

ANALYSIS OF THE COMPATIBILITY OF HIGH SCHOOL PHYSICS MATERIALS WITH LANDSLIDE MATERIALS

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ABSTRACT

Indonesia is prone to landslides. Analysis of the level of suitability of high school physics material with landslide material is important because not all physics material can be integrated with landslide material. Until now, it is not known the level of conformity of high school physics material with landslide material for at least one semester. This study aims to determine the level of suitability of high school physics material with landslide material. This type of research is a descriptive research and uses a qualitative approach. The population used is all material which is a field of physics study and the sample is Physics material for Senior High School curriculum 2013. The instrument of this research is an analysis sheet of the suitability of Physics material with Landslide material in the form of tables and data collection techniques through documentation studies. The results showed that the physics material for class X semester 1 was in the very appropriate category and semester 2 was in the very appropriate category, the physics material for class XI semester 1 was in the quite appropriate category, the physics material for class XI semester 2 was in the very appropriate category, physics material for class XI semester 2 was in the very appropriate category. class XII semester 1 and semester 2 are in the inappropriate category. This research implies that physics material with a very suitable category to be integrated with landslide material is easy to develop into a physics book integrated with landslide material.

Keywords : Physics materials, Landslide materials.



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I. INTRODUCTION

Indonesia is prone to landslides. Indonesia is an archipelago where three large plates meet, namely the Indo-Australian Plate, the Eurasian Plate, and the Pacific Plate. The earth's surface has varied reliefs due to extreme plate dynamics. In addition, the Indonesian region has a tropical climate of two seasons that have the characteristics of extreme changes in weather, temperature, and wind direction. Characteristics that cause Indonesia to often experience landslides. Landslides are the 3rd largest (third) type of disaster in Indonesia after floods and tornadoes[1]. Large landslides and smaller-scale mass movements are natural widespread processes that result in the downward and outward movement of slope-forming materials, significantly sculpting the landscape and redistributing sediment and debris to gentler terrain[2]. Landslide is the displacement of slope-forming material in the form of rock, debris, or mixed material that moves out of the slope[3].

Based on Law Number 24 of 2007 concerning Disaster Management, it is stated that disasters are events that can threaten and disrupt people's lives and livelihoods caused by several factors, namely natural factors, non-natural factors, and factors that result in fatalities, environmental damage, property losses objects and psychological impact[4].

Based on the Indonesian BNPD Disaster Data, data on the occurrence of landslides in Indonesia in 2013-2020 can be seen in table 1.

Table 1. Data on Landslide Disasters in Indonesia in 2013-2020.

Year Event	Number of events	Victim died
2013	296	190
2014	600	372
2015	517	128
2016	626	186
2017	848	163
2018	615	177
2019	719	719
2020	572	

(Source: BNPB)

Based on table 1, It can be seen that landslides often occur in Indonesia and cause many casualties. Landslides occur every year to the period 2013-2020. In 2013 there were 296 incidents, in 2014 there were 600 incidents, in 2015 there were 517 incidents, in 2016 there were 626 incidents, in 2017 there were 848 incidents, in 2019 there were 719 incidents and in 2020 there were 572 incidents.

West Sumatra Province is one of the areas prone to landslides. This is supported by the Regional Regulation of the Province of West Sumatra number 5 of 2007 which states that the location and geographical conditions of West Sumatra are disaster-prone areas, especially landslides[5]. The West Sumatra region is located at the confluence of the Indo-Australian and Euro-Asian plates in the Indian Ocean west of the Mentawai Islands and is traversed by the Semangka fault line from South Solok to Pasaman which consists of highland areas that are prone to landslides.

The government has issued Government Regulation of the Republic of Indonesia Number 21 of 2008 article 14 which explains that disaster mitigation can be carried out by local governments in the form of formal education, non-formal education, and informal education[6]. Supported by the decision at the World Conference held in Sendai, Japan on 14-15 March 2015 on Disaster Risk Reduction (World Conference on Disaster Risk Reduction) which resulted in the decision "Sendai Framework for Natural Disaster Risk Reduction 2015-2030". The framework states that every level of society must have an understanding of knowledge about disasters to improve preparedness for natural disasters by integrating disaster knowledge into the education curriculum in schools.

In addition, it is supported by Government Regulation Number 32 of 2013 article 77 concerning changes to the National Education Standards which explains that the curriculum structure for educational units is education that is by regional advantages or potential, local wisdom, and regional demands. One of the potential areas owned by West Sumatra is the landslide disaster[7].

Education can be used as an effective means of reducing the risk of landslides. Efforts to reduce the risk of landslides in the field of education can be done by integrating landslide disaster material into the material of one of the subjects at school. One of the subjects that are suitable to be integrated with landslide material in physics, because physics is a subject that studies natural phenomena and their causes related to everyday life. Landslides are natural events or phenomena that are studied in the field of science. Therefore, physics subjects can be used as a means to carry out disaster mitigation through education.

