THE EDUCATIONAL VALUES THROUGH THE HOLISTIC MATHEMATICS EDUCATION (HME) MODEL BASED ON AMONG SYSTEM IN LOW CLASSES

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Abstract: A good education in low-classes does not only aim to foster an academic aspect, but also establish a non-academic side in order to have good personality and characters. Hence, mathematics is one of the sciences that is appropriate to develop all of these potentials. Some prior research results have delineated that mathematics is not only effective to expand students’ intelligence, but also form learners’ characters. Therefore, this paper presents that the Holistic Mathematics Education (HME) model based on among system is one of the educational values used to develop students’ characters in low-classes.

Keyword: Holistic Mathematics Education, Value Education, Among System

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INTRODUCTION

Educational values plays an important role in realizing human beings with dignity and character (Kusumaningsih, Darhim, Herman, & Turmudi, 2018; Ym, 2017). Formal education is one of the educational pathways that can develop educational values for students (Windrati, 2011). One of them is Elementary School. It is very important to develop educational values in low grades to face a world, that full of challenges (Sudaryanti, 2012; Sundaresan & Kala, 2015; Wuryandani, Maftuh, .., & Budimansyah, 2014), because low grades are the foundation that can strengthen positive values in students, that are very useful for the next stage. Other studies also explains that schools must contribute to the development of students’ values education (Hakam, 2018), because educational values can provide opportunities to deepen teacher-student relationships, make learning more effective, and can create a good learning environment (Benninga, Berkowitz, & Kuehn, 2003; Berkowitz, Battistich, & Bier, 2008; Bryk & Schneider, 2002; Lovat, Clement, Dally, & Toomey, 2010; Newmann, 1996). Mahatma Gandhi and Theodore Roosevelt (Khaidir, 2012) also stated that the success of a country is determined by the quality of its character. For this reason, good education at an early age is not only to develop academic potential, but also to develop the potential to have a noble personality and character as the goals of national education (Sisdiknas, 2003). Other studies also explain that educational values at an early age are very important so that students are able to face challenges in the outside world (Sudaryanti, 2012).

Mathematics is one of the branches of knowledge, which not only aims to improve students’ intelligence but also form students’ characters (Soedjadi, as cited in Rohana, 2012; Williams, Yanchar, Jensen, & Lewis, 2003). Every aspect of students’ potentiality requires mathematics’ skills and comprehension in every situation, offering positive changes for students in upcoming stages (Anthony & Walshaw, 2009; Asman & Markovits, 2009; Markovits, 2011).

Based on the condition above, teaching mathematics in low-classes is not only integrated to develop students’ understanding of the mathematical concept, but also establish students’ characters and motivation. Mathematics teaching trains students to think logically, consistently, analytically, systematically, communicatively, responsibly, critically, creatively, and cooperatively due to the three aspects above. This view is supported by researches conducted by Soedjadi (as cited in Rohana, 2012) and Williams et al., (2003), postulating that teaching mathematics and other courses as a teaching tool is not only applied to achieve a single goal like educating students academically, but also form students’ characters. Consequently, the teaching process could transform people to be insightful and well-characterized, which adhere to the main goal of a contemporaneous education. The aim above can be achieved by offering students real experiences concerning the issue of mathematics (Williams et al., 2003). Another research also informs the importance of teaching mathematics contextually, in which it is only beneficial to improve students’ understanding, but also it is relevant to the demands of the 21st century (Lutfianto, Zulkardi, & Hartono, 2013; Widjaja, 2013).

Students in Lower grade prefer to see things as a whole. Some of the results of previous research, holistic education, especially in learning mathematics can develop character values for students (Rahmatul Hayati, 2018b, 2018a; Rahmatul Hayati, Fauzan, Iswari, & Khaidir, 2017, 2018, 2019). Thus, in this paper, the author will describe how educational values through mathematics learning in lower grades uses the HME Model based on Among System which is
one of the liberating educational models because it is based on Ki Hadjar Dewantara’s educational concept, namely the Among system concept which has the principle of giving freedom and independence for students to construct their knowledge, but not out of the concept (Dewantara, 1977; Samho & Yasunari, 2013; Wiryoopranoto, Herlina, Marihandono, & Tangkiisan, 2017).

The HME model based on Among System is the concept of holistic education, because this model develops the potential of students as a whole as expected in current education (Latifah & Hernawati, 2009; Miller, 2006; Rubiyanto & Haryanto, 2010; Rudge, 2008). Through this holistic education concept, the mathematics learning provided is designed according to the characteristics of low-grade students in order to develop the potential of students as a whole. Based on the concept of Ki Hajar Dewantara, this model positions education as a guide (Putri, 2012; Wangid, 2009; Wiryoopranoto et al., 2017), and learning is adapted to the interests and characteristics of children, and children are given the freedom and independence to solve mathematical problems (Rahmatul Hayati, 2018a). The teacher acts as a tutor, where the teacher guides and directs students so that there are no conceptual errors.

