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MORALITY BEFORE KNOWLEDGE

Analysis of the suitability level of physics lessons with flood material

Luthfika Putri Antari[1*], Ahmad Fauzi[1]
[1] *Department of Physics Education, Faculty of Mathematics and Natural Sciences, Universitas Negeri Padang, Padang City, West Sumatra 25132, Indonesia.*
*Correspondence: luthfikaputriantari11@gmail.com

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ABSTRACT
Background: Padang City is one of the cities that is prone to natural disasters such as floods. The integration of physical materials with flood materials is suitable to be applied in this city. In fact, in the field, in the Physics subject package book provided by the government, there has been no integration with natural disaster materials, especially floods. To integrate flood material into Physics material, an analysis is needed first to see the suitability of Curriculum Objectives on Physics material with flood material. **Methods:** By using qualitative descriptive research, using the nonprobability sampling technique which is Purposive Sampling, the researchers took samples of Physics textbooks for senior high school (tenth, eleventh, twelfth grades) used by schools in the city of Padang that use the 2013 Curriculum. **Findings:** Based on observations of 15 high schools in the city of Padang, the 2016 revised edition of High School Physics published by Erlangga is the book studied. Based on the results of the study, the most suitable class to be inserted in this material is eleventh grade because it has the highest level of suitability. On the contrary, twelfth grade is the least suitable class to insert this material. **Conclusion:** To improve the relevance and effectiveness of physics learning in high school in Padang city, it is necessary to develop teaching materials that integrate flood materials, especially for eleventh grade, where the highest level of suitability is found. **Novelty/Originality of this Study:** This study addresses a crucial gap by incorporating natural disaster education, specifically focusing on flood-related content, into the high school physics curriculum in Padang City, an area highly susceptible to such disasters. It distinctively integrates fundamental physics principles with practical disaster mitigation knowledge, aiming to improve students' understanding and preparedness for real-world natural phenomena.

KEYWORDS: flood; level of conformity analysis; physics lesson.

1. Introduction

So far, learning related to natural disasters is given to geography subjects or social sciences or social studies. When viewed from the nature of science, natural disaster learning is also included in the science or science family. Therefore, it should be taught in accordance with the nature of science so that learning outcomes are more meaningful for students and the community so that in practice natural disaster learning can be integrated in science materials in secondary schools. This is what makes learning physics integrated with Flood material suitable to be applied in Padang City. Padang City is one of the cities that is prone to natural disasters such as floods.

In fact, in the field in the subject of Physics there has been no integration with natural disaster material. Disaster education is very important to be applied in the world of education (Shiwaku et al., 2007). The way to implement disaster education is through an

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integrated curriculum of disaster materials. A curriculum that is integrated with disaster material is one of the efforts to provide understanding, knowledge of disasters through education (Rahma, 2019). One of the subjects that is suitable for integration with disaster material is the subject of Physics. According to Suparno in Zaman (2012), Physics is knowledge of the physical properties of an object or event, such as shape, size, roughness, weight, and how these objects interact with each other. In studying physics concepts, a condition is needed that allows a person to interact directly with the object to be studied. Physics is a scientific discipline that studies natural phenomena and explains how they can occur (Coccia, 2020). Minister of Education and Culture Regulation No. 59 of 2014 states that one of the objectives of physics courses in senior high school is to develop the ability to reason in inductive and deductive analytical thinking by using Physics concepts and principles to explain various natural events and solve problems both qualitatively and quantitatively.

Based on the objectives of learning Physics, it is expected that learning physics can explain various events and problems that occur in nature. So that students can take the right steps if there are problems in their environment. However, facts in the field of the Physics learning process in schools that have not been associated with natural disaster material. The learning process carried out by educators and students in schools must reflect the implementation of the curriculum used. For example, books or teaching materials used and students in the learning process are expected to achieve maximum learning goals.

Books provided by the government are books published by the Curriculum and Books Center of the Ministry of Education and Culture. In addition, there are also books published by private companies that are used in schools. Integrated physics teaching materials for disaster materials are widely available. However, in reality, integrated teaching materials for disaster materials, especially floods, have not been provided by the government or other publishers for at least one semester. This is evidenced by the absence of these textbooks in high schools in Padang City. The results of observations in several bookstores in Padang have also not found Physics textbooks that are integrated with Flood disaster material for at least one semester. To integrate flood material into physics material, the physics material in teaching materials must be analyzed first by looking at the suitability of Curriculum Objectives in the Physics material for at least one semester. If the Physics material is in accordance with the Curriculum Objectives, the Physics material can be integrated with disaster material. Integrating Flood material into Physics material requires efforts to develop Physics teaching materials to obtain teaching materials that are integrated with Flood material.