The integration of landslide material into physics material requires efforts to develop physics textbooks that integrate landslide material. Before integrating landslide material with physics material, it is necessary to know the level of suitability of physics material with landslide material per semester or at least for one semester, because not all physics material can be integrated with landslide material. However, it is not yet known the level of suitability of physics material with landslide material per semester or at least for one semester.

Based on relevant research, Cemani (2018), which aims to determine the level of suitability of the material in the second-semester science book class IX with landslide material. The research only integrates science material for class IX semester II. The results of this research are the level of suitability of the material in the IX semester II science book with landslide material which is in the inappropriate category.

Purwati's research (2018) aims to find out more effective learning between integrated physics learning for landslide disaster education and conventional physics learning in terms of increasing mastery of business and energy materials. The research integrates high school physics material on work and energy. The research shows

that integrated physics learning in landslide disaster education is more effective than conventional physics learning in terms of increasing mastery of business and energy materials[8].

Wati's research (2015) aims to produce a product in the form of an integrated physics learning module for landslide disaster management. This research integrates high school physics material on the dynamics of motion. The study obtained an integrated physics learning module for landslide disaster management .

Based on previous research, it can be seen that several studies have been developed on the integration of physics material with landslide disaster material and no one has conducted research on analyzing high school physics material with landslide material for all semesters or at least for one semester. Physics material which is integrated with landslide material in this study has not been carried out per semester but per BC, namely physics class X BC 3.7 on Particle Dynamics and BC 3.9 on Work and Energy.

Based on the problems and previous studies, the researcher is interested in researching to analyze the level of suitability of physics material with landslide material. This research is important to do before developing a high school physics textbook that integrates landslide material, which is an integrated physics book with landslide material that aims to increase students' understanding of the threat of landslides that often occur in West Sumatra. This research was conducted by analyzing the material based on the realm of knowledge, namely factual, conceptual and procedural knowledge. The physics material that will be analyzed for its suitability with landslide material is taken from the Physics material for Senior High School class X, XI, and XII in the physics textbook for Senior High School class X, XI, and XII published by Erlangga revised edition 2016, because the textbook is one of the teaching materials that are widely used by schools in the city of Padang.

Based on the background of the problem that has been described, the researchers conducted a descriptive study by analyzing the level of suitability of physics material with landslide material with the title Analysis of the Conformity Level of Senior High School Physics Material with Landslide Material.

II. METHOD

This type of research is descriptive research with a qualitative approach. Descriptive research is research that aims to investigate the circumstances, conditions, or other things that have been mentioned, and the results are presented in the form of a research report[9]. Meanwhile, the qualitative approach is research that produces descriptive data in the form of written or spoken words from people and observed behavior[10].

The population is a generalization area that includes objects or subjects that have certain qualities and characteristics set by researchers to be studied and conclusions drawn. The population of this research is all material in the field of physics studies. The sampling technique used is the Non-Probability Sampling technique of which the type is Purposive Sampling, meaning that the sampling technique is carried out with certain considerations. By using the purposive sampling technique, the sample taken is high school physics material according to the 2013 curriculum.

The research procedure consists of three stages, namely the preparation stage, the implementation stage, and the completion stage. the preparation stage consists of making research designs, determining research subjects and objects, making research instruments, conducting instrument validity tests, analyzing instrument validation test results and making instrument improvements. The implementation phase consists of the methods used to collect data. How to collect data in this study is to analyze the suitability of high school physics material with landslide material. Meanwhile, at the completion stage, the activities carried out are processing data from research results, making conclusions from research conducted, and reporting research results.

Instruments are data collection tools that is a systematic procedure with pay attention to the rules that have been determined[11]. The research instrument used was compiled by itself, then the instrument feasibility test was carried out using a validity test. The research instrument used is a sheet of conformity analysis of Physics material with Landslide material in the form of a table. This instrument has a score from 1 to 5. With the highest score being 5 and the lowest score being 1 for each indicator.

The validity assessment uses the instrument validity assessment sheet for the suitability of high school physics material with Landslide material. This assessment sheet consists of 3 assessment components, including the accuracy of the instrument with the data to be measured, the adequacy of the items, or the completeness of the instrument items with the use of language.

Assessment of the validity of this research instrument in the form of a checklist or checklist with a scale of 1 to 4. The value of the validity of the research instrument can be obtained using the following equation (1).

$$Va = \frac{\sum_{i=1}^m Ai}{n} \quad (1)$$

The symbol Va in equation (1) represents the total mean value for all criteria, the symbol Ai shows the average value for the i -th criterion, and the symbol n represents many criteria in the research instrument[12]. After obtaining the value of Va , the validity of the material analysis level instrument can be seen in table 2.

Table 2. Category of Instrument Validity Level.

