The exploration of character education contents in the physics textbooks about newton’s law

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Abstract. Character education is recommended to be integrated into all school subjects as an effort to solve the problem of moral degradation among the Indonesian students. Therefore, this study aims to explore the character education contents in the physics textbooks used by the teachers in the learning process. The findings demonstrated that there were 14 character values contained in the textbooks, which have had recommendations from the Ministry of National Education of Indonesia as the feasible learning sources.

1. Introduction

In essence, education serves to develop three aspects of human beings: physical, mental and character. Although physical and mental aspects are very important things, they can be a threat without character [1][2]. This is in line with Theodore Roosevelt who states that educating someone just to think with reason without character education means building a threat in social life. However, in practice the current education has not been able to realize the three dimensions above in a balanced and proportionate fashion. The reason is the implementation of education that prioritizes the world of cognition. Indeed education is not only about learning skills, but also about the ability to decide what (to do?) And why (must do?) [2]. This means that education must be able to develop the thinking systems, values, morals, and beliefs to order to promote the students to be able to survive in their environment.

In Asia and the Pacific Programme of Educational Innovation for Development (APEID) conference involving 11 countries including Indonesia, it is commenced that it is important to develop the characters of the students [3]. One of the notable reasons is that the importance of character education should be taught or included in other types of education because characters play a pivotal role in assisting the students to become successful through the decision-making process they are delving into. Additionally, characters can influence their behaviours, decisions, and the portrait of who they are [1].

In the practice of character education the teachers generally; 1) implement it with reactive and unplanned procedure, 2) regard it as a hidden curriculum taken place within the instructional practice with a focus on daily behaviors or rules in schools, 3) unconsciously carry it out meaning that their behaviors affect the students without realizing the effects on the students’ behaviors [4]. The implementation of character education in the physics subject can be internalized by applying
appropriate learning methods. For example, with the experimental method, the teachers can teach the characters of cooperation and honesty to the students. Second, the study circle can help internalize the character education meaning that through the materials the students not only know about the theory or law of physics but also they can capture the values of life. Third, the internalization of character education through the example of physical figures is also worthy. For example, the teachers encourage the students to learn and apply the character of hard work by Albert Einstein in finding a theory, and the story of Thomas Alva Edison who succeeded in discovering incandescent light bulbs [5].

However, the main problem lies in the teachers’ lack of knowledge related to character education itself. This is in line with the survey research in Sweden demonstrating that teachers receive very little training in character education [4]. It is very unrealistic to expect teachers to be able to facilitate the learning process that they have never experienced and received training before [6].

In the lesson planning, the teachers generally plan the lesson plan (hereafter RPP) by referring to the textbooks owned by the teachers and the students. However, based on the results of the analysis of RPP in Newton’s Law materials, the teacher has not integrated physics learning with character education. Therefore, the researchers intend to explore the inclusion of character education in the physics textbooks about Newton’s Law.

The character values to be explored are based on the Character Education Implementation Guidelines stating that there are 18 character values. They comprise; 1) Religious, 2) Honest, 3) Tolerant, 4) Discipline, 5) Hard Work, 6) Creative, 7) Independent, 8) Democratic, 9) Curious, 10) Spirit of Nationality, 11) Love the nation, 12) Appreciative to Achievement, 13) Friendly/Communicative, 14) Love Peace, 15) Fond of Reading, 16) Caring of Environment, 17) Caring for Society, and 18) Responsible [7].

2. Methods
This study employed a qualitative approach with content analysis. The textbooks analysed in this study have received recommendations from the Ministry of National Education as the reference books in physics learning for class X, senior high school. The textbooks were written by Reva Yulietta and Dede Sahidin, and published by CV Arya Duta in 2016. The instrument used in exploring character education contained in physics textbooks is using question guide sheets of 18 character education indicators and character education coding sheets. The data analysis in this study followed the analytical framework of Miles and Huberman, which can be seen in Figure 1. Furthermore, in the development stage, this learning device is assessed by peers to be then improved. After going through a cycle between assessment-revisions, learning devices are tested on students. The implementation phase was held for 16 meetings. Evaluation is carried out for each stage of ADDIE activities.

![Figure 1. Data Analysis Framework of Miles and Huberman](image)

The reliability and validity tests used in this study were the stability reliability test. It is the condition when a symbol (message) that is the object of content analysis is coded twice by the same
coder and the result remains the same. Meanwhile, the strategy used in this study to address the validity issue comprised of three ways. First, the researchers involved themselves in the observation process continuously. Second, the researchers used theoretical triangulation at the time of data collection. Third, this study involved external auditors.

3. Results and Discussions

Based on the Decree of the Ministry of National Education Number 11 in 2005 regarding textbooks, textbooks are the mandatory reference for schools which contain learning materials in order to increase faith and piety, character and personality, mastery of science and technology, sensitivity and aesthetic abilities, and physical and health potentials based on the national education standards. The physics textbooks for class X senior high school were authored by Reva Yulietta and Dede Sahidin and published by CV Arya Duta in 2016. The Ministry of National Education regards the textbooks as the feasible learning sources to be used in 2013-Curriculum-based learning. Based on the analysis results, several findings related to the character education content in the physics textbooks about Newton's Law can be seen in Table 1.