Based on relevant research, namely research by Lestari (2019) on the Development of High School Physics E-Modules Based on the SETS (Science, Environment, Technology, And Society) Model Integrated with Flood Disaster Material to Improve Disaster Mitigation Competence. Here researchers develop Physics teaching materials that are integrated with Flood material only in KD (Basic Competence) 3.9 and basic competency (KD) 3.10 class X. In developing teaching materials, researchers have proven how practical and effective the integrated teaching materials are for the Flood material, it's just that researchers integrate Flood material into certain KDs only and material suitability analysis is not carried out throughout the semester so that it is known which semester is the most suitable for integration with Flood material for at least one semester. Then, based on research by Ardiansyah et al. (2019) the level of suitability of the Curriculum Objectives in the junior high school at class VIII science textbook semester 1 with the Flood material, in this study only examined the suitability of the junior high school Science material with the curriculum objectives in a particular semester, researchers did not conduct an analysis in the entire semester to obtain which semester was most suitable to be integrated with the Flood material for at least one semester.

In previous studies, no researcher has analyzed the suitability of physics material with curriculum objectives to integrate Flood material for at least one semester. Based on these problems and findings, researchers encourage researchers to conduct research on the suitability analysis of physics materials with curriculum objectives to integrate Flood

materials. Research will be carried out on the material in the book for the achievement of textbooks in accordance with the curriculum objectives. The suitability of physics material with Flood material in this study researchers will analyze based on the realm of knowledge, namely factual, conceptual and procedural knowledge of physics material in textbooks to obtain relevant physics material to be integrated with flood material. The Physics material that will be analyzed for suitability with the flood material is taken from the physics material in the 2016 revised edition of the high school physics textbook published by Erlangga which is one of the teaching materials widely used by schools in the city of Padang. The research questions carried out are: What is the level of suitability of Physics material with flood material in senior high school (tenth, eleventh, twelfth grades) physics teaching materials for at least one semester?

2. Methods

The type of research carried out is descriptive research and the approach used is a qualitative approach in the presentation of research results. Descriptive research is carried out with the aim of explaining something or describing something as it is (Margono, 2010). According to Moleong in Margono (2010) which states that a qualitative approach is research that produces descriptive data in the form of written or spoken words of people and observed behavior.

In this study the author took samples using the Nonprobability Sampling technique which is a type of purposive sampling, meaning a sampling technique with certain considerations. With the purposive sampling technique, in this study researchers took samples of physics textbooks for senior high school (tenth, eleventh, twelfth grades) used by schools in the city of Padang that use the 2013 Curriculum. The results of observations of the most widely used physics textbooks by senior high school in the city of Padang out of the 15 schools observed, namely the 2016 revised edition of the high school Physics book published by Erlangga.

The instrument used in this study is the Analysis sheet of the suitability of physics material with Physics material with Flood material in Physics teaching materials for senior high school (tenth, eleventh, twelfth grades). This instrument has a score with a scale of 1, 2, 3 and 4. The highest score for each indicator is 4 and the lowest score is 1. The compatibility between physics material and Flood material can be seen from the realm of knowledge, namely factual, conceptual and procedural knowledge of physics material that is suitable for integration with flood material.

Data collection techniques in this study through documentation studies, information obtained from various kinds of written sources or from documents. This documentation study is carried out by collecting documents or data needed in research problems and then examined in depth. The data obtained through the documentation method is data on the suitability of Physics material with Curriculum Objectives and the suitability of Flood material on physics teaching materials for senior high school (tenth, eleventh, twelfth grades). This data is obtained by using an analysis sheet instrument for the suitability of physics material with Flood material.

