition to the learning model, the use of fun interactive media is also the key to improving students' science literacy. Interactive media can help teachers present chemical bonding materials in the form of visuals, animations, interactive quizzes, and simulations, so that abstract concepts such as ionic, covalent, and metal bonds can be easier to understand. The presentation of this interesting material is able to foster students' curiosity, increase their motivation to learn, and encourage them to participate more actively in the learning process.

The combination of learning models and interactive media is expected to be able to create meaningful learning and foster high-level thinking skills. Students are not only trained to remember or understand the concept of chemical bonds, but also to evaluate, compare, and create solutions based on the phenomena they learn. Thus, the low HOTS problem for students' science literacy can be solved gradually through innovative, interactive, and fun learning.

The results of interviews with teachers at SMA Negeri 2 Percut Sei Tuan revealed that literacy in the school has been implemented, but it is not optimal and does not lead to science literacy. Therefore, science literacy skills among students still need to be honed. In learning, teachers often use two learning model; student

centered and teacher centered. To help learning, teachers use RPMs, teaching materials, and sometimes use teaching aids. The media that is often used is PPT and learning videos. However, it is still not enough to make students have high abilities in HOTS science literacy.

Based on the above background exposure, the researcher wanted to conduct a study entitled "The Effect of Discovery Learning Model with Interactive Media Genially for Improvement Student's HOTS Literacy Science Skills on Chemical Bonding"

1.2 Identification of Problem

Based on the background of the problems that have been stated above, the following problems can be identified:

- 1) Students lack an understanding of abstract concepts of chemical bonding materials so they often experience misconceptions and difficulties in solving problems.
- 2) Learning models that are inappropriate and tend to be teacher-centered cause students to be less engaged in learning.
- 3) The media used in the form of powerpoints that are not technology-based and not interactive cause students to have difficulty liking learning materials and difficulty understanding concepts.
- 4) Students' motivation to learn chemical bonds is still low because it is considered difficult and boring
- 5) The lack of the concept of HOTS Science Literacy in students makes it difficult for students to be active in analyzing and solving complex problems.

1.3 Scope of Study

Based on the background that has been stated above, the scope of the problem in this study is the Application of the Discovery Learning Model assisted by Genially Interactive Media in Improving the Ability of Students' Science Literacy HOTS on Chemical Bonding Materials

1.4 Scope of Problem

In this study, the problem is limited to:

1. Conducted on students of X class
2. The learning model that will be used is Discovery Learning
3. The interactive learning media used in this study is Genially
4. The material presented in this study is on the subject of chemical bonding
5. Student learning success is measured by the improvement of students' understanding and ability of HOTS Science Literacy

1.5 Problem Formulation

Based on the above background, the formulation of the problem in this study is:

1. How is the distribution of student's HOTS literacy science skills in the pretest?
2. How is the distribution of student's HOTS literacy science skills in the posttest?
3. Is there any effect of using the discovery learning model with interactive media genially on chemical bonding material on improving student's HOTS literacy science skills?
4. How does the improvement of student's HOTS literacy science skills after the implementation of discovery learning model with interactive media genially on chemical bonding?

1.6 Research Objectives

Based on the problems that have been explained above, the objectives of this study are:

1. To find out how the distribution of student's HOTS literacy skills in the pretest.
2. To find out how the distribution of student's HOTS literacy science skills in the posttest.
3. To determine the effect of the use of the discovery learning model with genially interactive media on chemical bonding material on improving student's HOTS literacy skills.
4. To find out the improvement of student's HOTS literacy science skills after the implementation of discovery learning model with interactive media genially on chemical bonding

1.7 Research Benefits

The results of the research conducted are expected to provide benefits in the form of theoretical benefits and practical benefits. The theoretical benefits of this research are as scientific development, while the practical benefits of this research are:

1. For teachers, by carrying out this research can help complement the learning model and interactive media owned by teachers, especially in chemistry learning.
2. For students, by carrying out this research, it is hoped that it can provide convenience in understanding and improving the ability of HOTS science literacy in chemical bonding materials.
3. For schools, the implementation of this research is expected to improve student learning achievement and improve the quality of student literacy HOTS in chemistry learning.
4. For researchers, by carrying out this research, it is hoped that it can increase knowledge in the use of discovery learning models using interactive media genially in improving students' science literacy skills so that it can be used as a development in the learning process.