Students’ Character Development and Lecturer’s Teaching Profile in Introduction to Elementary Mathematics Class Using Logical Mathematics Materials That Based on Character Education

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Abstract

This study is following up previous one about the development of Introduction to Elementary Mathematics course materials using character education approach; which had resulted in a material about mathematical logic using character education approach which is valid, practical, and effective. The subjects are freshmen of the Department of Mathematics Education, Faculty of Teacher Training and Educational Sciences, Nusantara Islamic University, Bandung, Indonesia. This study employed qualitative action research design with practical action research type. The action research was carried out in five classroom sessions where every session was divided into four practical action research steps as follows: identifying focus area, collecting the data, analyzing and interpreting data, and developing an action plan. All classroom sessions are carried out by referring to the main materials that were previously developed; and they all implemented contextual approach based on character education stages: moral knowing, moral feeling, and moral actions. This study used the following instruments to gather the data: observation over students and instructors’ activities, questionnaires, and interview guidelines. This study has successfully found that both students’ character development and instructor’s teaching profiles dynamically improve when the instruction session implement materials that integrated character components into mathematical logic materials.

Key words: Mathematical logic, character, teaching profile, practical action research.

Introduction

Adversities that present in Indonesian community are basically direct results of poverty and ignorance which later lead to high rate of unemployment. In addition, other indicators such as crime rates, drug abuse, terrorism, mobbed rallies, and corruption are also increasing. Things get worse when those misconducts are not only conducted by low class and uneducated people, but also by those who have more proper education and possess public official status. Meanwhile, adolescents, the generation to whom the future of this nation heavily relies upon, are not only conducting misdemeanor behavior, but also felonies that cause many loss of life. In short, moral conditions of this nation are in lowest level nowadays.

Those poor conditions have drawn attention of government which then took initiatives to prioritize character development in the development plan of the nation. As the consequence, every step taken to develop the nation must bear efforts to give positive impacts on characters. As an institution considered being the most responsible to the issues of character, the Ministry of National Education has urged all schooling levels to implement and integrate character education in their programs. The character education includes a focus on intellectual curiosity and polite behaviors that are implemented through habituation and intervention. Thus, it is expected that the program could result in a school culture that nurture the development of good characters.

There are various notions of character, one of them according to the Government of the Republic of Indonesia, “Characters are special values (knowing the value of kindness, willing to take good actions, realizing it in real life, and giving impacts to surrounding environment) that are planted and exhibited through actions” (Pemerintah Republik Indonesia, 2010, p. 7). Meanwhile, with respect to character education, Public Schools of North Carolina (2006, p. 2) said that “Character education is a national movement creating schools that foster ethical, responsible, and caring young people by modeling and teaching good character through emphasis on universal values that we all share.”
In relation to the development of nation’s characters and cultures, the Ministry of Education, Kementrian Pendidikan Nasional (2010, p. 6) claims that “the process of values development have become the foundation of characters and it requires sustainable actions, integrated to all subjects (Citizenships, History, Geography, Economics, Sociology, Anthropology, Indonesian language, Social Studies, Science, Mathematics, Religion Classes, Physical Education, Arts, and Sports).” Clearly, character development is not merely a responsibility of Citizenship and Religion teachers; rather, it needs to be developed across all subjects.

The aforementioned conditions have triggered the researchers to develop learning materials that integrate character education into mathematics. In a research and development process in 2012-2013, a study has successfully developed a mathematical logic learning materials that integrate character education. The materials will be used in the first semester to the freshmen. This study expects that the students will have awareness of noble characters since the first day of study; and they will keep up the good character and develop it further with other noble characters through studying mathematics.

The learning materials have been tested for their validity, practicality, and effectiveness. Mathematical logic materials based on character education approach have explicitly integrated character of honest, discipline, and hard work. In general, the integration of character education in mathematical logic learning materials include the character of honest and discipline that integrated in: statements and their truth, operations on statements, and also in argument and deductive method topics. Meanwhile, the character of hard work was integrated in the argument and deductive method topic.

In 2015, the researchers continued the study by doing followed up research intended to answers the following questions: 1) How were the characters of students who learned Introduction to Elementary Mathematics using mathematical logic materials? 2) What profile of a lecturer teaching that could develop good character in students?