Descriptive statistical analysis techniques use ideal standard standards, used to determine the category of suitability of physics material with flood material (Equation 1, Table 1, and Table 2). This study uses a Likert scale with alternative score choices, namely Very Appropriate (SS), Appropriate (S), Less Appropriate (KS), and Not Appropriate (TS), with a score of 4 is the highest score for 3 assessment elements in accordance with the assessment indicator, a score of 3 for 2 assessment elements in accordance with the assessment indicator, a score of 2 for 1 assessment element in accordance with the indicator and a score of 1 is the lowest score if none of the assessment elements are in accordance with the indicator.

$$Value\ (X) = \frac{Actual\ score}{Maximal\ score} \quad \text{(Eq. 1)}$$

Table 1. Achievement Requirements and category

Achievement Requirements	Category
$X > Xi + 1.80 \times SBi$	Fits perfectly
$Xi + 0.60 \times SBi < X \leq Xi + 1.80 \times SBi$	Appropriate
$Xi - 0.60 \times SBi < X \leq Xi + 0.60 \times SBi$	Less suitable
$Xi - 1.80 \times SBi < X \leq Xi - 0.60 \times SBi$	Not compliant

(Widoyoko, 2009)

Table 2. Percentage and category

Percentage	Category
$X > \frac{Xi + 1.80 \times SBi}{Ideal\ maximum\ score} \times 100\%$	Fits perfectly
$\frac{Xi + 0.60 \times SBi}{Ideal\ maximum\ score} \times 100\% < X \leq \frac{Xi + 1.80 \times SBi}{Ideal\ maximum\ score} \times 100\%$	Appropriate
$\frac{Xi - 0.60 \times SBi}{Ideal\ maximum\ score} \times 100\% < X \leq \frac{Xi + 0.60 \times SBi}{Ideal\ maximum\ score} \times 100\%$	Less suitable
$\frac{Xi - 1.80 \times SBi}{Ideal\ maximum\ score} \times 100\% < X \leq \frac{Xi - 0.60 \times SBi}{Ideal\ maximum\ score} \times 100\%$	Not compliant

Xi: Average ideal score = 1/2 (maximal ideal score+ minimal ideal score)
SBi: Ideal Tray Deviation = 1/6 (maximal ideal score-minimal ideal score)

3. Results and Discussion

Analysis of the suitability of Physics lessons with Flood material aims to find out which Physics material is suitable for inserting Flood material into it. The suitability of Physics material with Flood material will be seen from three domains of knowledge, namely factual knowledge, conceptual knowledge and procedural knowledge of Flood material and Physics material in high school physics textbooks (tenth, eleventh, twelfth grades).

3.1 Analysis of the level of suitability of tenth grade physics lessons with flood material

Figure 1, showing data on the level of suitability of physics lessons with flooded materials from the range of KD 3.1 to 3.6. Aspects of factual knowledge obtained value that vary from KD to KD, such as KD 3.2, KD. 3.5 and KD 3.6 aspects are the maximum level of suitability.

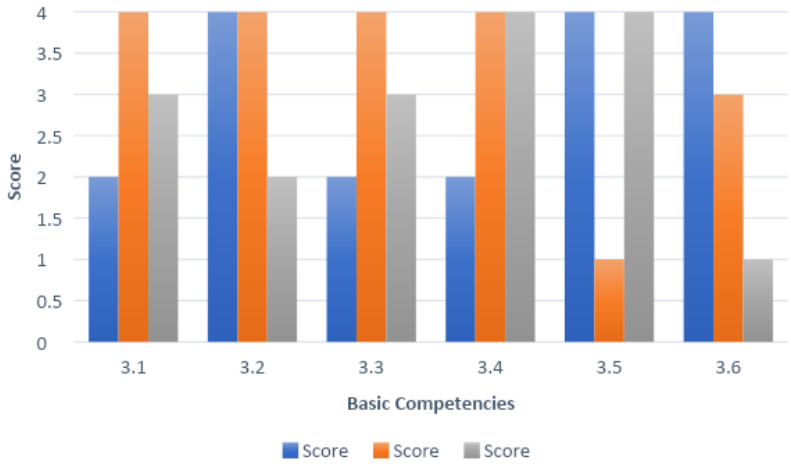

Fig. 1. Analysis of the level of suitability of physics lessons with the flood material of tenth grade first semester

Aspects of conceptual knowledge are generally appropriate except KD 3.5 which is far from the level of very appropriate. KD 3.5 is expected to be able to analyze parabolic motion using vectors, along with their physical meaning and application in everyday life. On the other hand, KD 3.6 appears to have obtained only the least degree of conformity in the aspect of procedural knowledge. This KD expects students to be able to analyze physical quantities in circular motion at a constant rate (fixed) and their application in everyday life.

