

## Conference Paper

# Mathematics Learning Which Include with Character Values (Based on Findings at Guangxi Normal University and UNNES)

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## Abstract

Character values need to be given to students from elementary school to university. These character values can be integrated into the learning process for all fields of study, including Mathematics. The problem: How do you teach a mathematics teacher or lecturer in the Mathematics Education Study Program to integrate character values in the learning process? This study involved partner lecturer, namely Prof. Guo Yuanbing from Guangxi Normal University. As a result, tips were obtained if a lecturer wanted to integrate character values in the learning process. The tips: (1) Lecturers provide exemplary attitudes, speaks, and actions that reflect noble character. (2) Lecturers provide information to students about the character values developed by the university. (3) Lecturers insert the character values on mathematical tasks. (4) Lecturers are strongly advised to evaluate the growth of character values in students. Suggestion: Universities should provide regulations on the need for lecturers to evaluate the emergence of student character values.

**Keywords:** Character Value, Mathematics Learning, partner lecturer

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## 1. Introductions

### 1.1. Background

This article was written based on collaborative research between UNNES and Guangxi Normal University, China. This research is related to the integration of character values in mathematics learning. This research is considered important because with the strong character produced by good education, various new needs, challenges, and demands can be fulfilled or overcome. Starting in 2017, the Ministry of Research, Technology and Higher Education of the Republic of Indonesia and the Ministry of Education and Culture of the Republic of Indonesia (2017) have synergized the Character Education Strengthening (CES/PPK). There are five (5) main values of character that are developed

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as priorities of PPK movement in the world of education in Indonesia, namely: religious, nationalist, independent, mutual cooperation, and integrity. Research also wants to explore the ways of lecturers/teachers in China in integrating character values into mathematics learning.

Character is disposition, nature, morals, character, or personality that distinguishes an individual from other individuals. So, character can also be said to be the actual state of an individual, which distinguishes himself from other individuals. Character education is a form of human activity in which there is an educative action intended for the next generation. Ma (2009) and Pattaro (2016), wrote that education character needs to be given in the path of education. Thus, the tips of a mathematics teacher or lecturer in the Mathematics Education Study Program in integrating character values into the learning process need to be known, learned, and practiced.

## **1.2. Problem formulations**

The formulation of the problems that are reviewed and resolved through the description of this paper are as follows. How do you teach a math teacher or lecturer in the Mathematics Education Study Program to integrate character values in the learning process?

## **1.3. Objectives**

Along with the problems raised, the purpose of writing this article is to find tips for a math teacher or lecturer in the Mathematics Education Study Program in integrating character values into the mathematics learning process.

## **1.4. Literature review**

### **1.4.1. Definition of student character value**

Character of students is character, nature, character, or personality that distinguishes the thoughts, attitudes or actions of a student with other students. So, the character of students is the actual state of being in a student that is different between one student and another.

Whereas character education, is the conscious and planned effort of the Department of Education to realize the atmosphere and process of empowering students' potential

and civilization to build good personal or group character as citizens. Harms *et al* (2004), Xiaoman (2006), and Çubukçu (2012) wrote that character values need to be in the curriculum. Character education is a form of human activity in which there is an educative action intended for the next generation.

Thus, character education is a system that instills character values into an individual, which includes: thought, science, awareness, willingness, and action to be able to carry out these values both towards the Almighty God, himself, people others, the environment, as well as the nation and country.

#### **1.4.2. Function of character education to students**

The function of character education in students is to develop the basic potential of a student so as to have good manners, noble hearts, good behavior, and positive thinking. According to Thompson (2002), Che & Yuan (2012), and Narvaez & Lapsley (2006), the function of student character education is in principle to strengthen and build the good behavior of children of a multicultural nation that begins with education for students. In addition, character education also have function to improve human civilization in a country and good international relations in the world. Character education can be done through formal channels, through school and non-formal channels, for example through various media, including family media, the environment, government, business, or technology media.