Va value	Validity Level
$3,4 \leq Va \leq 4$	Very valid
$2,8 \leq Va < 3,4$	Valid
$2,2 \leq Va < 2,8$	Quite valid
$1,6 \leq Va < 2,2$	Not valid
$1 \leq Va < 1,6$	Invalid

(Source: Ref [12])

The results of the instrument validity assessment of the suitability of high school physics material with landslide material can be seen in table 3.

Table 3. Validity Assessment Results

Validator's Name	Score	Category
HD	3,27	Valid
RJ	3,08	Valid

Research data were collected through documentation studies where research data were obtained from various types of written sources or documents. Meanwhile, data analysis uses content analysis techniques that analyze the content of the written data obtained. Data analysis is a way in compiling the data carried out systematically so that data is obtained from research will be easy to understand[13]. The data in this study were analyzed by calculating the value for each semester, calculating the average for all semesters, calculating the ideal average, calculating the standard deviation, calculating the ideal standard deviation, and then looking at the level of suitability of the physics material with the landslide material based on table 4.

Table 4 . The degree of suitability of the Physics material with the Landslide material.

Requirements for Achievement	Category
$X > \bar{x} + 1,5 SB_X$	Very
$\bar{x} + 0,5 SB_X < X \leq \bar{x} + 1,5 SB_X$	Appropriate
$\bar{x} - 0,5 SB_X < X \leq \bar{x} + 0,5 SB_X$	In accordance
$\bar{x} - 1,5 SB_X < X \leq \bar{x} - 0,5 SB_X$	Quite
$X \leq \bar{x} - 1,5 SB_X$	Appropriate
	Not suitable
	It is not in accordance with

(Source: Ref [4])

III. RESULTS AND DISCUSSION

The research was conducted by taking data on high school physics material with landslide material based on factual, conceptual, and procedural knowledge. So that the data obtained in the form of numbers are processed using statistical methods and produce data in the form of descriptive data. The descriptive data obtained is in the form of an analysis of high school physics material that is integrated with landslide material.

Physics material for class X semester 1 consists of 6 basic competencies (BC), namely BC 3.1 on the Nature of Physics and Scientific Procedures, BC 3.2 on Measurement, BC 3.3 on Vectors, BC 3.4 on Straight Motion, BC 3.5 on Parabolic Motion, and BC 3.6 on Circular Motion. Analysis of the level of suitability of high school physics material with landslide material for class X semester 1 based on factual, conceptual, and procedural knowledge can be seen in Figure 1.

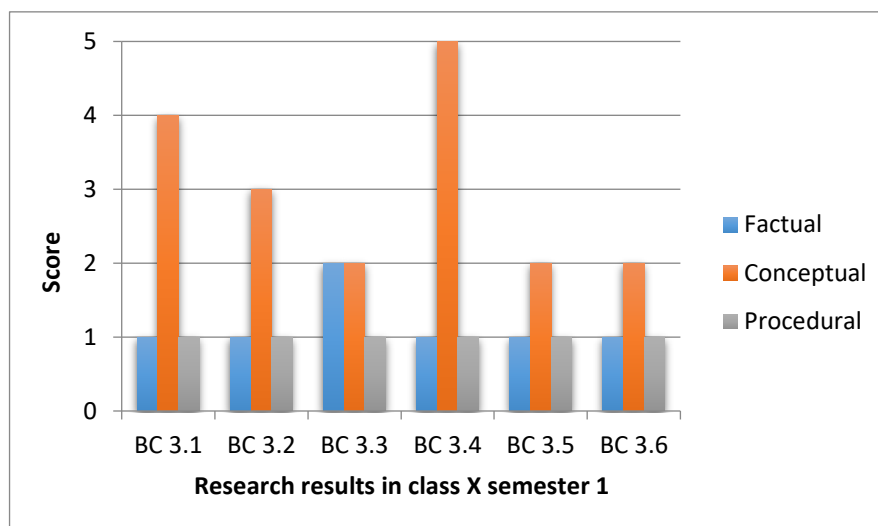


Fig. 1. Analysis of the level of suitability of high school physics material with landslide material for class X semester 1 based on factual, conceptual and procedural knowledge

Based on Figure 1, it can be seen that in BC 3.1, a score of 1 was obtained for factual and conceptual knowledge and a score of 4 was obtained for conceptual knowledge. BC 3.2 physics material gets a score of 1 for factual and conceptual knowledge and gets a score of 3 for conceptual knowledge. BC 3.3 material got a score of 2 for factual and conceptual knowledge and got a score of 1 for procedural knowledge. BC3.4 physics material gets a score of 1 for factual and procedural knowledge and gets a score of 5 for conceptual knowledge. BC 3.5 physics material gets a score of 1 for factual and procedural knowledge and gets a score of 2 for conceptual knowledge. BC 3.6 physics material gets a score of 1 for factual and procedural knowledge and gets a score of 2 for conceptual knowledge. The results of data analysis on the suitability of high school physics material with landslide material for class X Semester 1 can be seen in table 5.