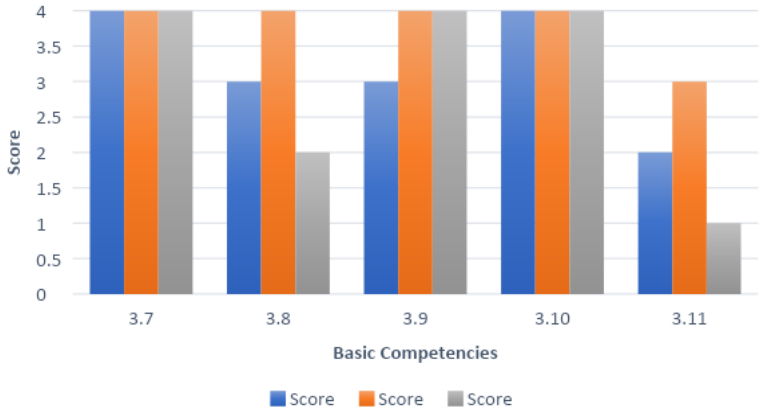

Fig. 2. Analysis of the level of suitability of physics lessons with the flood material of tenth grade second semester

Based on Figure 2, the level of suitability of physics lessons with the flood of basic competencies (KD) 3.7 and 3.10 looks very in line with the value of 4 each aspect of knowledge. Where KD 3.7 is expected students to be able to analyze the interaction of force and the relationship between force, mass and straight motion of objects and their application in everyday life and KD 3.10 students are expected to be able to apply the concepts of momentum and impulse, as well as the law of conservation of momentum in everyday life. In KD 3.11, the three aspects of knowledge obtained the lowest score from the entire KD in the first semester of tenth grade. This shows that the concepts of force and vibration are not yet in accordance with the flood material in the available books.

3.2 Analysis of the degree of suitability of eleventh grade physics lessons with flood material

Figure 3 showing the analysis of the suitability of eleventh grade KD with flood material in physics books at school. Overall, the factual knowledge aspect is quite appropriate for any KD. In KD 3.6, it can be seen that the value gain in the aspect of conceptual knowledge is very small. The KD expects students to be able to explain the kinetic theory of gasses and the characteristics of gasses in closed spaces. Furthermore, the procedural knowledge aspect obtained the lowest value, namely at KD 3.2. The KD discusses the elasticity properties of materials in everyday life.

Based on Figure 4, again the aspect of factual knowledge is almost close to the level very suitable for all KD. This aspect has not been maximally achieved in the last two KDs, namely KD 3.11 and KD 3.12. On conceptual knowledge and procedural knowledge aspects, KD 3.11 gets the lowest score. This shows that the optical instrument material contained in Shiva textbooks does not include flood material. KD 3.7 needs to improve the suitability of physics lessons with flood materials, especially procedural aspects as well as KD 3.8 and 3.10. Conversely, KD 3.13 needs to improve the suitability of physics lessons with flood matter in aspects of factual knowledge.

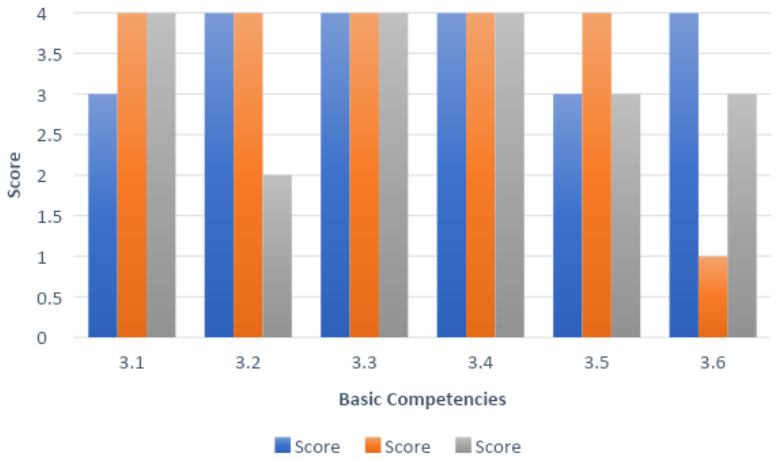

Fig. 3. Analysis of the level of suitability of physics lessons with the flood material of eleventh grade of the first semester

