# CHAPTER I
# INTRODUCTION

## 1.1 Background

The era of the Industrial Revolution 4.0 is now a widely discussed issue, including in Indonesia. Globalization in Indonesia has entered the Era of Industrial Revolution 4.0 and makes it easier for people to do activities with more effective and efficient time. The revolution paradigm that continues to develop periodically is initiated by advances in science and technology as a supporter of the renewal. The world of education in the development of the revolutionary era continues to be required to improve its system (Cholily, Putri, & Kusgiarohmah, 2019: 1-2). The right education system brings progress to a country. In the era of industrial revolution 4.0 educational institutions are in an ideal position to help grow an ideal and superior workforce. Students can access unlimited available information, making it an option for virtual learning and connect easily as it is integrated to various platforms. In addition, learning in the era of revolution 4.0 can implement blended learning and case-based learning.

Education 4.0 is a plan to expand access and relevance to support the realization of smart education through improving and equalizing the quality of education and utilizing technology to realize world-class education so that students have 21st-century skills that refer to global competency standards that prepare young people to enter the world of work and the reality of life in the 21st century. Education in the 21st century is characterized by digitalization in various aspects of life, including in the field of education known as the super highway in obtaining information and using technological media. (Hasibuan & Prastowo, 2019: 32)Attendance, source books, assignments, evaluations and many other aspects that utilize technological advances (Sujana & Rachmatin, 2019: 2). Technological advances and easy access to information should be able to facilitate teachers in explaining the material, so that it is in accordance with the concept of education in the 21st century, namely student-centered learning. Education is no longer centered on a reciprocal or two-way relationship between students and teachers, but on the network as the center, directly

contacting other students with different sources of information; not only domestically, but also abroad. And in the 21st century the teacher is only a facilitator in connecting or being a contact person between students' prior knowledge. This encourages the development of more individualized learning methods and concepts, student independence and personal knowledge acquisition methods will be well implemented. This is what is called the era of education 4.0 (Teknowijoyo & Marpelina, 2021: 179-180). In the era of education 4.0, technological developments, especially in the digital world, have opened up new opportunities to create more interactive and interesting learning media.

Based on previous research on android-based physics learning media using codular according to Safitri and Hayuhanti (2023), students can use this media to understand comparison material, help in repeating material, both at school and outside school. Schools can make this mobile learning media as an additional collection of learning media and references in making mobile learning media on other materials. According to Satriani et al (2023) the output resulting from the development research that has been carried out by researchers is an android-based economic learning media with a codular platform in the form of a digital economy application. The distribution or sharing process can also be done easily, can be shared via file transfers such as bluetooth, shareit and whatsapp messenger. According to Cholid and Ambarwati (2021), based on research and development of learning media with android applications, it can be concluded that the learning media for android applications in fiqh subjects with the subject matter of zakat fitrah to facilitate distance learning for grade V students of MI Al-Islam Gunungpati. According to Arianda et al (2024), this research aims to create an attractive module in android-based learning media that will help in the process of teaching moral principles. According to Vilmala and Mundilarto (2019), this research produces android-based physics learning media on static fluid material for high school students and finds out whether android-based physics learning media can improve students' cognitive learning outcomes in terms of learning motivation.

Based on the results of observations at SMA Negeri 5 Medan that researchers have done in class XI MIPA with a total of 72 students which shows that 82.98% of students say that physics is a difficult lesson and always leads to formulas, and students have difficulty connecting understanding in everyday life so that it results in physics learning outcomes from students who are less than optimal. The KKM value at SMA Negeri 5 Medan is 78, but the student learning outcomes obtained by students are still below the KKM with an average score of 53.55. From the results of the teacher interview said that the superior XI MIPA class reached 75% of the KKM score, while the regular class only reached 40%. When learning physics with Temperature, Expansion and Heat material, the media used by teachers is limited to books and technology in the form of projectors and Microsoft PowerPoint. However, the media is only in the form of images that tend to be boring. The lack of interesting learning media makes students' interest in physics subjects to study physics low and results in unsatisfactory student learning outcomes.