Table 5. Data analysis of the suitability of high school physics material with landslide material for class X Semester 1.

No	Physics Material	Conformity Value
1.	BC 3.1 The Nature of Physics and Scientific Procedures	0,7333
2.	BC 3.2 Measurement	0,7333
3.	BC 3.3 Vector	0,8000
4.	BC 3.4 Straight Motion	1,0000
5.	BC 3.5 Parabolic Motion	0,7333
6.	BC 3.6 Circular Motion	0,6000

Based on table 5, it can be seen that the highest suitability score for physics material with landslide material for class X semester 1 is in BC 3.4 for Straight Motion material with a score of 1.0000, and the lowest suitability score for class X semester 1 is for BC 3.6 for circular motion. with a score of 0.6000. Landslide is a natural phenomenon that occurs due to external disturbances that disturb the balance of the soil so that the movement of the soil mass occurs to find a new balance. Landslide is a process changes in the stress-strain state of the slope soil mass leading to mass separation and soil movement down the slope, while maintaining continuity contact between the shear mass and the undisturbed soil beneath[14]. Based on the type of motion, landslides can be classified into 6 types, namely falls, topples, block movements, slides, spreads, and flows[15]. The types of landslide movements related to straight motion materials are the types of falls, tops, block movements, and slides. The types of landslides that move in a straight line are falls, topples, block movements, and translational avalanches and landslides. A fall is a type of landslide that moves through the air or moves in free fall. Freefall is the motion of an object without an initial velocity.

Physics material for class X semester 2 consists of 5 BC, namely BC 3.7 on Particle Dynamics, BC 3.8 Newton's Laws of Gravity, BC 3.9 for Work and Energy, BC 3.10 Impulse Momentum, and BC 3.11 Simple

Harmonic Vibration. Analysis of the level of suitability of high school physics material with landslide material for class X semester 1 based on factual, conceptual, and procedural knowledge can be seen in Figure 2.

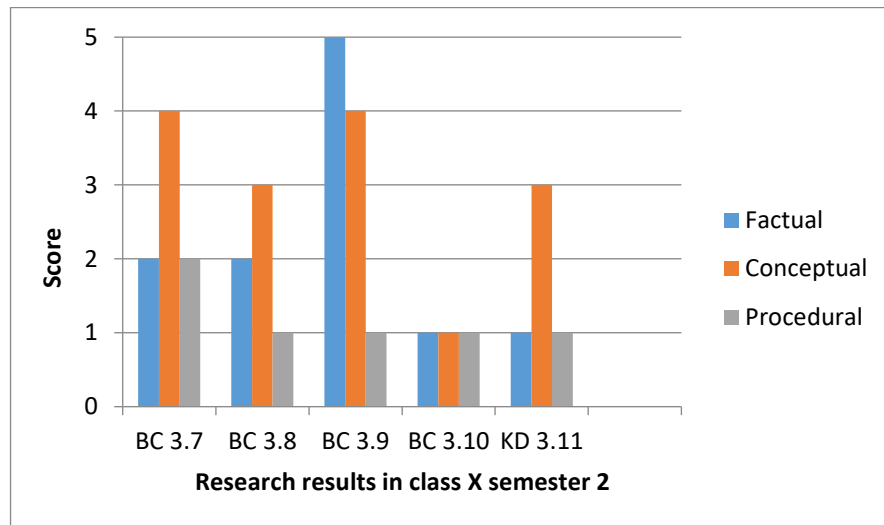


Fig. 2. Analysis of the level of suitability of high school physics material with landslide material for class X semester 2 based on factual, conceptual and procedural knowledge

Based on Figure 2, it can be concluded that the BC 3.7 physics material gets a score of 2 for factual and procedural knowledge and gets a score of 4 for conceptual knowledge. BC 3.8 physics material gets a score of 2 for factual knowledge, a score of 3 for conceptual knowledge, and a score of 1 for procedural knowledge. BC 3.9 physics material gets a score of 5 for factual knowledge, a score of 4 for conceptual knowledge, and a score of 1 for procedural knowledge. BC 3.10 material gets a score of 1 for factual, conceptual, and procedural knowledge. The results of data analysis on the suitability of high school physics material with landslide material for class X semester 2 can be seen in table 6.

Table 6. Analysis of the level of suitability of high school physics material with landslide material for class X Semester 2.

