CHAPTER I
INTRODUCTION

1.1 Background of the Problem

Education is a humanistic process which is then known as humanizing humans. According to Law No. 20 of 2003 declares that education is a deliberate and systematic endeavor to establish a conducive learning atmosphere and activities. This initiative aims to empower students to actively cultivate their inherent potential, fostering religious and spiritual strength, insight, personality, intelligence, noble morals, and skills essential for personal, societal, and national well-being. Science, originates from the words Natural Science, signifying its connection to the natural world. Meanwhile, science encompasses knowledge, representing everything known to humans (Nuraeni, 2023). Science education in secondary schools is formulated not only as a standalone subject but also as an integrated science curriculum. Both educational approaches are perceived as means to cultivate thinking skills, learning proficiency, curiosity, compassionate attitudes, and a sense of responsibility toward the natural and social environment. Integrative science melds various components, including attitudes, knowledge, and skills. To facilitate fruitful science learning, the learning environment must vigilantly track advancements in science and technology. The caliber of the learning environment significantly shapes the quality of the employed learning outcomes (Handika, 2020).

Currently, science learning activities still minimally utilize teaching materials that keep pace with developments in science and technology. Based on research by Aisyah (2020), teaching materials have the potential to transform learning activities, making them more engaging. This transformation provides students with the opportunity to learn independently, reducing their reliance on the teacher's presence. Consequently, students find it easier to master each competency

required. In reality, many teachers face challenges in comprehending teaching materials and exhibit limited creativity in their development. For instance, teachers persist in using traditional tools such as books and blackboards during the learning process. One learning media that is considered effective is media that involves students directly (students become the center of the learning process/student center learning) especially in terms of increasing achievement (Dishinta, 2020). Media that allow it to be used include online-based worksheets.

The development of Student Worksheet at this time facilitates effective learning; students can more easily comprehend science learning materials. This Student Worksheet teaching material was created using Liveworksheets, an application designed for electronic student worksheet. In the development of Student Worksheet, there are videos serving as relevant (real) examples, enhancing the interest of students. Moreover, teachers can assign tasks to students without the need for corrections (Widiyanti, 2021).

Based on the results of pre-research conducted by researchers with science teachers at SMP Negeri 29 Medan regarding curriculum analysis, information was obtained indicating that the school utilized the Merdeka Curriculum. From the results of interviews with teachers, it was found that in the current Independent Curriculum program, teachers must be able to motivate students so that they can participate in learning enthusiastically and educate, and train students to improve their skills as young people who are active, creative and innovative in utilizing learning media. technology based. This is an emphasis for teachers to be able to develop media or teaching materials that utilize technology so that students can learn by following technological developments. The analysis of student needs revealed that teachers had not fully embraced Student-Centered Learning (SCL), as reflected in responses predominantly categorized as "Sometimes" and "Never," which received the most responses.

Furthermore, students were not accustomed to the use of Student Worksheet in their learning, as evidenced by most student responses falling under "Never" and "Sometimes." The teacher mentioned that during recent teaching sessions, Student Worksheet was not utilized; instead, government textbooks, containing experimental activities/ exercises, were employed to support classroom learning.

An analysis of students' characteristics revealed that students exhibited enthusiasm for participating in science learning using electronic teaching materials, evident from the most frequent response being "Often." However, observations and interviews uncovered that teachers had never employed Student Worksheet in teaching and learning activities in class due to a lack of understanding of how to create technology-based teaching materials. This deficiency holds students' comprehension of learning materials and deprives them of student-centered learning experiences, ultimately leading to a decline in student learning outcomes.

Based on research by Noormiati (2023), Student Worksheet Science using Liveworksheets is proven to improve student learning outcomes because, in learning, the display of teaching materials makes students interested, students easily understand the material, makes students active and communicative in the learning process and students can use it to learn effectively. Independent. According to Indriani and Marhaeni (2022), it is known that the use of Student Worksheet can improve student learning outcomes because it is fun to use, useful when studying, easy to use, and students also do not feel bored when studying. In Rohmah's research (2022), it was stated that with the help of Liveworksheets, science learning outcomes could be increased effectively and used to make students active, happy, and interested, and could improve science learning outcomes on magnetic materials. Using Liveworksheets with web-based applications can improve student learning outcomes because it can improve students' skills in practicing their speaking skills actively, interactively, and communicatively (Prabowo, 2021).

Based on research by Aini et al. (2019), several conditions in preparing Student Worksheet must be met so that can become good teaching materials, including didactic requirements, constructive requirements, and technical requirements. The first requirement, namely the didactic requirements, regulates the use of the universal Student Worksheet so that it can be used by both slow and clever students. The second requirement, the construction requirement, regulates the use of language, sentence structure, vocabulary, level of difficulty, and clarity. In essence, it must be appropriate in the sense that it can be understood by the user, namely, students. The third requirement, namely the technical requirement, emphasizes the presentation of the Student Worksheet, such as writing, pictures, and appearance.

