Character building in physics learning for Indonesia children

I M Astra
Universitas Negeri Jakarta, Rawamangun Muka, Jakarta Timur, 13220
E-mail: imadeastra@gmail.com

Abstract. This paper aims to develop the character of Indonesia children in physics learning. Indonesia now face moral crisis that is very dangerous and threatening for young generation. Violence, sexual abuse, and corruption occur more frequently. This condition needs solution to make Indonesia better. The most effective solution is character building reflected Indonesia character that is known as nobility, tolerance, and religious. Character education is important to grow since childhood to build the young generation representing living value of Indonesia. Method used in this study is literature study from various references Mardapi (2011) states that character education is part of affective domain. Unfortunately, affective domain gets the least concern if it is compared to cognitive and psychomotor domain. Therefore, affective domain needs more concern in every learning activity so education character can be applied properly. A physics teacher can build good character well if he understands the characteristic of subject and applied appropriate learning model that is suitable for students characteristic and school properties. Students’ character that can be developed by applying problem posing and collaborative learning model are creative thinking, critical thinking, logical thinking, honest, good behavior, team work, and tolerance.

1. Introduction
In this globalization era, technological breakthrough is developing fast so it creates competitions in various aspects of our lives, where education is one of that. Education is a way to build qualified human resources. Therefore, it is an obligation to increase the education quality.

Increasing the quality of human resources needs a good learning strategy because it is expected to improve the education system. This is supported by government by introducing act no 20/2003 about education system. The objective of the act is stated on article 3 “The National Education functions to develop the capability, character, and civilization of the nation for enhancing its intellectual capacity, and is aimed at developing learners’ potentials so that they become person imbued with human values who are faithful and pious to one and only god; who possess morals and noble character; who are healthy, knowledgeable, competent, creative, independent; and as citizens, are democratic and responsible”.

According to that statement, it is clear that education is not only focus on cognitive and psychomotor domain but also on affective domain that concerns on character building. Bloom separates education aim into three domains, namely: cognitive, affective, and psychomotor domain [1]. Cognitive domain focus on activities related to intellectual capacity, such as: knowledge, understanding, and thinking skill. Thinking skill on cognitive domain involve remembering, understanding, applying, analyzing, creating, and evaluating. The second domain, psychomotor, focus on physical ability involving human body. The last domain, affective, is related to interest and attitude. The objectives of all domain can be achieved by responsibility, teamwork, commitment, discipline, honesty, confidence, respect, and self-controlling.
Indonesia now face moral crisis that is very dangerous and threatening for young generation. Violence, sexual abuse, and corruption occur more frequently. This condition needs solution to make Indonesia better. The most effective solution is character building reflected Indonesia character that is known as nobility, tolerance, and religious. Character education is important to grow since childhood to build the young generation representing living value of Indonesia.

Mardapi states that character education is part of affective domain [2]. Unfortunately, affective domain gets the least concern if it is compared to cognitive and psychomotor domain. Therefore, affective domain needs more concern in every learning activities so education character can be applied properly.

Physics is branch of science concerned with the nature and properties of matter and energy [3]. In physics learning, there are a lot of topics that can be used for character building. For example, when students learn about heat transfer, they can also learn about justice, giving, and solidarity by observing the properties of heat and reflecting to the rich and the poor interaction [4].

Based on the problem above, the research problem is “How to build character in physics learning for Indonesia children?”.

2. Literature review

2.1 Character

Character etymologically comes from greek language “kasairo”, which means “blue print”, “fundamental shape”, “fingerprint”. In this condition, Character is something given or something that being natural behavior of human in their groups. However, the terminology of character is ambiguous[5]. Mourier proposes two ways of interpretation for character. First, character is a set of condition that is taken for granted, or something that have been exist on human. In other words, this can be assumed as given. Second, character can be understood as level of ability that can be mastered by individuals [6]. That character is called a willed process. Another expert define character as shown below:

"Character determines someone’s private thoughts and someone’s actions done. Good character is the inward motivation to do what is right, according to the highest standard of behaviour, in every situation" (Hill, 2002).