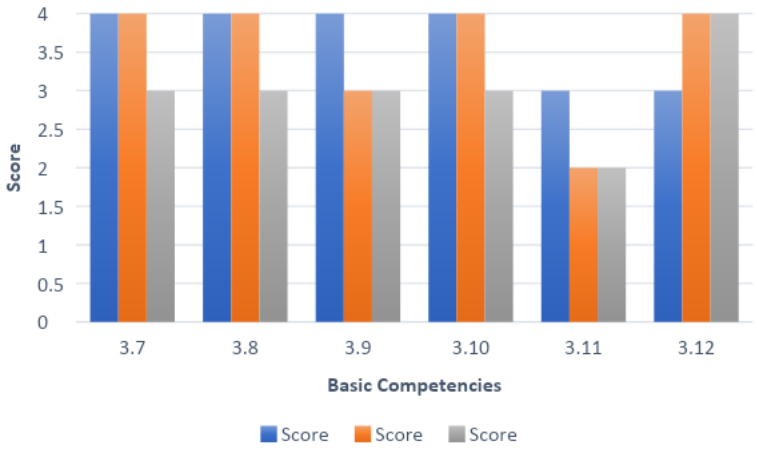

Fig. 4. Analysis of the level of suitability of physics lessons with the flood material of eleventh grade second semester

3.3 Analysis of the level of suitability of twelfth grade physics lessons with flood material

Figure 5 shows the results of the analysis of the level of suitability of physics lessons with flood material. Generally, the level of conformity of all KD has not been maximized in all three aspects.

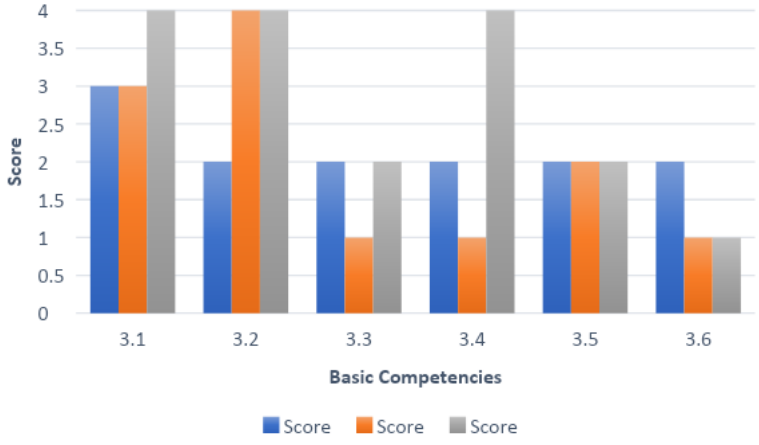

Fig. 5. Analysis of the level of suitability of twelfth grade physics lessons in the first semester with flood material

The average aspect of factual knowledge is not yet appropriate other than KD 3.1. Meanwhile, aspects of conceptual knowledge obtained a level of suitability that is quite diverse for each KD. However, the three KDs with the lowest values are KD 3.3, 3.4 and 3.6. The three KDs contain magnetic field material, magnetic induction, and magnetic force, electromagnetic induction phenomenon, electromagnetic radiation phenomenon and its utilization in technology, and its impact on life. In addition, KD 3.6 needs to be improved in compliance with flood materials, especially in the aspect of procedural knowledge.

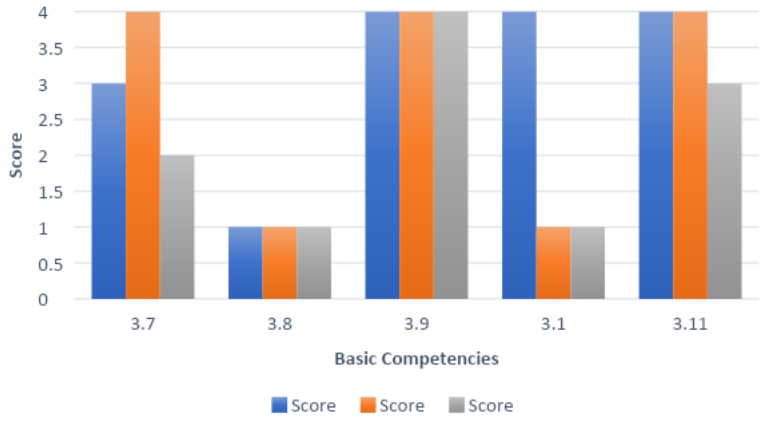

Fig. 6. Analysis of the level of suitability of twelfth grade physics lessons in the second semester with flood material

