Development of spiritual intelligence values in learning materials of Physics to support reinforcement of character education

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Abstract. The learning of physics according to the 2013 curriculum claim a student to practice spiritual attitudes or spiritual intelligence values well. For this objective, the learning material of physics should contain the spiritual intelligence based on physics concept. In fact, the learning material of physics such as books, handout, worksheet and etc have not the spiritual intelligence values. This research has an objective to develop the spiritual intelligence values based on physics concept in the learning material. The type of research method is research and development at the third level that conducts research to develop an existing product, make a product and test the effectiveness of the product. The results of research showed that teaching materials have been produced containing spiritual intelligence values based on physics concepts, teaching material products have very high validity with an average value of 84.96, the use of the product is practical according to teachers and students with an average value of 85, 70 and 82.49, respectively, the use of products in learning activities can increase the achievement of knowledge competencies and spiritual attitudes of students or is called effective for learning physics.

1. Introduction
The 2013 curriculum contains four core competencies, namely spiritual attitude, social attitude, knowledge and skills. Students are expected to increase their faith in God through spiritual competence, can have a good personality in interacting in society through social competence, increase insight through knowledge competencies, and improve the ability to apply their knowledge through skills [1]. All competencies in the 2013 curriculum have been described in various psychology books and are called intelligence. Intelligence is the ability to think and act appropriately based on experience to respond well as the right voter, communicator, problem solver, negotiator, healer and erector of synergy to achieve goals in daily life [2][3].

The purpose of developing the 2013 curriculum is to build student character through learning in school. The character of students is expected to be developed through the achievement of competence or intelligence development in each subject [4], such as physics. The intelligence of students will be able to be developed through understanding physics concepts in learning material [5]. There are many intelligences that are built through learning, such as spiritual intelligence. One's spiritual intelligence is the ability to interpret worship through a mind that is natural to humanity and is principled by God. In addition, spiritual intelligence is one's ability to use spiritual resources to solve life's problems, and be virtuous [6].
The current phenomenon in the community is the degradation of the nation's character due to lack of example and the knowledge acquired has not been used as a basis for building character. Various programs for the development of national character such as returning to the mosque in Minang, leadership training and strengthening programs for character education in schools through the slogan for character have not been successful [5]. On the other hand, the character will be able to be built well, one way is through the development of spiritual intelligence on learning in schools [7]. The development of the values of spiritual intelligence in the physics learning material introduced by this study is a novelty in the nation's character building.

2. Research Methods

The research method used is research and development with third level types. In the research carried out the development of an existing product in the form of teaching materials from physics subjects. Development is carried out on physics learning materials contained in teaching materials with spiritual intelligence values. Then, the product is used in learning activities to see its effectiveness.

Stages of research starts from conducting an investigation of existing products, literature studies from various sources, product development planning, internal testing of product design, revision of design, product manufacture, limited field testing and product revision. Investigation of existing products is carried out through learning observations and teaching materials used by students in class. Based on the results of this investigation, the design of product development with spiritual intelligence values in learning material of physics is carried out. The next stage is internal testing of product design by experts. Then, improvements to the product design are based on internal test results and make products in the form of learning materials of physics that contain the values of spiritual intelligence. Limited field testing of products in learning to determine the level of practicality and effectiveness.

There are five instruments used in this study to obtain data, namely analysis sheets for physics textbooks in schools, sheets for product validity on internal tests, practicality sheets, learning outcomes tests and observations for limited field testing. The research data were analyzed using descriptive statistics, normality tests of data groups, homogeneous tests to determine the variance of two data distributions is same or different and t tests of one group to determine the effectiveness of product use.

3. Results and Discussions

3.1. The results of the investigation of learning and teaching materials in schools

There are two investigations carried out namely teaching materials and learning in class. The results of the analysis of four physics books for high school grade X used in classroom learning indicate that the physics material of teaching materials contains spiritual intelligence values with an average value of 30. Meanwhile, the average value for the knowledge and skills category is 98, 75 and 81.25, respectively. The results of the analysis of this book show that the content of spiritual intelligence values in physics books for high school grade X is still relatively low. The results of observations for the learning process in the classroom show that the cultivation of spiritual values in three stages of learning, namely preliminary, core and closing activities are still relatively low with an average value of 30. The impact on this learning process is the average value of students on the middle exam semester of five classes is 64.81 or classified as low. The data from the results of the investigation of existing teaching materials and learning recommends the importance of developing the values of spiritual intelligence in physics materials to improve the achievement of competencies and character building of students.

