Development of social and emotional intelligence values in Physics learning material for strengthening character education

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Abstract. Knowledge is a basis to build student’s character. Development of the 2013 curriculum in Indonesia conducted by the government for character building. The learning activities of each subject in the class build the character of students through reinforcement of learning material. The purpose of research is development the values of social and emotional intelligence in physical learning material to build student’s characters in comprehensive learning process. The research method is research and development with several steps, namely research on existing products, literature studies, product development planning, internal design testing, design revision, product making, preliminary field testing, first product revision, main field testing and second product revision. Based on the data analysis, the development of the values of social and emotional intelligence in physics learning materials is very valid, very practical and effective to be used in physics learning to support the character building of students in senior high school in grade X.

1. Introduction

Strong character accompanied by high competence will be able to give birth to an advanced nation [1]. Education becomes important to build excellent character and high competence of the nation’s children [2]. From the perspective of psychology, the development of competencies is also called intelligence such as spiritual, social, emotional, intellectual and kinesthetic intelligence [3]. In school education, the formation of competencies consists of spiritual, social, knowledge and skills competencies that are achieved holistically or comprehensively [4]. Therefore, character building through the development of values of social and emotional intelligence in physics learning material is a new breakthrough and innovation in the world of education today.

The degradation of character from among children, adolescents and adults has become a major problem for the Indonesian people today. On the other hand, one of the factors for giving birth to a golden generation, namely the intelligent generation characterized by the Indonesian nation in 2045 is the quality of character [5] [6]. However, various social phenomena that are not good occur in the midst of society, such as false reporting on various social media, student-to-student fights, theft, blasphemy, intimidation, acts of murder, corruption, immoral acts and so on [7]. All actions and events that are not good are caused by a lack of emotional control from each individual community. Strengthening character education from every community member, especially children and adolescents, is important to do.
Many efforts have been made by various parties, including the community, government and educational institutions to improve the character degradation of the nation's children [8] [9] [10]. The program back to surau by the Minang tribe as an effort to build Nagari children in religious Sumatra, noble and skilled. However, this effort has not been successful. Furthermore, leadership training conducted by government and non-government institutions has not been able to improve the character of employees and employees. The strengthening movement of character education in schools through the learning process and school culture has not been able to strengthen the character of students. In the learning process, students are encouraged to behave like discipline, honesty, hard work, religious, caring social, caring for the environment, responsible, creative, independent, democratic, respectful of achievements, friendly / communicative, fond of reading, peace-loving and others. Furthermore, leaders, teachers and educators develop the school culture through various activities and slogans to encourage students to have good character.

If observed closely, the failure of all programs to strengthen the character of the nation's children that have been running up to now is caused by a lack of obedience and has not made knowledge of various scientific disciplines the basis of character building. This study aims to build character through the development of values of social and emotional intelligence in physics. Research that has been done as an innovation in the world of Education to support the achievement of learning objectives and character education strengthening programs.

2. Research Methods

The type of research used is research and development. The purpose of this research is to produce Physics teaching materials integrated values of comprehensive intelligence such as spiritual intelligence, social intelligence, emotional intelligence, intellectual intelligence and kinesthetic intelligence. The level of research and development used is level 3, namely research conducted to develop existing products, make products and test the effectiveness of the products produced.