The HME model based on Among System has 10 stages that must be applied in learning mathematics, namely: 1) Apperception through the surrounding environment. 2) Group discussion by utilizing the surrounding environment. 3) Group demonstration. 4) Individual exercise. 5) Mathematical modeling. 6) Individual demonstration. 7) Reflection. 8) Impressions and messages, as well as giving meaning. 9) Celebration. 10) Comprehensive assessment (R. Hayati et al., 2018; Rahmatul Hayati, 2018). So that the ten syntax models can be implemented properly, the teacher needs to develop model components so that "Freedom of Learning" can be carried out properly, namely: 1) Constructivism, 2) Nature’s Nature, 3) Independence, 4) Parables, 5) Inquiry, 6) Cooperation, and 7) Strengthening (Rahmatul Hayati, 2018b; Rahmatul Hayati et al., 2018).

**METHOD**

This research employed descriptive method. In this study, the subject or object of research will be described and explained based on the facts that appear as they are. This study will examine educational values in lower classes through the HME model based on Among System, which is a model that is able to develop students’ overall potential (intellectual, social, emotional, aesthetic, psychomotor, and spiritual potential). This research is part of the impact of the HME model based on Among System that has been developed previously. Based on the results of previous research, the HME model based on Among System is valid, practical, and effective on students’ understanding of mathematical concepts, learning motivation, and character values.

In this article, the author will describe the impact of the Among system-based HME model on value education in lower grades. The subjects in this study were third grade students at SD Negeri in Pantai Cermin District. The research instruments were in the form of interview guidelines, documentation, questionnaires and observation sheets. Data collection techniques were observation, interviews, and questionnaires. Data analysis was carried out by descriptive analysis.

**RESULT AND DISCUSSION**

Based on the previous studies conducted by (Rahmatul Hayati, 2018; Rahmatul Hayati, Fauzan, Iswari, & Khaidir, 2018; Rahmatul Hayati et al., 2019), the data got as follows:

1. Observation and Interview

Picture 1 is the result of observation of the learning process.
through the HME model based on the among system which is done by peers.

![Ketercapaian Sintak Model](image)

**Picture 1.** The achievement of Syntax model

Picture 1 is the achievement of the syntax model through HME Model based among system on low-grade students, especially in grade 3 Elementary School. Based on the results of interview with teachers and students, data is obtained that the HME model based on among system is one model that is able to develop students’ character values and it is one of the education that releases students because students are given freedom and independence to solve mathematical problems through the environment. On this activity, the teacher acts as the tutor to guide students keeping on learning.

2. Questionnaire

Table 1 is the result of the students’ assessment of character value.

<table>
<thead>
<tr>
<th>No</th>
<th>Aspects Developed</th>
<th>Character Developed</th>
<th>aspects assessed</th>
<th>Items Numbers</th>
<th>assessment results</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Intellectual</td>
<td>Honesty, hard work</td>
<td>Understand math well</td>
<td>17, 18</td>
<td>83</td>
<td>Very good</td>
</tr>
<tr>
<td>2</td>
<td>Social</td>
<td>Tolerance, social care</td>
<td>a. Helping a friend who is having a hard time</td>
<td>8</td>
<td>86</td>
<td>Very good</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>b. Respect for friends</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>c. Able to cooperate well</td>
<td>9, 20, 24</td>
<td>86</td>
<td>Very good</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>21, 22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Emotional</td>
<td>Honesty, care for the environment</td>
<td>Understand yourself and others</td>
<td>10, 16, 19</td>
<td>82</td>
<td>Very good</td>
</tr>
<tr>
<td>4</td>
<td>Estitical Potential</td>
<td>Tolerance</td>
<td>Able to communicate well</td>
<td>25</td>
<td>83</td>
<td>Very good</td>
</tr>
<tr>
<td>5</td>
<td>Psychomotor</td>
<td>Curiosity, discipline</td>
<td>Able and brave to speak well in front of the class</td>
<td>4, 6, 15</td>
<td>82</td>
<td>Very good</td>
</tr>
<tr>
<td>6</td>
<td>Spiritual</td>
<td>Honesty, religious,</td>
<td>Understand what is wrong and what is right</td>
<td>1, 3, 5, 7, 11, 12, 13, 14, 23</td>
<td>81</td>
<td>Very good</td>
</tr>
</tbody>
</table>

From Table 1, it can be seen that through the HME model based on among system, students’ character values can develop very well.