Figure 6, shows that KD 3.9 obtained maximum value on all three aspects of knowledge. In contrast, KD 3.8 has minimal value. This explains that the qualitative concept of quantum phenomena that include the properties of blackbody radiation, the photoelectric effect, the Compton effect, and X-rays in everyday life is not yet compatible with flood matter. In addition, KD 3.10 also obtained low scores except for the aspect of factual knowledge. This KD discusses the characteristics of the atomic nucleus, its use, protection of radioactivity, and its impact in everyday life.

Table 3. The percentage of the degree of suitability of physics lessons to flood material

No	Class/ Semester	Conformity percentage (%)	Criterion
1	Tenth/1	79	Appropriate
2	Tenth/2	83	Appropriate
3	Eleventh/1	88	Fits perfectly
4	Eleventh/2	85	Fits perfectly
5	Twelfth/1	60	Not compliant
6	Twelfth/2	68	Not compliant

Overall, the level of suitability of high school physics lessons to flood material is shown in percentage form as shown in Table 3. The three grade levels have varying percentages. The tenth grade obtained a conformity percentage of 79% and 83% each semester so that it was categorized accordingly. The percentage of suitability of physics lessons with flood material in twelfth grade textbooks is higher than tenth grade, namely 88% and 85% with very appropriate categories. Unlike the previous one, twelfth grade textbooks only obtained a conformity percentage of 60% and 68% so that they were categorized as inappropriate. It can be concluded that flood material has not been included optimally in physics lessons in grade eleventh.

This study aims to determine the level of suitability of high school physics material (tenth, eleventh, twelfth grades) with Flood material. Compatibility of Physics material with Curriculum Objectives Curriculum Objectives that can be seen from the realm of knowledge, namely factual, conceptual and procedural knowledge of Physics material in accordance with the Curriculum Objectives, namely conformity with SKL, conformity with IC, conformity with KD, scientific approach, authentic assessment and local content. The

suitability of physics and flood material will be seen based on three domains of knowledge, namely factual, conceptual and procedural knowledge. Gunawan &; Palupi (2016) stated that factual knowledge consists of knowledge of terminology and knowledge of specific elements, conceptual knowledge consists of knowledge of classifications and categories, knowledge of principles and generalizations, and knowledge of theories, models and structures, while procedural knowledge consists of knowledge of skills and algorithms, knowledge of techniques and methods, and knowledge of The criteria determine the exact procedure of the flood material and the high school physics material (tenth, eleventh, twelfth grades) for each semester. The results of this analysis will facilitate research in developing physics teaching materials that are integrated with flood materials.

Flood Material is one of the local content materials in the form of regional potential that can be integrated in integrated subjects, especially Physics subjects. For example, the physics book explains the causes and consequences of cold lava floods that occurred in West Sumatra province. Learners will be more interested because the incident is still recent and very close to their environment. Because according to Idi (2014) who stated that the position of local content in the curriculum is not as a stand-alone subject, but as an integrated subject, which is part of existing subjects. Therefore, local payloads do not have their own time allocation. Local content is also positioned as a component of the Curriculum. So that this local content must be in textbooks and also implemented in learning.

Physics is a scientific discipline that studies natural phenomena and explains how they can occur. Regulation of the Minister of Education and Culture of the Republic of Indonesia/*Peraturan Menteri Pendidikan dan Kebudayaan Republik Indonesia* (Permendikbud RI) No. 59 of 2014 states that one of the objectives of physics courses in senior high school is to develop the ability to reason in inductive and deductive analytical thinking by using Physics concepts and principles to explain various natural events and solve problems both qualitatively and quantitatively. Through learning Physics we can insert the material of natural events into matter. For example, by integrating Flood natural disaster material with Physics material. Because flooding is one of the natural disasters that often occurs in the area of West Sumatra (Umar &; Dewata, 2018; Nursal &; Halawa, 2021; Nugroho et al., 2022). Analysis of the suitability of Physics material with Flood material aims to find out which Physics material is suitable for integration with Flood material.