Character education teaches how to think systematically and have a good behavior that help individuals to live and work together as family, society, and citizen and make responsible decisions. Character that have been standard is found in The Six Pillars of Character which is introduced by Character Counts Coalition (a project of The Joseph Institute of Ethics). The six characters mentioned above are:

a. Trustworthiness, a kind of character that makes individuals have: integrity, honesty, and loyalty.
b. Fairness, a kind of character that makes individuals become open minded and not to exploit other people.
c. Caring, a kind of character that makes individuals have a care to other people and social condition.
d. Respect, a kind of character that makes individuals have admiration and appreciation to other people.
e. Citizenship, a kind of character that makes individuals have awareness to obey the law and norms.
f. Responsibility, a kind of character that makes individuals have discipline and awareness to make certain that particular things are done well

Character is similar with nature that is composition of every permanent behaviour so it becomes special feature that make an individual have a different with others. The character can be interpreted from behavior when individuals interact each other. The interaction contains psychological and ethic meaning. Based on psychology, character is a visible behavior representing theirself. While based on ethic, character is something that shows human value and trusted attitude, so charactereed individual can present firm standpoint, kindness, commend, and trust. Character has a meaning in moral value, where the behavior is responsible and firm. Ministry of National Education develops culture education and nation character through Pusat Kurikulum as shown on the table below:
Table 1. Value and Description of culture education and nation character

| Value          | Description                                                                 |
|----------------|-----------------------------------------------------------------------------|
| 1. Religious   | Attitude and behavior that obey the obligation of religion, tolerance with others, live together peacefully |
| 2. Honest      | Attitude based on efforts to make him as a person who is always trustworthy on words dan actions.          |
| 3. Tolerance   | Attitudes and actions that respect religious differences, ethnic, opinion, attitude, and other persons' actions that is different from him. |
| 4. Discipline  | Measures that show orderly and obedient behavior on various terms and regulations.                         |
| 5. Work Hard   | Behavior that shows earnest effort in overcoming various barriers to learning and duty, and complete the task as well as possible. |
| 6. Creative    | Think and do something to make way or new results from something that already have.                        |
| 7. Independent | Attitudes and behaviors that are not easily depend on other people in completing tasks.                    |
| 8. Democratic  | A way of thinking, and acting based on equality between rights and obligations of himself and others.       |
| 9. Curiosity   | Attitudes and actions that always strive for knowing deeper and wider than something which he learned, viewed, and heard. |
| 10. Spirit of nationality | The way of thinking, acting, and being insightful placing the interests of the nation and state above self-interest and group. |
| 11. Patriotism | How to think, behave, and do the show loyalty, caring, and high appreciation to the language, physical environment, social, cultural, economy, and politics of the nation. |
| 12. Meritocracy| Attitudes and actions that drive him to produce something useful for society, and recognize, and respect the success of others. |
| 13. Friendly   | Actions that demonstrate happy speaking, get along, and work with others.                                  |
| 14. Peacefull  | Attitude, words, and actions that cause people others feel happy and secure for their presence.           |
| 15. love reading | The habit of providing time for various reading a reading that gives him the virtue.                       |
| 16. Environmental care | Attitudes and actions that always try to prevent damage to the surrounding natural environment, and developing efforts to improve the natural damage that has occurred. |
| 17. social care | Attitudes and actions that always want to help to others and to the needy.                                |
| 18. Responsibility | Attitudes and behavior of a person to carry out the taskand obligations, which he should have done, against oneself, society, environment (nature, social and cultural), the state and God Almighty. |
2.2 **Building of character education**

The steps in character building according to Najib Sulham (2010: 20) in Sofan Amri, et al (2011: 43) are as follows:

a. Incorporating the concept of character in each lesson by:
   1) Implanting the value of goodness in children (knowing the good) instilling the self-concept to each child when enter the lesson.
   2) Using a way that makes a child have a reason or desire to do good (desiring the good)
   3) Giving some examples to the children about the character being fault. For example, through stories with figures that are easy to understand students
   4) Developing a loving attitude. Rewarding to a child doing the good and Treating the children doing something bad by giving educated punishment
   5) Performing good action (acting the good). Character application in learning process during school.

b. Creating a slogan that is able to grow the habit in all the behavior of the school community

c. Continuous monitoring is a manifestation of character building implementation.

d. Assessment of parents has a great role to build the character of the child.