No	Physics Material	Conformity Value
1.	BC 3.7 Particle Dynamics	0,9333
2.	BC 3.8 Newton's Law of Gravity	0,7333
3.	BC 3.9 Business and Energy	1,4000
4.	BC 3.10 Impulse Momentum	0,6667
5.	BC 3.11 Simple Harmonic Vibration	0,7333

Based on table 6, it can be seen that the highest suitability score for physics material with landslide material for class X semester 2 is at BC 3.9 Business and Energy with a score of 1.4000, and the lowest suitability score for class X semester 1 is BC 3.10 Momentum Impulse with a score 0.6667. When the rock mass moves from the top to the bottom of the slope, it can indicate that the rock mass is doing work because it experiences displacement. The work that works on an object is proportional to the change in its kinetic energy, if they work on an object is getting bigger, the change in its kinetic energy is also getting bigger. Likewise with landslides, if the slope conditions are steep, the business value will be even greater and the kinetic energy generated from the movement of the ground will also be very large. If the kinetic energy due to the movement of the ground is large, then a landslide will occur on the steep slope[8].

The physics material for class XI semester 1 consists of 6 BC, namely BC 3.1 Equilibrium and Rotational Dynamics, BC 3.2 Elasticity and Hooke's Law, BC 3.3 Static Fluids, BC 3.4 Dynamic Fluids, BC 3.5 Temperature and Heat, and BC 3.6 Kinetic Theory of Gases. Analysis of the level of suitability of high school physics material with landslide material for class X semester 1 based on factual, conceptual, and procedural knowledge can be seen in Figure 3.

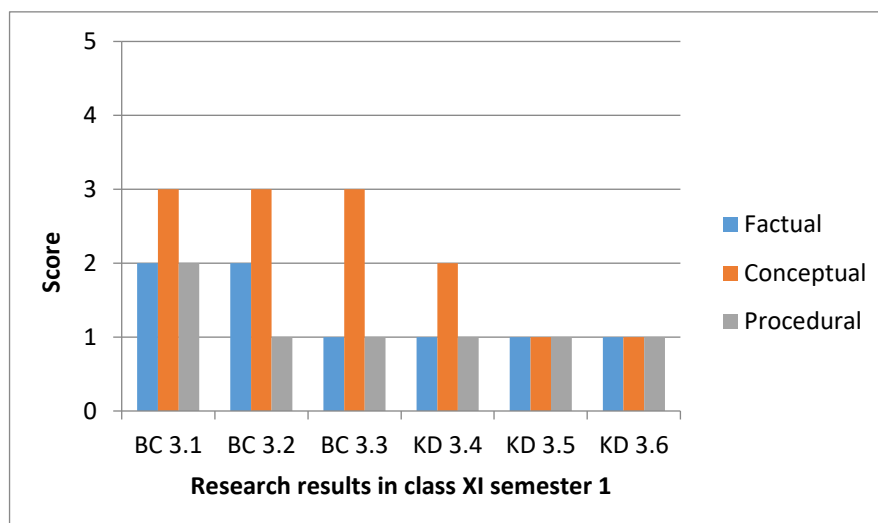


Fig. 3. Analysis of the level of suitability of high school physics material with landslide material for class XI semester 1 based on factual, conceptual and procedural knowledge

Based on Figure 3, it can be seen that the physics material for class XI semester 1 in BC 3.1 gets a score of 2 for factual knowledge and procedural knowledge and gets a score of 3 for conceptual knowledge. BC 3.2 physics material gets a score of 2 for factual knowledge, a score of 3 for conceptual knowledge, and a score of 1 for procedural knowledge. BC 3.3 physics material gets a score of 1 for factual and procedural knowledge and gets a score of 3 for conceptual knowledge. BC 3.4 physics material gets a score of 1 for factual and procedural knowledge and gets a score of 2 for conceptual knowledge. BC 3.5 physics material gets a score of 1 for factual, conceptual, and procedural knowledge. BC 3.6 physics material gets a score of 1 for factual, conceptual, and procedural knowledge. The results of data analysis on the suitability of high school physics material with landslide material can be seen in table 7.

Table 7. Analysis of the suitability of high school physics material with landslide material for class XI Semester 1.

No	Physics Material	Conformity Value
1.	BC 3.1 Equilibrium and Rotational Dynamics	0,9333
2.	BC 3.2 Elasticity and Hooke's Law	0,9333
3.	BC 3.3 Static Fluids	0,8000
4.	BC 3.4 Fluid Dynamic	0,7333
5.	BC 3.5 Temperature and Heat	0,5333
6.	BC 3.6 Kinetic Theory of Gases	0,5333

Based on table 7, it can be seen that the highest adjustment score for physics material with landslide material for class XI semester 2 is in BC 3.1 Equilibrium and Rotational Dynamics and BC 3.2 Elasticity and Hooke's Law with a score of 0.9333 and the lowest score is based on class X semester 1 found in BC 3.5 Temperature and Heat and BC 3.6 Kinetic Theory of Gas with a score of 0.5333.