Temperature, expansion, and heat are physics topics that require a deep understanding. These concepts are often difficult to understand without good visual and interactive illustrations. This results in students not fully understanding the material that has been delivered by the teacher. One way to utilize technology is through the use of kodular, an application development website used to create learning media. The kodular application can be installed on students' devices and they can use it to improve learning outcomes. Students today are more familiar with technology and digital media. So, with new innovations in learning media such as kodular, the learning atmosphere will be more interesting.

By using codular-based media, learning media creators can combine elements such as video, interactive simulation more easily. By presenting codular-based media learning for students, students will be more motivated and involved in physics learning. Meanwhile, teachers have the opportunity to create a creative, innovative learning

atmosphere to improve student learning outcomes. Therefore, the development of appropriate learning media can help students overcome this difficulty.

Based on the background described above, the researcher thinks it is necessary to carry out Codular research applied in learning. Therefore, the researcher intends to make a study with the title "Development of Android-Based Physics Learning Media Using Codular to Improve Student Learning Outcomes on Temperature, Expansion and Heat Material at SMA Negeri 5 Medan".

## 1.2 Identification of Problems

Based on the background that has been stated, the problems of this study can be identified as follows:

1. Students of SMA Negeri 5 Medan are still lacking in understanding physics material about temperature, expansion and heat.
2. There is still a lack of IT knowledge of physics teachers in making learning media.
3. Physics teachers have never used android-based learning media using kodular

## 1.3 Scope

This research is a research conducted in the classroom, namely to class XI students of SMA Negeri 5. This research only covers the development of android-based physics learning media using kodular on heat material at SMA Negeri 5 Medan.

## 1.4 Scope of the Problem

Based on the formulation of the problems that have been described, the limitations of the problems in the study are:

1. This research was conducted at SMA Negeri 5 Medan for students in class XI MIPA 2 even semester T.A 2023/2024.
2. The learning media that will be developed is Android-based learning media using codular.
3. The material used in this study is class XI physics material about temperature, expansion and heat.

## 1.5 Formulation of the Problem

Based on scope of the problem boundaries above, the problem formulations in this research are:

1. How is the feasibility of Android-based learning media using codular to improve student learning outcomes on temperature, expansion and heat?
2. How is the practicality of Android-based learning media using codular to improve student learning outcomes on temperature, expansion and heat?
3. How is the effective of Android-based learning media using codular to improve student learning outcomes on temperature, expansion and heat?
4. How is the learning outcomes of students using Android learning media using kodular?

## 1.6 Research Purposes

Based on the formulation of the problem above, the objectives of this study are as follows:

1. Knowing the feasibility of Android-based learning media using kodular to improve student learning outcomes on temperature, expansion and heat material.
2. Knowing the practicality of Android-based learning media using kodular to improve student learning outcomes on temperature, expansion and heat material.
3. Knowing the effective of Android-based learning media using kodular to improve student learning outcomes on temperature, expansion and heat material.
4. Knowing the improvement of student learning outcomes in temperature, expansion and heat in the use of Android-based learning media using kodular.

## 1.7 Benefits of Research

### 1.7.1 Theorrtical Benefits

This research is expected to be more interesting or more advanced in learning. It is also expected to contribute fully to the advancement of science and technology in the field of physics, especially by building Android-based products using codular. In the process of evaluating teacher and student responses as users.

### 1.7.2 Practical Benefits

The practical benefits of this research are expected to be useful for various parties, including:

a. For a researcher: Able to contribute experience or insight related to how the use of technology in the learning process, especially physics lessons.
b. For a teacher: Able to contribute insights or references related to how to utilize the technology field. And motivate teachers to be more creative in designing varied learning.
c. For a student: Able to make new conditions and innovations in learning and assessment. Can foster interest, desire, and enthusiasm in learning.
d. For a school: Can be used as a direction to be able to improve the quality of education, especially in the implementation of the Physics learning process.