The stages of research reported in this paper are limited to eight stages, namely research on existing products, study of the literature, planning of product development, internal design testing, design revisions, product manufacturing, limited field testing and revision of the product. The first stage, research on existing products is done to see the specifications, advantages and disadvantages of products on the market; The second stage, the study of the literature is carried out to obtain information for the expected product design; The third stage, planning of the development of Physics teaching materials integrated values of social and emotional intelligence consists of covers, instructions on learning, competencies, maps of concepts, content of learning materials integrated values of social and emotional intelligence, examples of problems, supporting information, practice problems, evaluations, and responses to evaluation results; The fourth stage, internal testing of the design to determine the value of the validity of product planning in the form of Physics teaching materials integrated values of social and emotional intelligence; The fifth stage, the revision of product design based on the results of internal testing of the design; The sixth stage, making physics teaching materials products integrates social and emotional intelligence values based on revised designs; The seventh stage, limited field testing knows the practicality of Physics teaching materials according to teachers and students and the effectiveness of product use in the learning process, and; The last stage, the revision of the product based on the results of limited field testing. The research instruments used in the framework of collecting data are sheets of analysis of Physics books used by students in schools, sheets from validity tests, sheets from practical tests, test sheets from learning outcomes and observation sheets to see the effectiveness of using Physics teaching materials integrated values of social and emotional intelligence in the learning process. Research data obtained from data collection instruments were analyzed using descriptive statistics, normality tests of data groups, homogeneity tests to determine the variance of two data distributions of the same or different and test the difference of the two average values to determine the effectiveness of the use of the product.

3. Results and Discussions
3.1. **Results of analysis of physics books at school**

There are four physics books used by students in schools that have been analyzed. The purpose of the book analysis is to see the feasibility of the contents in five dimensions, namely spiritual attitudes, social attitudes, emotional attitudes, knowledge and skills. The results of the content feasibility analysis are shown in the graph in Figure 1.

![Figure 1](image)

**Figure 1.** Results of an analysis of the feasibility of the contents of a physics book at school

The results of the analysis of physics books in Figure 1 used by students in schools show that the contents of the book are not balanced between the five dimensions of the feasibility of the content, namely spiritual attitudes, social attitudes, emotional attitudes, emotional attitudes, knowledge and skills. The contents of the book of physics are still dominated by knowledge of physics concepts at 68.60 percent. Furthermore, the contents of the book for skill dimensions are still small at 20.93 percent. Meanwhile, physics books used by students in the learning process still have very little content; the dimensions of spiritual, social and emotional attitudes respectively are 2.33, 4.07 and 4.07 percent. Data from the feasibility of the contents of this physics book recommends the importance of developing the values of social and emotional intelligence in physics material to support the achievement of student competence in a holistic or comprehensive.

3.2. **The results of product validity tests**

Products in the form of integrated physics teaching materials social and emotional intelligence values have been validated by 10 experts for four components of assessment such as the feasibility of content with eight indicators, languages with six indicators, presentation of contents with eight indicators, and graphics with six indicators. The average value of the four assessment components is displayed by the graph in Figure 2.
Figure 2. Results of validation on the development of social and emotional intelligence values in physics teaching materials

The average value of each assessment component is not equally distributed. The graphic component has a value of 90.67 and higher compared to the other three components, namely the feasibility of content, language and presentation sequentially with an average value of 86.75, 85.75 and 87.25. Components of content, language, and presentation must be improved so that all components of the validity evaluation have a balanced value. However, all components of the validity assessment have a very valid category.

3.3. The results of the product practicality test

The value of practicality tests on Physics teaching materials integrated social and emotional intelligence is carried out on teachers and students. There are four components that are assessed from the practicality of using the product, namely ease of use, benefits, attractiveness and clarity. Table 1 shows the results of the practicality test of teaching materials.

| Components of practicality | Teachers | Students | Teachers | Students |
|----------------------------|----------|----------|----------|----------|
| Easiness                   | 95.80    | 75.00    | 81.25    | 81.80    |
| Benefits                   | 78.60    | 75.40    | 83.92    | 81.10    |
| Attractiveness             | 95.00    | 77.10    | 85.00    | 82.80    |
| Clarity                    | 95.00    | 77.50    | 85.00    | 82.20    |

In general, the average value of all components of practicality assessment of the physics teaching materials integrated the value of social and emotional intelligence by the teacher is higher than the assessment by students. For the value of social intelligence in the physics teaching materials, the teacher's assessment is a very high category, except the components of benefits of the product is high categories and students assess that the practicality of the physics teaching materials is high. Meanwhile, the value of emotional intelligence in the physics teaching materials has a very high value of practicality.
by teachers and students. Especially for the values of social intelligence in the physics teaching materials, improvement is important to do to increase the value of practicality by students.