Table 1. The number of occurrences of the character education content about Newton’s Law

| Aspects of character education       | Total number of occurrences |
|-------------------------------------|-----------------------------|
| Religious                           | 5                           |
| Honest                              | 13                          |
| Tolerant                            | 1                           |
| Discipline                          | 11                          |
| Hard-work                           | 10                          |
| Creative                            | 9                           |
| Independent                         | 14                          |
| Democratic                          | -                           |
| Curious                             | 12                          |
| Spirit of nationality               | -                           |
| Love the nation                     | 1                           |
| Appreciative to achievement         | 7                           |
| Friendly/Communicative              | 16                          |
| Love peace                          | -                           |
| Fond of reading                     | 5                           |
| Caring of environment               | -                           |
| Caring for society                  | 2                           |
| Responsible                         | 10                          |

Table 1 show number of occurrence of the character education content about Newton’s law. The results showed that of the 18 Indonesian characters that must be developed in the learning process, there were 14 characters contained in the physics textbooks. The character values not found in the physics textbooks were democratic, the spirit of nationality, love peace, and caring of environment. The character education contents shown in Table 1 were exhibited in several components: integrated in the learning materials, through the learning methods used, through physicist profiles, and through assignments given.

The character education contents were mostly integrated into the learning methods. Among the learning methods used were a demonstration, experiments, and project-based learning. It was proved by the characters found within the process of using the learning methods: friendly/communicative characters.

The demonstration method was conducted five times in learning Newton's Law. The characters internalized through this method were discipline, independent, friendly/communicative, and curious. This is in line with the results above that demonstration method can improve the students’ learning
activities and motivation, such as full concentration on the teachers’ explanation, active question and answer session with the teachers and the classmates one another, active group discussion, peer-empowerment to solve problems in the discussion group, complete preparation of the stationary and the textbooks, monitoring of the discussion results, completion of the given tasks, solving own problems, on-time assignment submission, learning perseverance, learning interest and capacity, tenacity in facing the difficulties, desire to excel in learning, and autonomy [8].

The experimental method was conducted twice. The characters internalized through this method were curious, discipline, honest, friendly/communicative, and responsible. It is in line with the results of the study stating that the application of the experimental method in learning can improve the scientific attitude of students. The scientific attitudes observed in the study include: 1) curiosity, 2) discipline, 3) honest, 4) responsible and 5) cooperative [9].

The last but not least method was project-based learning, which was conducted twice. The characters internalized through this method were friendly, communicative, responsible, honest, creative, and hard work. This is in line with the results of research concluding that project-based learning can improve 21st-century students’ abilities, namely: 1) critical thinking skills, 2) creativity, 3) collaboration skills, and 4) communication skills [10]. In addition, the application of project-based learning can also develop those characters when they were facing difficulties [11].

Furthermore, the characters integrated into the textbooks were religious, tolerant, hard work, caring about society, and creative. The Newton’s Law materials deal with the phenomena of motion of objects in the earth and the celestial objects, such as planets, moons, and sun. Through this lesson, many religious characters emerge like the quote "All exist because of the greatness and majesty of God as the creator", and "That is one proof of the greatness and majesty of God that has created order and balance of the universe". The characters of tolerance, hard work, social care, and creativity were emphasized specifically within the given stories.

Character education through the profiles of the physicists listed in the physics textbooks was manifested in the occurrences of some characters, namely curious, hard work, creative, and appreciative of achievement. The physicists were Isaac Newton and Johannes Kepler. The curiosity character of natural phenomena was the underlying trigger for the Newton and Kepler to continue exploring various sciences to answer their great curiosity level. The hard work character was illustrated through the journey of Newton and Kepler while formulating various theories. The character led them to be two of the greatest scientists in the world.

Character education through the assigned tasks was also manifested in the occurrences of some characters, namely independent, responsible, discipline, honest, creative, and appreciative of achievement. Of all the manifested characters, autonomy through the act of independent learning was mostly exhibited. Such a character was internalized through the individual tasks. Furthermore, the honest character was exhibited within the process of making the reports of the activities they have accomplished. Meanwhile, the characters of responsibility, discipline, creativity, and appreciation of achievement were exhibited in the guidelines and rules given by the teacher in carrying out the tasks.

4. Conclusions
Based on the findings of the present study, it can be concluded that there are 14 character values in learning about the Newton’s Law mediated by the physics textbooks that have received recommendations from the Ministry of National Education. The character education is internalized through various ways including within the learning materials, within the process of applying the learning methods, within the description of the physicists, and within the process of accomplishing the assigned tasks. The exhibited characters were religious, honest, tolerant, discipline, hard work, creative, independent, curious, love the nation, appreciative to achievement, friendly/communicative, fond of reading, caring about society, and responsible.

References
Acknowledgments
This research was supported by the lesson plan of physics subject for senior high school level class X about Newton’s Law at SMAN 3, SMAN 4, SMAN 5, SMAN 6, and SMAN 9, Jambi City. We would like to thank all of the physics teachers who have provided the contributing data for this study.