2.3 **Learning definition**

Learning is an activity undertaken by teachers programmed in instructional design that creates a process of interaction between fellow learners, teachers with learners and with learning resources. Nana Sudjana states that learning is a process marked by a change in a person. Learning by Morgan in Agus Suprijono is a permanent change in behavior as a result of experience. One of the signs that a person has learned can be observed by the change of behavior within him. The behavioral changes include the cognitive domain, the psychomotor domain, and the affective domain [7] [8].

Learning can be done face to face or without face-to-face. The face-to-face learning is carried out in the classroom where the interaction between learners and teachers takes place. In face-to-face learning, learning can be carried out in a classroom by not requiring direct teacher and student interaction. Open learning can be helped by using technology to enable the development of mobile learning (m-learning). Along with the development of technology, m-learning can take advantage of android applications in learning activities [9] [10] [11].

3. **Method**

Method used in this study is literature study. Steps in this method are collecting and analyzing data. On the first step, various references discussing about character building and physics learning are collected. After that, the references are analyzed to construct this study [12].

4. **Discussion**

From the literature review of character education development studies, character education can be designed in the curriculum, promoted in the community, facilitated in the classroom, given examples and role models. Some ways of character development that physics teachers can do in learning, first a teacher understands the basic competencies that must be achieved by students such as:

Basic competence 3.6 (knowledge): Applying the concept of static electricity and direct current electrical law. Basic competence 4.6: solving technological and engineering problems related to static electricity and direct current electricity [13]. After that the teacher made a concept map about the material that will be developed to achieve basic competence.
Then the teacher understands the characteristics of the students as well as the appropriate learning model to achieve Basic Competence (KD) as for basic competence above will be tried to be achieved with collaborative learning model of group investigation type, it is suitable for passive students and low learning outcomes.

Marjan and Ghodsi mentioned that collaborative learning is an educational approach to teaching and learning involving groups of learners working together to solve problems, complete tasks, or create a product [14]. Here the role of the teacher is to facilitate students in group discussions, as consultants when there is conflict within the group, as well as to observe progress processes in group activities.

In Group Investigation (Slavin, 2009), students in groups work out, execute, and report on problem solving outcomes. Students participate in discussing a problem or project with friends and teachers. Students also gain practical experience in giving or receiving criticism. It provides students with an intensive topic of study and gained specific knowledge on a topic. Through this technique it is hoped that their understanding of the importance of the invention will increase. The purpose of the study cited is actually to improve the process and the results of physics learning through the application of collaborative learning model of group investigation type. This model has been tested in SMA N 14 MIA class 10 obtained results shown only related to the characters that want to be developed as follows:

**TABLE 2. Assessment Result of Student-Student Interaction**

| Aspect                          | Cycle I | Cycle II | Cycle III |
|--------------------------------|---------|----------|-----------|
| Team Work                      | 61,11   | 65,97    | 76,39     |
| Information exchange           | 45,14   | 64,58    | 75,69     |
| Delivering opinion             | 45,14   | 64,58    | 75,69     |
| Listening to others’ opinion   | 45,14   | 64,58    | 75,08     |
| Average                        | 49,13   | 64,93    | 75,87     |
TABLE 3. Learning outcome of Affective Domain

| Aspect          | Cycle I | Cycle II | Cycle III |
|-----------------|---------|----------|-----------|
| Curiosity       | 61.11   | 65.97    | 76.39     |
| Team work       | 45.14   | 64.58    | 75.69     |
| Discipline      | 45.14   | 64.58    | 75.69     |
| Responsibility  | 45.14   | 64.58    | 75.08     |
| Care            | 49.13   | 64.93    | 75.87     |
| Politeness      | 61.11   | 61.8     | 75        |
| Activeness and  | 54.86   | 59.03    | 68.06     |
| Responsiveness  | 61.8    | 61.8     | 75.69     |
| Respect         | 57.55   | 61.63    | 70.225    |