A landslide is an event of mass movement in the form of soil, rocks, and materials that make up the slopes due to disruption of soil stability. In general, landslides occur due to external forces acting on the slopes, which can cause soil stability to be lost. BC 3.2 material on the elasticity of solids discusses stress, strain, modulus of elasticity, and Hooke's Law. Applications of Hooke's Law are often found in everyday life, one of which is in landslide events, especially on the shear strength of the soil. Soil shear strength is the ability of the soil to resist shear stresses that occur when loaded. The value of the shear strength of the soil is influenced by several factors including the gradation of grains, the density of the soil or the weight of the soil, the water content contained. If the soil mass is given an external force then the soil will experience a change in shape and the term is deformed. If the external force applied increases, the deformation will collapse[16].

Physics material for class XI semester 1 consists of 6 basic competencies, namely BC 3.7 Thermodynamics, BC 3.8 on Mechanical Waves, BC 3.9 on Traveling Waves and Stationary Waves, BC 3.10 on Sound Waves and Light Waves, BC 3.11 on how optical devices work, and BC 3.12 about Global Warming. Analysis of the level of suitability of high school physics material with landslide material for class XI semester 2 based on factual, conceptual, and procedural knowledge can be seen in Figure 4.

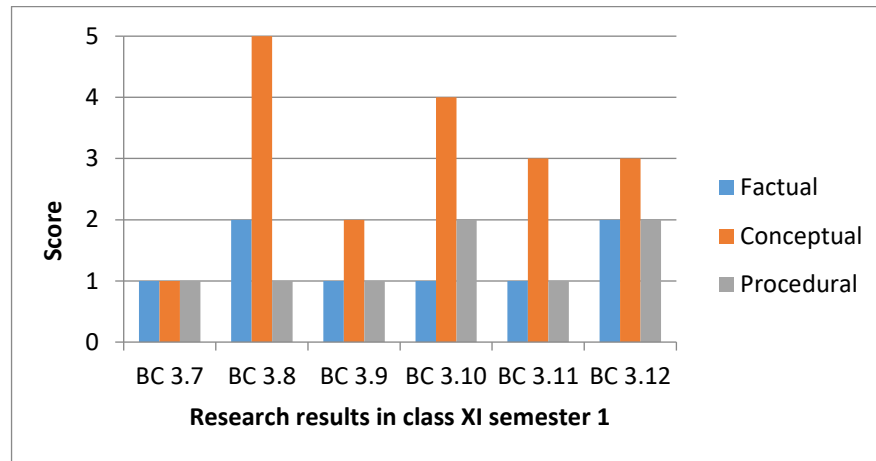


Fig. 4. Analysis of the level of suitability of high school physics material with landslide material for class XI semester 2 based on factual, conceptual and procedural knowledge

Based on Figure 4, it can be seen that the physics material for class XI semester 2 at BC 3.7 gets a score of 1 for factual, conceptual, and procedural knowledge. The BC 3.8 physics material gets a score of 2 for factual knowledge, a score of 5 for conceptual knowledge, and a score of 1 for procedural knowledge. BC 3.9 physics material gets a score of 1 for factual and procedural knowledge and gets a score of 2 for conceptual knowledge. BC 3.10 physics material gets a score of 1 for factual knowledge, a score of 4 for conceptual knowledge, and a score of 2 for procedural knowledge. BC 3.11 physics material gets a score of 1 for factual and procedural knowledge and gets a score of 3 for conceptual knowledge. BC 3.12 physics material gets a score of 2 for factual knowledge, a score of 3 for conceptual knowledge, and a score of 1 for procedural knowledge. The results of data analysis Analysis of the level of suitability of high school physics material with landslide material for class XI Semester 2 can be seen in table 8.

Table 8. Analysis of the level of suitability of high school physics material with landslide material for class XI Semester 2.

No	Physics Material	Conformity Value
1.	BC 3.7 Thermodynamics	0,5333
2.	BC 3.8 Mechanical Wave	1,0667
3.	BC 3.9 Traveling Wave and Stationary Wave	0,6667
4.	BC 3.10 Sound Waves and Light Waves	0,9333
5.	BC 3.11 How Optical Instruments Work	0,7333
6	BC 3.12 Global Warming	0,8667

Based on table 8, it can be seen that the highest suitability score of physics material with landslide material for class XI semester 1 is at BC 3.8 Mechanical Waves with a score of 1.0667, and the lowest suitability score for class X semester 1 is at BC 3.7 Thermodynamics with a score of 0,5333.

Earthquake vibrations can trigger ground movement or landslides. Mitigation of landslides can be done by knowing the weak zones that have the potential for landslides to occur. To determine the weak zone that has the potential for landslides triggered by earthquakes on the slopes, microtremor measurements can be carried out. Microtremor is a ground vibration with a certain amplitude that can describe the geological conditions of an area due to natural or artificial events[17].