Based on the results of research for tenth grade semester 1 and semester 2, physical materials such as parabolic motion, circular motion, the concept of force, and vibration have a low level of conformity with the topic of flooding because the nature and application of these physical concepts are not directly related to the phenomenon of flooding. Parabolic motion usually refers to the motion of objects thrown at a certain angle against the ground, such as the motion of bullets or balls. This phenomenon is mainly discussed in the context of projectiles or objects that experience two components of motion (horizontally and vertically) simultaneously. In the event of a flood, water moves more likely to follow the flow caused by gravity, height differences, and ground resistance, rather than parabolic motion patterns.

Circular motion involves objects moving in a circular trajectory with centripetal force acting towards the center of the circle. Common examples are the motion of planets around the sun or spinning wheels. In the context of flooding, the flow of water usually does not follow a circular trajectory significantly. The movement of water is more influenced by the topography of the land, the speed of flow, and the surrounding obstructions. The concept of force includes various types of forces such as gravitational force, frictional force, normal force, and attraction or repulsive force between objects. This concept is more general and fundamental in physics. Although the force of gravity affects the flow of water during floods, discussions of forces in physics books tend to be too general and do not specifically explain the behavior of water during floods. Vibration refers to the alternating motion of an object through its equilibrium point, such as vibration in a spring or sound waves. The phenomenon of vibration is not directly relevant to the mechanism of flooding or the behavior of floodwater. The phenomenon of flooding is more related to fluid dynamics and the movement of large water masses.

Physics textbooks are usually designed to teach basic principles of physics that are generally accepted and cover a wide range of natural phenomena. The focus is on understanding basic concepts and their application in a variety of contexts, rather than specific phenomena such as flooding. The phenomenon of flooding is better explained through the perspectives of geography, meteorology, hydrology, and fluid dynamics. It involves the study of rainfall patterns, drainage systems, topography, and water flow behavior at ground level, which is more specific and relevant compared to basic physics topics. To explain flooding comprehensively, an interdisciplinary approach involving knowledge from different fields of science is needed, not just physics. Therefore, physics books may make only a small contribution in understanding the flood phenomenon as a whole. However, in general, the physics textbooks that exist today have a sufficient level of suitability for flood material to be inserted. This is because there are only 3 KD with a low level of suitability compared to 11 KD in tenth grade.

In eleventh grade semester 1 and semester 2, the suitability of Physics material with Flood material gets a percentage of 88% and 85% with very appropriate categories because there is a lot of factual, conceptual knowledge and procedural knowledge on Flood material with Physics material that has compatibility so that Flood material can be inserted into Physics material as local content. For example, in static fluid matter and dynamic fluid matter. Physical material that is very suitable for inserting Flood material is dynamic fluid matter. Dynamic fluids are closely related to flooding because when it rains with a fairly heavy discharge it will produce a large amount of water. Water with a large amount requires a large cross-sectional area, this is in accordance with the physical theory that the greater the water discharge, the greater the volume of water produced each unit of time.

The speed of water flow is directly proportional to the water discharge. If it is associated with force and pressure, it can be explained that a large water flow rate will exert a large force and a large force will exert great pressure. The flow rate of water also depends on the location of the height of a place. The higher a place is, the greater the water flow rate. Therefore, when rainwater falls with a greater discharge, the speed of water will be greater as well as when water overflowing from rivers, dams, or reservoirs that are located higher will have greater kinetic energy so that the speed of water flow will also be enlarged. A large water speed will cause a rapid flow of water. When this water flow hits or hits objects around it, these objects will be carried away by the current or stay in place. In addition, material about global warming is also related to floods (Wasko, 2021), because one of the triggers for flooding is global climate change. Floods that occur in Indonesia are usually due to heavy rainwater that falls so that the river water discharge is abundant. Thus, what happened was that river water was abundant and inundated people's homes. In order for the soil to avoid the danger of erosion/landslides, efforts that can be made are to reforest or replant deforested land and land that is passed by many water currents.