Average

TABLE 4. Learning Outcome of Psychomotor Domain

| Aspect          | Cycle I | Cycle II | Cycle III |
|-----------------|---------|----------|-----------|
| Observing       | 61.11   | 65.97    | 76.39     |
| Questioning     | 45.14   | 64.58    | 75.69     |
| Associating     | 45.14   | 64.58    | 75.69     |
| Presenting      | 45.14   | 64.58    | 75.08     |
| Average         | 49.13   | 64.93    | 75.87     |

From the results of research shows there are changes in the character of students during the classroom action research. Other examples that have been tried for active students as well as students who have moderate learning outcomes as well as schools that have a complete laboratory at SMA Labschool class II to:

Basic competence 3.7: Applying the laws of magnetism in everyday matters
Basic Competence 4.7: Demonstrate magnetism and electromagnet concept map of material distribution made by teacher:
Basic competence will be achieved using Problem Posing model of Pre-Solution Posing type Implementation of Problem Posing Type Posing Pre-Solution Posing. Problem posing pre-solution posing type is one of the learning model that involves students actively in teaching learning process. This learning model requires students to make their own questions and answers based on the questions given by the teacher [15] [16]. Based on Silver's opinion [17], the application of learning model problem posing type of pre-solution posing is as follows:

a. Describing content
   The teacher explains the material to the student if necessary to clarify the concept of using, in this step the teacher provides the student with a code.

b. Illustrating the problems
   The teacher gives examples of problems, with problem posing model of pre-solution posing type that gives stimulus such as a picture, story, diagram, exposure and others, then students illustrate problem / describe problem given by identifying given stimulus.
c. Creating problems
Teachers provide practice with problem posing model of pre-solution posing type by relating problems related to their daily life.

d. Discussing problems
In this step, a teacher becomes a facilitator to guide the students to discuss to solve the problem. The facilitator or teacher only monitors and directs the course of teaching and learning activities, should not be involved in problem solving. It is important to cultivate students' confidence that they have the ability to solve problems themselves.

e. Discussing alternative solution
Teacher Discussed the assigned task with problem posing model of pre-solution posing type and teacher trains students to look for other possible questions from the stimulus provided. In this research, this model will be applied in physics learning.

According to the result of the research, it is found that there is influence of application of learning model of problem posing type pre-solution posing to physics learning outcome. In this study, the physics topic used is the magnetic field. In addition to applying this model in its entirety, on this experiment students do experiment in group because of the limited tools. When students do experiment. Their character can be built. The character are carefully, honestly, responsible, not manipulate data, able to work together, mutual respect, polite, open minded, creative thinking, critical, logical and able to communicate the results of the experiment.

Based on the two results of classroom action research, it can be seen if a teacher wants to develop the character in the learning. The teacher must understand the characteristics of the subject and choose the appropriate model of learning, then determine the character that focuses to be developed. It is not apart from the characteristics of students and infrastructure facilities is in school.

5. Conclusion
From the results of the discussion above can be concluded that learning is an activity undertaken by teachers programmed in instructional design that creates a process of interaction between fellow learners, teachers with learners and with learning resources. In the implementation of the learning, teachers can use various learning models designed to the characteristics of the subject to instill character, including the application of problem posing model of pre-solution posing type, collaborative model of group investigation type, therefore this model can be used in physics learning in the classroom. Through this model of learning can also be developed character of students include creative thinking, critical and logical, work carefully, honest and polite behavior and social skills such as working together and mutual respect. The character of Indonesian children can be formed in physics learning.

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