The physics material for class XII semester 1 consists of 6 BC, namely BC 3.1 Direct Electric Current Circuit, BC 3.2 Static Electricity, BC 3.3 Magnetic Field, BC 3.4 Magnetic Induction, and BC 3.5 Alternating Current Circuit. Analysis of the level of suitability of high school physics material with landslide material for class XII semester 1 based on factual, conceptual, and procedural knowledge can be seen in Figure 5.

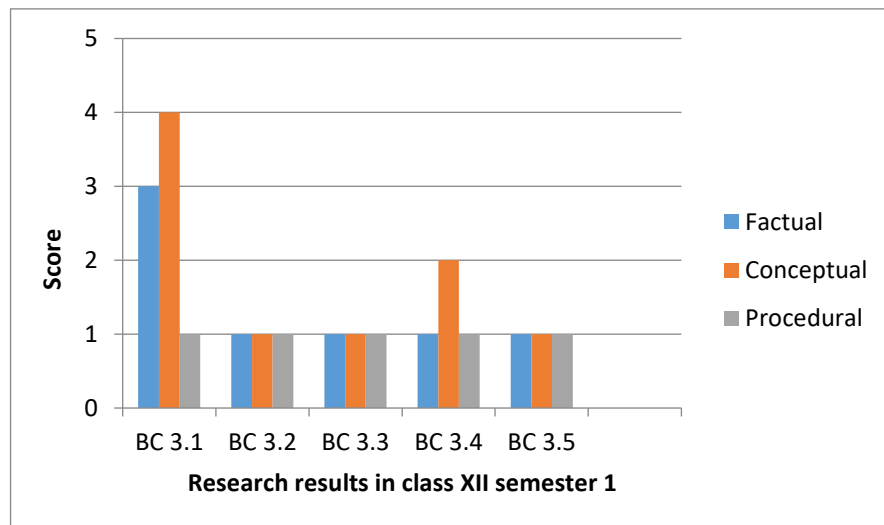


Fig. 5. Analysis of the level of suitability of high school physics material with landslide material for class XI semester 2 based on factual, conceptual and procedural knowledge

Based on Figure 5, it can be seen that the physics material for class XI semester 1 at BC 3.7 gets a score of 3 for factual knowledge, a score of 4 for conceptual knowledge, and a score of 1 for procedural knowledge. BC 3.2 physics material gets a score of 1 for factual, conceptual, and procedural knowledge. BC 3.3 physics material gets a score of 1 for factual, conceptual, and procedural knowledge. BC 3.4 physics material gets a score of 1 for factual knowledge and procedural knowledge and a score of 2 for conceptual knowledge. Physics material BC 3.5 gets a score of 1 for factual, conceptual, and procedural knowledge. The results of data analysis on the suitability of high school physics material with landslide material for class XII semester 1 can be seen in table 9.

Table 9. Analysis of the level of suitability of high school physics material with landslide material for class XII Semester 1.

No	Physics Material	Conformity Value
1.	BC 3.1 Direct Current Circuit	0,9333
2.	BC 3.2 Static Electricity	0,5333
3.	BC 3.3 Magnetic Field	0,5333
4.	BC 3.4 Magnetic Induction	0,6000
5.	BC 3.5 Alternating Current Circuit	0,5333

Based on table 9, it can be seen that the highest suitability score of physics material with landslide material for class XII semester 1 is in BC 3.1 Direct Electric Current Circuit with a score of 0.9333, and the lowest suitability score for class XII semester 1 is in BC 3.2 Static Electricity, BC 3.3 Magnetic Field and BC 3.5 Alternating Current Circuit with a score of 0.5333.

Direct current circuit material can be applied in landslide materials, one of which is by using the resistivity method. The resistivity geoelectric method is a geoelectric method that studies the electrical resistivity (specific resistance) properties of a rock layer in the earth. The resistivity method uses Ohm's law principle, where the potential difference at the end of the conductor is equal to the product of the resistance (R) and the current (I) [18].

Physics material for class XII semester 2 consists of 6 basic competencies, namely BC 3.6 on Electromagnetic Radiation, BC 3.7 on Relativity, BC 3.8 on Quantum Concepts and Phenomena, BC 3.9 on Digital Technology, BC 3.10 on Atomic Cores and BC 3.11 on Energy Sources. Analysis of the level of suitability of high

school physics material with landslide material for class XII semester 2 based on factual, conceptual, and procedural knowledge can be seen in Figure 6.