#### **1.4.3. Objectives of character education to students**

The purpose of character education, Montonye *et al* (2013) wrote that character education for students is to form a strong nation, noble, moral, tolerant, and ready to cooperate or cooperate. In addition, character education for students will also shape the nation so that it has a patriotic spirit or likes to help others, develops dynamically, is oriented to science and technology, has faith and fear in God Almighty.

## **2. Research Methods**

The research method used is a qualitative approach. The research subjects were lecturers and students of the *Local Student Class* at *Guangxi Normal University* (GXNU) in China. One class is chosen. Class selection was handed over to GXNU researchers/partner lecturer, as International Partner Lecturer.

The data is in the form of survey results, observations, interviews, and triangulation results of research on how to integrate character values in the lecture process in the *Local Student Class at Guangxi Normal University* based on the findings of the case in China.

Analysis of the data in this study uses the rules of Matthew B. Miles & A. Michael Huberman. Miles and Huberman (2014) and Moleong (2010) suggested that data analysis includes: data reduction, data display, data interpretation, and conclusion/verification.

### 3. Research Results and Discussion

#### 3.1. Realization of integrated character education with mathematics learning

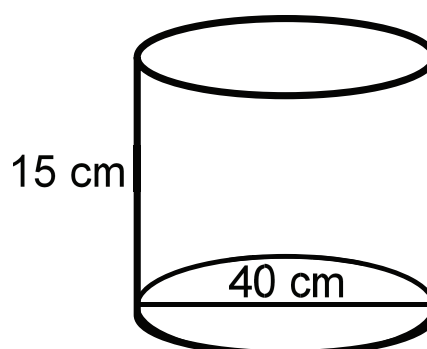
The realization of Character Education that is integrated with mathematics learning can also be implemented. The implementation can be through the provision of theory, practice questions, or through the example and actions of the teacher/lecturer in their daily lives. The following is alluded to about practice problems that are integrated with character values.

1. Integration of character values with mathematics lessons at elementary school level

**Example:**

*Do the following questions in your group. Condition so that all friends in the group participate actively in solving problems. Discuss politely. Pay attention to the following picture. If  $\pi = 3.14$ , calculate the volume of the tube.*

The expected solution:



Given :  $t = 15$  cm

$$d = 40 \text{ cm}$$

$$r = \frac{1}{2}d$$

$$\text{So, } r = \frac{1}{2} \times 40 = 20$$

$$\pi = 3,14$$

Asked : The volume of the tube?

Answer : The formula of cylinder is  $\pi \times r \times r \times t$  or  $\pi \times r^2 \times t$

$$V = \pi \times r^2 \times t$$

$$= 3,14 \times (20)^2 \times 15$$

$$= 3,14 \times 400 \times 15$$

$$= 18.840 \text{ cm}^3$$

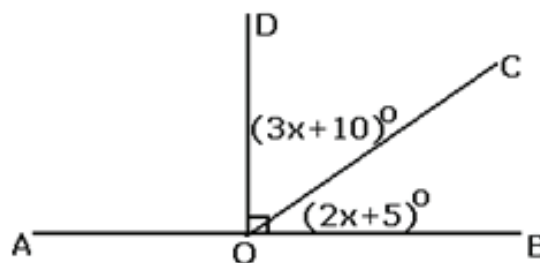
So, the tube volume is  $18.840 \text{ cm}^3$

## 2. Integration of character values in mathematics lessons at junior high school level

Example:

*Pray before working. Do the following tests independently. Dont cheat. Take care of your integrity.*

*Pay attention to the following picture!*



Calculate the measure of  $\angle BOC$ .

Expected solution:

$$\text{Given: } \angle DOC = (3x + 10)^\circ$$

$$\angle BOC = (2x + 5)^\circ$$

Asked: The measure of  $\angle BOC$ ?