In this study, researchers used Temperature and Heat material in basic competency 3.4, namely, analyzing the concepts of temperature, expansion, heat, heat transfer, and their application in everyday life, including mechanisms for maintaining stable body temperature in humans and animals and basic competency 4.4 Carrying out Experiments were conducted to investigate the effect of heat on the temperature and shape of objects, as well as heat transfer. This material is suitable for use with the project learning model because students are expected to be more active in learning Temperature and Heat, and be able to relate projects in this material to everyday life. This is supported by research by Laia (2023), which states that there is an increase in students' learning abilities and activeness in science learning by using the project-based learning (PjBL) model on the subject matter of temperature and heat.

Based on the background of the problem that has been explained, it is necessary to carry out research entitled **"Development of Student Worksheets Based on PjBL Using Liveworksheet on Temperature and Heat Materials to Increase Student Learning Outcomes SMP Negeri 29 Medan T.P 2023/2024".**

1.2 Problem Identification

Based on the background stated above, several problems can be identified, namely:

1. Low student learning outcomes in science learning
2. The Student Worksheet teaching materials used by teachers are limited to activities/trial exercises from textbooks
3. The Student Worksheet does not provide students with a learning experience to freely explore their creative and advanced potential in the field of technology
4. Teachers' low understanding of interesting and technology-based teaching materials regarding learning materials

1.3 Scope

The scope of this research will be limited to the following**:**

1. Student Worksheet based on PjBL was developed using Liveworksheets on Temperature and Heat material to increase student learning outcomes.
2. This Student Worksheet is intended for class VII SMP Negeri 29 Medan.
3. The type of research is Research and Development (R&D) by developing Student Worksheet with the ADDIE model.

1.4 Problem Limitations

To be able to focus on this research, therefore the researcher determined the problem being studied, namely:

1. Development of Student Worksheet based on PjBL using Liveworksheets with the ADDIE model.
2. Student Worksheet based on PjBL using Liveworksheets designed through this research using the Project Based Learning (PjBL) model only for Temperature and Heat material to improve the learning outcomes of class VII students at SMP Negeri 29 Medan.

3. Student Worksheet Quality Assessment is limited to assessments by Material Experts, Language and Learning Experts, Design Experts, and responses from students and educators.
4. Student Worksheet based on PjBL using Liveworksheets designed only to see the feasibility of it according to the basis and student learning outcomes.

1.5 Problem Formulation

Based on the problem limitations above, the problem formulation in this research is as follows:

1. What is the feasibility of Student Worksheet based on PjBL using Liveworksheets on Temperature and Heat material to improve the learning outcomes of class VII SMP students based on material expert validation?
2. What is the feasibility of Student Worksheet based on PjBL using Liveworksheets on Temperature and Heat material to improve the learning outcomes of class VII SMP students based on validation from language and learning experts?
3. What is the feasibility of Student Worksheet based on PjBL using Liveworksheets on Temperature and Heat material to improve the learning outcomes of class VII SMP students based on design expert validation?
4. How do students and educators respond to Student Worksheet based on PjBL using Liveworksheets on Temperature and Heat material to improve the learning outcomes of class VII SMP students?
5. How do student learning outcomes in class VII SMP improve after using Student Worksheet based on PjBL using Liveworksheets?
6. How effective is the use of Student Worksheet based on PjBL using Liveworksheets on Temperature and Heat material for class VII SMP in improving student learning outcomes?

1.6 Research Objective

Refering to the problem formulation above, this research has the following objectives:

a. Produce Student Worksheet based on PjBL using Liveworksheets on Temperature and Heat material to improve the learning outcomes of class VII SMP students that are suitable for use based on the results of material expert validation.
b. Produce Student Worksheet based on PjBL using Liveworksheets on Temperature and Heat material to improve the learning outcomes of class VII SMP students that are suitable for use based on the validation results of language and learning experts.
c. Produce Student Worksheet based on PjBL using Liveworksheets on Temperature and Heat material to improve the learning outcomes of class VII SMP students that are suitable for use based on the results of design expert validation.
d. Produce Student Worksheet based on PjBL using Liveworksheets on Temperature and Heat material to improve the learning outcomes of class VII SMP students, which are suitable for use in the learning process based on the results of responses from students and educators.
e. Student learning outcomes increased after using the Student Worksheet based on PjBL using Liveworksheets on Temperature and Heat material.
f. Produce Student Worksheet based on PjBL using Liveworksheets on Temperature and Heat material for class VII SMP, which is effective in improving student learning outcomes.

1.7 Benefits of Research

It is hoped that this research can contribute to:

1. **Theoretical Benefits**

It is hoped that the results of this research can contribute to science education, especially in the development of teaching materials and reference

materials on Student Worksheet based on PjBL using Liveworksheets in science learning so that students are more active in participating in learning.

2. Practical Benefits

a. For researchers, it can broaden their insight as prospective educators to improve their ability to develop teaching materials that are able to prepare students to compete in the future education system.
b. For schools, the results of this research can contribute in the form of teaching materials used to improve the quality of learning and improve the quality of graduates for school progress.
c. For teachers, it can provide more innovative reference choices for teaching materials in developing Student Worksheet, which can be used as a guide in implementing science learning.
d. For students, it can provide alternative teaching materials that can provide student-centered learning so that learning is more interesting and able to improve student learning outcomes and be able to apply them in everyday life.