Research Method

Answers to the questions will be described in more qualitative ways. The objective of qualitative research is “to describe and possibly explain events and experiences, but never to predict” (Willig, 2008, p. 9). The qualitative research method being used was referred to action research design. According to Mills (Cresswell, 2012, p. 577), “action research designs are systematic procedures done by teachers (or other individuals in an educational setting) to gather information about, and subsequently improve, the ways their particular educational setting operates, their teaching, and their student learning”. More specifically, the type of action research used is practical action research which according to Creswell, (2012, p. 579), “is a research when teachers seek to research problems in their own classrooms so that they can improve their students’ learning and their own professional performance. Teams composed of teachers, students, counselors, and administrators engage in action research to address common issues such as escalating violence in schools. In these situations, educators seek to enhance the practice of education through the systematic study of a local problem.”

In general, there were three phases in this study: preparation, implementation, and report writing. Preparation phase started before the formal class session began; implementation phases was conducted in five stages/lectures, and the last phase was report writing. The implementation stage refers to the 4-step practical action research, as seen in the picture below

![Figure 1. Picture of Practical Action Research (Mills, in Cresswel, 2012, p. 581)](image)

Identification of focus areas was conducted in the planning stage where the objectives of the research were being formulated. Data collection was then collected in every session by using observation sheets equipped with video recording and questionnaires in the end of the fifth session. In the end of every session, lecturer and observer made discussions intended to analyze and interpret the data. Reflections
over the analysis results led to another step of action and identifying a new focus area. The four steps were taken respectively until the fifth session, and the study was concluded by composing the report.

**Instruments and Data Analysis**

The data was collected through questionnaires, observation sheets, and interviews. These varied method of data collections intended to get more detail and accurate information about the topic being investigated. Questionnaires and observation sheets for students were developed to capture the character the students developed when studying Introduction to Elementary Mathematics. Meanwhile, observation sheets for lecturer’s activities were intended to capture the profile of teaching of the lecturer. In the observation sheets, there was a blank space intended to put anecdotal record that captures the behaviors that indicate students’ or lecturer’s characters. As a complement, interviews were held to get more accurate data.

Based on the results of questionnaires and observation, this study analyzed the students’ character; and conclusion was drew by referring to concepts identified Supinah and Parni (2011) as follows: Not Seen, meaning that the students have not yet indicated early signs of characters indicators described; Began to being Seen, meaning that the students have begun to exhibit early signs identified by indicators; Started to Develop means that the students have exhibited behaviors in accordance to indicators; Developed means that the students have frequently exhibited the behaviors that are consistent with the indicators; and Habituated or become norms means that the students have continuously exhibited the behaviors that consistent with the indicators.

The analysis on the lecturer's profile was conducted by referring to the steps taken in Contextual Teaching and Learning and included three steps of character education identified by Lickona (1991), they were respectively: moral knowing, moral feeling, and moral action. The lecturer was considered to complete one step of learning activity when he has reached at least 75% of all indicators that has been previously determined.

**Setting and Subjects**

This study took place in the Faculty of Teacher Training and Educational Sciences, Nusantara Islamic University, Bandung, Indonesia. The subjects were freshmen in the Department of Mathematics Education in Academic Year 2015-2016.

**Finding and Discussion**

In classroom, there are two lecturers: one acts as instructor and the one as observer. After the class is over, both lecturers held a post-observation discussion to criticize about the class session and identify both students’ character and lecturer's profile of teaching. In the sections to follow this paper will provide more thorough discussion about the findings by referring them to the previously formulized problems.

**Students’ Character**

The following table presents the overall analysis results of the observation sheets over students’ characters in every session and it has been cross-analyzed with the data taken form questionnaires and interviews.