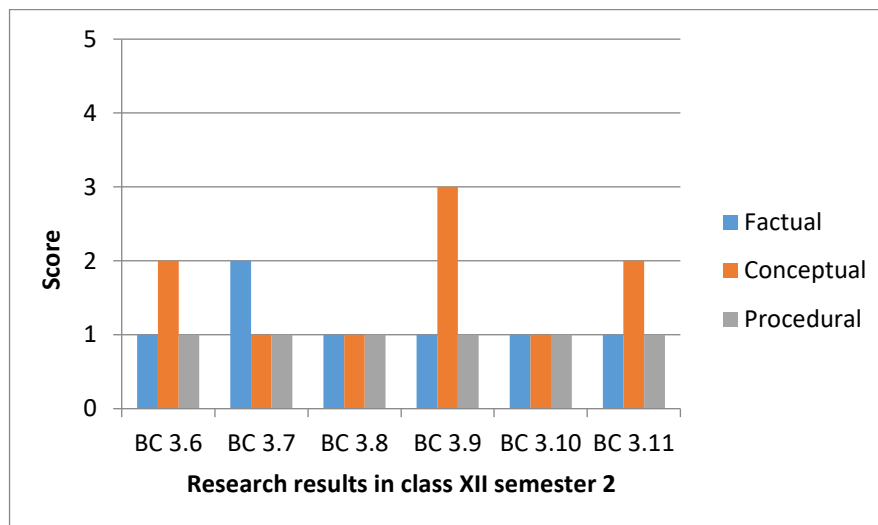


Fig. 6. Analysis of the level of suitability of high school physics material with landslide material for class XI semester 2 based on factual, conceptual and procedural knowledge

Based on Figure 6, it can be seen that the physics material for class XI semester 2 at BC 3.6 gets a score of 1 for factual and procedural knowledge and gets a score of 2 for conceptual knowledge. BC 3.7 physics material gets a score of 2 for factual knowledge, a score of 1 for conceptual knowledge and procedural knowledge. BC 3.8 physics material gets a score of 1 for factual, conceptual, and procedural knowledge. BC 3.9 physics material gets a score of 1 for factual and procedural knowledge and gets a score of 3 for conceptual knowledge. BC 3.10 physics material gets a score of 1 for factual, conceptual, and procedural knowledge. BC 3.11 physics material gets a score of 1 for factual and procedural knowledge and gets a score of 2 for conceptual knowledge.

The results of data analysis on the suitability of high school physics material with landslide material for class XII semester 2 can be seen in table 10.

Table 10. Analysis of the level of suitability of high school physics material with landslide material for class XII Semester 2

No	Physics Material	Conformity Value
1.	BC 3.6 Electromagnetic Radiation	0,6000
2.	BC 3.7 Relativity	0,6000
3.	BC 3.8 Quantum Concepts and Phenomena	0,5333
4.	BC 3.9 Digital Technology	0,8000
5.	BC 3.10 Atomic Core	0,5333
6.	BC 3.11 Energy Sources	0,6666

Based on table 10, it can be seen that the highest suitability score of physics material with landslide material for class XII semester 1 is in BC 3.1 Direct Electric Current Circuit with a score of 0.9333, and the lowest suitability score for class XII semester 1 is in BC 3.2 Static Electricity. , BC 3.3 Magnetic Field and BC 3.5 Alternating Current Circuit with a score of 0.5333.

Digital technology is widely used in everyday life, one of which can be used as a landslide disaster mitigation tool. Disaster mitigation can be done by using a Geographic Information System (GIS) to identify potential landslide hazards. Geographic Information System (GIS) is a computer-based system that functions to store and manipulate geographic information. There are four subsystems in the Geographic Information System (GIS), including input, output, database management system, manipulation, and analysis.

The results of the data analysis of the suitability of the Physics material for Senior High School classes X, XI, and XII each semester with landslide material can be seen in table 11.

Table 11. Data on the Conformity of Physics Materials for Senior High School Class X, XI and XII with Landslide Materials for Each Semester.

No	Class and Semester	Score (X)	\bar{x}	SB_x	Category
1.	X/1	0,7667	0,7422	0,0109	Very Appropriate
2.	X/2	0,8993			Very Appropriate
3.	XI/1	0,7444			Quite Appropriate
4.	XI/2	0,8000			Very Appropriate
5.	XII/1	0,6267			It is not in accordance with
6.	XII/2	0,6222			It is not in accordance with

Based on the data from table 11, it can be seen that 6 semesters measure the level of suitability of the Physics material with landslide material for class X semester 1 of 0.7667, class X semester 2 of 0.8993, class XI semester 1 of 0.7444, class XI semester 2 is 0.8000, class XII semester 1 is 0.6267 and class XII semester 2 is 0.6222. Each semester has its category, namely class X semester 1 and semester 2 obtaining a very appropriate category. class XI semester 1 received a very appropriate category, class XI semester 2 obtained a fairly appropriate category. Meanwhile, class XII semester 1 and semester 2 received the inappropriate category.

IV. CONCLUSION

This article concludes that the level of suitability of high school physics material with landslide material shows that the level of suitability of senior high school physics material with landslide material for class X semester 1 is very appropriate, class X semester 2 is very appropriate, class XI semester 1 is very appropriate, class XI semester 2 is quite appropriate, class XII semester 1 is not appropriate and class XII semester 2 is not appropriate.

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