Conversely, twelfth grade physics material which includes electricity and magnetism has a very limited relationship with the topic of flooding, so the insertion of flood material in this curriculum is not appropriate. Electrical and magnetic materials in twelfth grade usually cover topics such as electric fields, Coulomb's law, electric potential, capacitance, electric current, Ohm's law, electric circuits, magnetic fields, electromagnetic induction, and the application of electromagnetism in technology. These topics are very specific and require an in-depth understanding of the properties of electricity and magnetism and the laws that govern their behavior. The flood phenomenon has more to do with fluid dynamics, hydrology, geography, and meteorological factors such as rainfall and drainage systems (Cheng et al., 2020; Merz et al., 2014; Yereseme et al., 2022). While there are some aspects of electricity that are relevant to flooding, such as the risk of electrical hazards during flooding (e.g., short-circuits and electrical hazards), these are more safety and disaster management aspects than part of the electrical and magnetic physics curriculum. Inserting flood material can distract the focus from the main learning objective and cause confusion for students regarding what the learning objective should be.

4. Conclusions

This research shows that integrating flood material into physics subject matter in high schools in Padang City is very necessary considering that this city is prone to floods. Analysis of the suitability between physics and flood matter shows that not all physics materials in high school are currently suitable for integration with flood topics. Based on research using the nonprobability sampling technique with the type of purposive sampling on high school physics textbooks (tenth, eleventh, twelfth grades) revised edition 2016 published by Erlangga, it was found that eleventh grade is the most suitable for the integration of flood material, while twelfth grade is the least suitable. This suitability is assessed from aspects of factual, conceptual, and procedural knowledge. Overall, eleventh grade of the first and second semesters showed a very high level of suitability, with percentages of 88% and 85% respectively. In contrast, twelfth grades of the first and second semesters showed a low level of suitability, with percentages of 60% and 68%. Tenth grade showed a moderate level of suitability, with a percentage of 79% for the first semester and 83% for the second semester.

These results show that materials such as parabolic motion, circular motion, the concept of force, and vibration in current physics textbooks have a low conformity to the topic of flooding. For effective integration, it is necessary to develop physics teaching materials that are specifically adapted to flood materials, considering the importance of disaster education in providing applicable understanding and knowledge for students. In conclusion, to improve the relevance and effectiveness of physics learning at senior high schools in Padang City, it is necessary to develop teaching materials that integrate flood materials, especially for eleventh grade, where the highest level of suitability is found. This step will help students understand the phenomenon of flooding in the context of physics and improve their preparedness for natural disasters that often occur in the region.

Here are some recommendations that can be given, namely 1) Integrated Textbook Development. This textbook should include an explanation of how the principles of Physics are applied in flood events, such as fluid flow, pressure, and water dynamics. Enrichment of Existing Material: Include additional chapters or sub-chapters in existing Physics textbooks, which relate Physics material to flood phenomena. For example, when discussing fluid dynamics, examples of water flow during floods can be included. 2) Training and Workshops for Teachers. This training can include teaching techniques, development of teaching materials, and use of learning aids. 3) use of active learning methods. For example, using project-based learning (PBL) models or case studies that invite students to analyze flood data, understand water dynamics during floods, and design mitigation solutions.

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Author Contribution

Conceptualization, L.P.A.; Methodology, L.P.A.; Software, L.P.A., A.F.; Validation, L.P.A., A.F.; Formal Analysis, L.P.A., A.F.; Investigation, L.P.A.; Resources, L.P.A., A.F.; Data Curation, L.P.A., A.F.; Writing – Original Draft Preparation, L.P.A., A.F.; Writing – Review & Editing, L.P.A.; Visualization, L.P.A., A.F.; Supervision, A.F.; Project Administration, L.P.A..; and Funding Acquisition, A.F.

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Data Availability Statement
Not available.

Conflicts of Interest
The authors declare no conflict of interest.

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Biographies of Authors

Luthfika Putri Antari, Department of Physics Education, Faculty of Mathematics and Natural Sciences, Universitas Negeri Padang; Padang City, West Sumatra 25132, Indonesia.

- Email: luthfikaputriantari11@gmail.com
- ORCID: N/A
- Web of Science ResearcherID: N/A
- Scopus Author ID: N/A
- Homepage: N/A

Ahmad Fauzi, Department of Physics Education, Faculty of Mathematics and Natural Sciences, Universitas Negeri Padang; Padang City, West Sumatra 25132, Indonesia.

- Email: afz_id@yahoo.com
- ORCID: 0009-0007-1618-4982
- Web of Science ResearcherID: N/A
- Scopus Author ID: 57214359179
- Homepage: N/A