**DISCUSSION**

Based on the results of the study, it can be concluded that the HME Model based on among system for low-grade students is one model that is able to develop character values and one of the liberating models of mathematics education because in the model stage, students are given the freedom to think, be creative, and act as intended. Ki Hajar Dewantara’s educational concept is the foundation of this model.

In order to develop character values in students, in this study, the researchers took the theme "Kantin Kejajaruan". It is a canteen without a guard. In the honesty canteen, various kinds of cakes are provided with prices attached to the boxes provided. In the honesty canteen, there is also a cash box where students will be asked to enter their own money for the cake and take their own change.

In the early stages of the model, namely apperception through the
surrounding environment, the teacher motivates students by linking mathematical problems with the environment around students. In this stage the teacher not only motivates, but also provides concrete problems that are able to develop student character, so that students are able to interpret the learning content. At the next stage the teacher asks students to discuss in solving the concrete problems that have been given.

Picture 2 is a students’ activity while shopping at the honesty canteen. This activity is the second stage and when in the model stage, namely group discussions and demonstrations.

Picture 2. Students’ activities when shopping in the Honesty Canteen

In this activity, students are given the freedom and independence to shop at the honesty canteen according to their wishes with their group members. Students take change in the box provided. This activity can develop the character of curiosity, tolerance, cooperation, honesty, communicativeness, and discipline which is developed through shopping activities without a canteen guard. Honesty is a very important character to develop. The results of the study also mention that it is important to develop honest character, especially at an early age because it will affect later on to the next stage (Nikmah Rochmawati, 2018; Yasbiati, Mulyana, Rahman, & Qonita, 2019; Zulkhairi, 2017). Cooperation and mutual respect can be developed through the activity of buying cakes in the prepared honesty canteen. Religious character can also be developed through students’ attitudes when shopping at the honesty canteen. For example, students understand that although the canteen does not have a guard, one is not allowed to cheat because God Almighty always sees what is being done.

Furthermore, by discussing, students are given the freedom and independence to discuss with their group members through the surrounding environment. At this stage, students are given mathematical problems, for example buying food in the honesty canteen according to the money given and each group member is asked to solve the problems given. Each group member has a different opinion in solving problems. For example, with the money given as much as Rp. 5,000,-, each group is given the freedom to choose what they want in the honesty canteen. Through these activities, students can share knowledge, respect group members, help each other, and work together. With the guidance of the teacher, students are able to interpret the importance of honesty, sharing, helping and working together in life. This is in accordance with the concept of holistic education, which through this stage can develop intellectual, emotional, social, aesthetic, psychomotor, and spiritual potential. Based on a literature study conducted by Schuitema, Dam, and Veugelers in 2008, it can also be concluded that discussion is one of the recommended methods to improve students’ character values (Schuitema, Dam, & Veugelers, 2008).

Furthermore, in syntax 3, namely group demonstration, students are able to demonstrate their activities to the teacher and the teacher gives questions that are able to develop character values in students. For example: In the canteen there is no canteen keeper and Ananda is asked to buy goods and take his own change. Why doesn't Ananda take more than the money he has? This question is one of the
questions given to develop students' character values.

In the next model stage, to improve students' understanding, the teacher gives individual exercises to students and students are asked to make simple mathematical models so that students are familiar and able to make mathematical models of the given mathematical problems. Next, students demonstrate their results in front of the class. This can develop the character of curiosity, honesty, and self-confidence in students.

From the results of research that has been carried out through the HME model based on Among System, students are also able to interact well, are able to work together, have high curiosity, and many more character values are formed (Rahmatul Hayati et al., 2019). The educational values given in the application of the model can be seen from the syntax of the model and student books as supporting models. In the application of the model, the use of the surrounding environment is one aspect that is highlighted because it is in accordance with the characteristics of the low class who like to learn by utilizing the surrounding environment. In accordance with the developmental stages of low grade students, the environment (factors outside of school) has a greater influence on learning than the experience in the classroom (Lave, 1988; Nye, Konstantopoulos, & Hedges, 2004; Resnick, 1987; Rockoff, 2004). The educational figures (Rousseau, Jan Ligthart, Decroly, and Ki Hadjar Dewantara) are of the view that environmental factors are one aspect that is able to develop learning concepts, because children must be allowed to learn through self-initiated activities so that children have a solid understanding in learning (Rousseau in Hurwitz & Day, 2007).

According to Froebel, a German early childhood education leader, children have a good and creative nature, while Maria Montessori explains that their experience and quality of life will affect the behavior and lives of children in the future (Susanto, 2017). Furthermore, Ki Hajar Dewantara argues that children are born with their own nature and characteristics. Every child has unique characteristics because no child has the same characteristics even though conjoined twins. Every child is born with different potentials. Based on the opinions of some of these experts, it further emphasizes that the HME model based on Among System for low grade students is one of the models of value education in low grades because it can develop character values in students in low grades, and is one of the educations that liberate students. Through this model, students are given the freedom and independence to solve the problems given as the system concept among Ki Hajar Dewantara.