3.2. Internal test results of the product

The design of the product with physics learning material contains the values of spiritual intelligence validated by five experts. There are four components that are validated, namely the feasibility of content, languages, presentation of contents and graphics. Each component has several assessment indicators and scores from one to five. The results of the validation by the experts are shown in Table 1.
Table 1. The average value of the validity test of the product design

| No | Components                  | Average value | Validity category |
|----|-----------------------------|---------------|-------------------|
| 1  | Feasibility of content      | 83.00         | Very valid        |
| 2  | Languages                   | 86.00         | Very valid        |
| 3  | Presentation of contents    | 83.50         | Very valid        |
| 4  | Graphics                    | 87.33         | Very valid        |
|    | **Average value of validity** | **84.96**      | **Very valid**    |

The average value of each assessment component shown in Table 1 is between 83.00 and 87.33 with a very valid category for all components. The graphics component has the highest average value, while the feasibility of content component has the lowest average value. Overall, the design of physics teaching materials products containing spiritual intelligence values has an average value of validity of 84.96 or very valid categories. Because the product design of physics teaching materials is still below the value of 90.00, further development needs to be done.

3.3. The results of Limited field testing for products

There are two results for a limited field test of the product, namely the practicality test and the effectiveness test of teaching materials. Practicality tests were conducted on 3 teachers and 26 students for physics subject. The practicality assessment components are ease of use (1), benefits (2), attractiveness (3) and clarity (4). The practicality test results of physics teaching materials containing spiritual intelligence values according to the teacher are presented in Figure 1.

![Figure 1](image.png)

**Figure 1.** Practicality test results of physics teaching materials according to the teacher

The practicality value of each component is between 83.33 and 88.10. The highest practicality value is obtained by the benefit component and the lowest value by the attractiveness component. However, all components have an average value with a very high category. Meanwhile, the average value of the practicality test of physics teaching materials containing the value of spiritual intelligence is 85.70 or very high category. Then, the practicality test results of physics teaching materials containing the spiritual intelligence values according to students are shown in Figure 2.
According to students, the practicality of each component is between 79.50 and 84.00. The clarity component has the highest practicality value, while the ease of use component has the lowest practicality value. Meanwhile, the average value of the practicality test of physical teaching materials containing the spiritual intelligence values is 82.50 or very high category. Based on these practicality criteria, physics teaching materials containing the spiritual intelligence values are practically used in learning physics.

Measurement of the knowledge competence and spiritual attitudes of students before and after the use of physics teaching materials containing the spiritual intelligence values in the learning process is carried out to determine the effectiveness of the product. Before the product is used in learning, the average value of students’ knowledge competence is 40.77 with a standard deviation of 13.19 and variances of 174. Meanwhile, the lowest and highest scores obtained by students are 24.00 and 68.00 respectively with a range of grades 44. After using the product, the average value of students’ knowledge competence is 74.46 with a standard deviation of 8.40. Meanwhile, the lowest and highest grades obtained by students are 60.00 and 92.00 respectively. Then, a paired comparison tests is performed on the average value of the competence of students before and after treatment at the freedom degrees and significance level of 25 and 0.05 respectively and the value of paired t test is of -12.269 with t-table of -1,708 is obtained. The conclusion based on the results of a paired comparison test for this knowledge competency is the use of physics teaching materials containing the spiritual intelligence values is effectively used in classroom learning.

In the spiritual attitude competency, the average value has increased from 53.75 to 80.58 with the standard deviation has decreased slightly from 8.58 to 8.29. The increase also occurred in the lowest value of the spiritual attitude competency of the students namely 45.00 before treatment and 62.50 after treatment and the highest value of 72.50 before and 92.50 after treatment. The paired comparison test with the same approach is also performed on the average value of the competence of spiritual attitudes and obtained a paired t test of -11.49 and t table of -1.708, meaning that physics teaching materials containing the spiritual intelligence values are also effective to improve spiritual attitudes of students.

4. Conclusion

Based on the demands of the 2013 curriculum and character building, the conditions of physics teaching materials used by students in classroom learning before this study have recommended the importance of developing spiritual intelligence values in physics learning materials carried out. The results of research and development conducted on physics teaching materials containing the value of spiritual intelligence are very valid according to experts, are very practical to use in learning and are effective in increasing the knowledge competence and spiritual attitudes of students.

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