3.4. The results of testing the effectiveness of the product

The effectiveness of the physics teaching materials integrated the value of social and emotional intelligence in the learning process can be identified through paired comparison tests for competencies such as social attitudes, emotional attitudes and knowledge. In the competence of social and emotional attitudes, effectiveness is known from observing student attitudes before and after treatment. Whereas knowledge competence, paired comparison tests were conducted for the pretest and the posttest values to see the effectiveness of the teaching materials.

3.4.1. Effectiveness of social intelligence values. Determination of the effectiveness of the physics teaching materials integrated the values of social intelligence is determined through the achievement of competencies in social attitudes and knowledge of students. The results of observations of social attitudes of students obtained a mean value of 58.84 and standard deviation of 8.08 before treatment and a mean value of 82.26 and standard deviation of 4.99 after treatment. For knowledge competence, the mean value and standard deviation, respectively 53.07 and 11.05 for the pretest and 79.38 and 8.74 for the posttest.

The paired comparison tests of the competencies of social attitudes before and after treatment with degrees of freedom and significant level, respectively 25 and 0.05 have been obtained the value of the paired t-test is -12.71. Meanwhile, the value of t in the table is -1.70 for degrees of freedom 25 and significant level α 0.05 or a half value α is 0.025, meaning that it is outside the null hypothesis area. The results of the comparison between the t-test paired with the t value in the table indicate that there is a significant difference between the competencies of the social attitudes of students before and after the treatment. The implication of this difference is that the physics teaching materials integrated the values of social intelligence are effectively used in the learning process to improve the competency of social attitudes of students.

The same approach is carried out for the students' knowledge competencies. Paired t-test was obtained with a value of -11.19 from the results of the pretest and the post test for 25 degrees of freedom and a significant level α 0.05. Meanwhile, the value of t in the table is obtained with a value of -1.70 for degrees of freedom 25 and a significant level α 0.05 or a half value of α is 0.025 which indicates this value is outside the null hypothesis area. The conclusion taken for the knowledge competence is that there are significant differences between the mean values of the pretest and the posttest due to the physics teaching materials integrated the value of social intelligence in the learning process or called effective.

3.4.2. Effectiveness for values of emotional intelligence. The observations of the student’s emotional attitudes before treatment in the learning process have mean values and standard deviations, respectively 65.65 and 9.17. Whereas, the mean value and standard deviation of the students' emotional attitude competencies after treatment were 83.21 and 6.90 respectively. The pretest results of the knowledge competencies have sequential mean and standard deviation values, respectively 58.71 and 7.30 and the posttest have a mean value 81.42 and standard deviation 5.57.

For emotional attitude competence, the results of paired comparison tests for freedom degrees 27 and significant levels α 0.05 or a half values of α is 0.025 indicate that the value of paired t test is -12.02 and the value of t in the table is -1.07 or outside the null hypothesis area. The conclusion is that there are significant differences between the competencies of emotional attitudes of students before and after treatment, or the physics teaching materials integrated the value of emotional intelligence is effectively used in the learning process.

In the student's competency knowledge for freedom degrees 27 and significant level α 0.05, the value of paired t test is -14.19 and the value of t in the table is -1.7, or indicates outside the null hypothesis area. The conclusion of the paired t test for the knowledge competence is that there are significant
differences between the mean values of the pretest and the posttest, or the physics teaching materials integrated the values of emotional intelligence are effectively used in the learning process.

4. Conclusion

Based on the results of the analysis of book products used by students in schools now recommend the importance of developing the values of social and emotional intelligence in the physics learning material for class X high school. The products produced are the physics teaching materials integrated the values of social and emotional intelligence have a very valid of the validity category and a very high value of the practicality category. Furthermore, this physics teaching material product is effectively used in the learning process of students in the classroom to improve the achievement of competencies namely social, emotional and knowledge attitudes.

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