Educational values through the HME model based on Among System can also be developed through student books, which are one of the supporting books for the model. In the developed book, concrete mathematical problems are presented that are able to form character values in students. Picture 3 is an example of an illustration presented in a student book.

![Picture 3](image-url)

Picture 3. The Illustration in the student books

Based on picture 3 above, it can be seen that students are required to save their money since childhood so that they can manage their finances well in the future days. Through the HME model, the theme concerning the development of students’ characters is also integrated. One of the themes is “Mari Berbelanja ke Kantin
Kejujuran”. In this theme, students are assigned to answer concrete problems, leading students to be active and maintain honest values in their lives. Furthermore, picture 4 below is one of the illustrations placed in the student books concerning “Indahnya Sebuah Kejujuran”.

**Picture 4** Another illustration in the student books

Based on Picture 4, it can be seen that students are invited to be actively involved in learning. Picture 5 is an activity carried out by the teacher when guiding students.

**Picture 5.** Teachers’ activities when guiding students

From Picture 5, it can be seen that the teacher guides students during learning. Although in the among system concept, students are given freedom and independence in solving the problems given, but students are not left alone without guidance from the teacher. The goal is to avoid misconceptions.

Picture 6 is one of the jargons in the student book which aims to convince students that the importance of honesty wherever we are.

**Picture 2.** One of the jargons in the student's book which is one of the supporting models, it can indirectly convince students that the importance of honesty in life. In a book, illustration is very important. The results also explain the importance of illustration in textbooks (Basal, Celen, Kaya, & Boğaz, 2016). Without illustrations, presenting material in excessive amounts makes learning less efficient (Kuzu, 2007). Even when the text can be understood without pictures, pictures can support one's understanding in many ways (Molitor, Ballstaedt, & Mandl, 1989). Furthermore, akir also claims that, in order to create a learning atmosphere that is meaningful and easy to understand, words and images need to be presented simultaneously (Çakir, 2015). Other studies also explain that illustrations in textbooks can make children understand the characters that are formed through stories, pictures, and colors displayed (Prior, Willson, & Martinez, 2012).

Thus, the illustrations presented in the student's book greatly affect learning motivation and character values which ultimately have an impact on student achievement. This is confirmed by Shelestova and Zhetpisbayeva that simulations and illustrations play a role in elementary students' perceptions of classroom activities, namely in the form of motivation, interest, challenge and excitement (Y. Shelestova & A. Zhetpisbayeva, 2017).

Selanjutnya, Gambar 7 merupakan pernyataan yang dibuat oleh siswa tentang perasaan yang mereka rasakan selama belajar matematika melalui model HME berbasis sistem among. Ini merupakan tahapan ketujuh dan kedelapan model.
Furthermore, Picture 7 is a statement made by students about the feelings they feel during learning mathematics through the HME model based on Among System. This is the seventh and eighth stages of the model, namely reflection and impression, message, and giving meaning.

**Picture 3.** Students’ statements after the learning process

From Picture 7, it can be seen that, by studying the material through the HME Model based on among system, students are motivated in learning, and able to develop character values in students.

In order to increase students' motivation and self-confidence, at the end of the lesson, the teacher gives an award in the form of a lively applause between the teacher and students. This is an award for students because they have been able to follow the lesson well. Furthermore, to appreciate students' work, the teacher also evaluates the results in the form of individual tests at the end of the material and process assessments taken during the learning process that are in accordance with the characteristics of the HME model. At this stage, the character that develops is democratic and appreciates achievement. Thus, it can be concluded that the HME model based on among system is one of values education and liberating education for students, because in this model the teacher also develops model components, including 1) Constructivism, 2) Nature's Nature, 3) Independence, 4) Parables, 5) Inquiry, 6) Cooperation, and 7) Reinforcement.

**CONCLUSION**

The Holistic Mathematics Education (HME) model based on among system is one model that is able to develop students' potential as a whole through mathematics. Among them are intellectual, emotional, social, aesthetic, psychomotor, and spiritual potentials. The development of this potential has a positive impact on the development of student character values. The development of character values can be developed through the model syntax, namely: 1) Apperception through the surrounding environment can develop honest, curious, and respectful characters, 2) Group demonstrations by utilizing the surrounding environment can develop the character of curiosity, tolerance, cooperation, honesty, communicative, and discipline, 3) Individual exercise, mathematical modeling, and individual demonstration can develop curiosity, hard work, and honesty, 4) reflection, impression and message, and giving meaning can develop religious character, 5) Celebration and judgment holistically can develop a democratic character, and reward achievement.

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