<table>
<thead>
<tr>
<th>Session</th>
<th>Honest</th>
<th>Discipline</th>
<th>Hard Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session 1</td>
<td>Not seen</td>
<td>Not seen</td>
<td>Not seen</td>
</tr>
<tr>
<td>Session 2</td>
<td>Started to develop</td>
<td>Seen</td>
<td>Not seen</td>
</tr>
<tr>
<td>Session 3</td>
<td>Started to develop</td>
<td>Started to develop</td>
<td>Started to develop</td>
</tr>
<tr>
<td>Session 4</td>
<td>Developed</td>
<td>Developed</td>
<td>Started to develop</td>
</tr>
<tr>
<td>Session 5</td>
<td>Become norms</td>
<td>Become norms</td>
<td>Become norms</td>
</tr>
</tbody>
</table>

In general, the three characters integrated in mathematical logic material have been improved in students from one session to others. This is due to the fact this study situated character education based on Lickona’s (1991) principle as follows: moral knowing, moral feeling, and moral action respectively. This principle identifies that the honest character developed in the first session keep developed in the next sessions until it reaches the highest level as become norms or habituated in the fifth session.
The character of honest has been integrated in statements and their truth topic was introduced in the first session. By then, the students have already in the stage of moral knowing condition. In the second session, students were introduced to enlightening story about the greatest Prophet Muhammad PBUH, a great example of honesty and one who possess the noblest character of all. Students are also accustomed to read and appreciate the meaning of Asmaul Husna before the session began. These efforts had brought the students to the stage of moral feeling. In the following sessions, students were conditioned to act honest when doing assignments and tests. Here, the students have arrived to the stage of moral action. The same approach was also implemented to the character of discipline and hard work. The more immediate one character being integrated, the bigger chance the students will have to possess the character in higher level.

In addition to the three characters that were explicitly integrated into mathematical logic material, the study also found another three characters: curiosity, self-confidence, and respect to others. The students developed the three characters in themselves. This can be explained by the opinion of Sam and Ernest (1997) which describe that the values about mathematics education include accuracy, systematicness, rationalism, accuracy, being analytical, rationalism; compassion, integrity, moderation and gratitude; curiosity, thriftiness, patience, trust and creativity. Although the findings of this study do not exactly confirm to Sam and Ernest explanation about character education, they consistent with Dede’s (2006, p. 86) claim that “teaching mathematics educational values may show difference results according to countries, cities, school types, and grades.”

**Lecturer’s Teaching Profile**
The following table presents observation results over activities conducted by lecturer in every session:

| Table 2. Observation results over activities conducted by lecturer in every session |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Teaching using contextual learning scenarios and based on character education principles | Very good | Very good | Very good | Good | Good |
| Become the model of character education | Good | Very good | Very good | Very good | Very good |

**Note: S means session**

Of the five sessions, only in two sessions did the lecturer marked as “Good” for his teaching activities, and one time for character education modeling. The lecturer was marked as “Very Good” for his teaching activities in three sessions, and in four sessions for character education modeling. This achievement was gained due the well-prepared instruction scenarios that included teaching materials and modeling. Another thing that supported this successful implementation of character education was that the university provides supportive environments that have helped in shaping students’ noble characters as it has become the major ideas of the establishment of the university. Another important finding was the way how the lecturer used impromptu moments to integrate character values into his teaching.

The findings of this study are consistent with Sabandar’s (2011, p. 11) explanation that "it is expected that mathematics characteristics will also have impacts in forming good characters of the learners, especially when the teachers as well as the learners are ready to notice a right momentum in modeling and in forming the intended good characters. At the same time those characters identified in the process of learning should be well communicated by the teachers to the learners continually."

**Conclusion**
The study drew conclusions that Introduction to Elementary Mathematics delivered using contextual basis and referred to character education integration into mathematical logic could improve students’ characters in the following ways:

1. Students’ characters develop through the following paths: honesty and discipline develop into become norms or habituated level and hard work develops in the level start to develop. In addition to the three characters intentionally developed, this study also found other characters developed, they were: curiosity, self-confidence, and respect to others.

2. Lecturer’s teaching profiles that could improve students’ character were teaching using contextual approach in which she implemented impromptu moments to integrate character education into her teaching. Specifically, the use of learning materials to develop character followed the following scenarios: moral knowing (knowing the value cognitively), moral feeling (understanding the value affectively), and moral action (implementing the value in real action). Moral knowing was achieved
by integrating character education into certain chapters in the materials. Moral feeling was integrated through reflection on every step taken to implement moral knowing that was strengthened by the story of the noblest human being ever, Prophet Muhammad PBUH, and the reading of Asmaul Husna before the session began. Meanwhile, moral feelings were achieved through providing models or examples of character by the lecturer and consistently adhere to the rules that governed the teaching and learning sessions.

References