Answer:  $\angle BOC + \angle DOC = 90^\circ$  (right angle)

$$2x + 5 + 3x + 10 = 90$$

$$5x + 15 = 90$$

$$5x = 75$$

$$x = 15$$

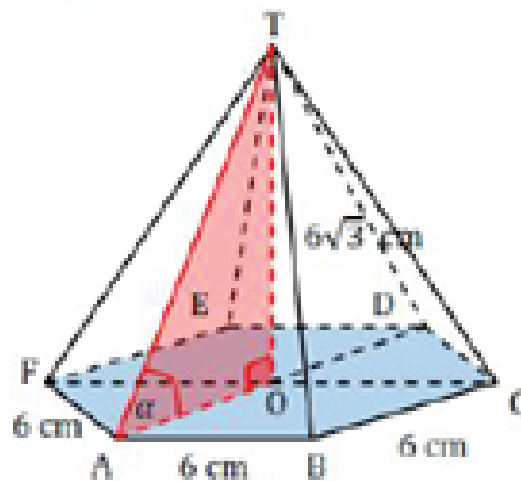
$$\angle BOC = (2x + 5)^\circ = 35^\circ$$

So, the measure of  $\angle BOC$  is  $35^\circ$

### 3. Integration of character values with mathematics lessons at high school level

Example:

*Do the following tests independently. Who can do the problem, please explain the findings in front of the class. Explain your findings in a polite and responsible manner.*



Given a regular hexagonal pyramid  $T.ABCDEF$ , the base side is 6 cm and the height is  $6\sqrt{3}$  cm.

Determine the sine value of the angle between the lateral edge and the base plane.

Expected solution:

Given :  $\triangle AOF$  is an equilateral triangle.

$AO = AF = 6$  cm. The height of the pyramid,  $TO = 6\sqrt{3}$  cm.

Asked : What is the sine value of the angle between the lateral edge and the pyramid base?

Answer : Pay attention to the  $\triangle TAO$ ,  $\triangle TAO$  elbows on O, so that:

$$\begin{aligned} TA &= \sqrt{AO^2 + TO^2} \\ &= \sqrt{6^2 + (6\sqrt{3})^2} \\ &= \sqrt{36 + 108} \\ &= \sqrt{144} \\ &= 12 \text{ cm} \end{aligned}$$

Suppose the angle between the lateral edge and the base plane is  $\alpha$ .

$$\alpha = \angle (TA, ABCDEF) = \angle (TA, AO)$$

Since  $\triangle TAO$  elbows on O, then, the sine value of angle  $\alpha$  can be calculated using the sine rule in trigonometry.

$$\begin{aligned} \sin \alpha &= \sin \angle (TA, AO) \\ &= \frac{TO}{TA} = \frac{6\sqrt{3}}{12} = \frac{1}{2}\sqrt{3} \end{aligned}$$

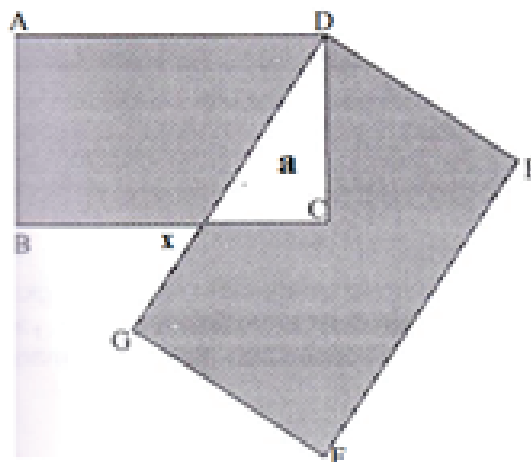
So, the sine value of the angle between the lateral edge and the base plane of the pyramid is  $\frac{1}{2}\sqrt{3}$

#### 4. Integration of character values with Geometry lectures at PT

Example:

*Do the following questions in your group. Condition your group so that all the members in the group participate actively in solving problems. Discuss politely.*

*The images beside are ABCD and DEFG images, known AB = 10 cm, AD = 24 cm, EF = 12 cm, and ED = 18 cm. What is the difference of the shaded area?*



Expected solution:

Given:  $AB = 10$  cm

$AD = 24$  cm

$EF = 12$  cm

$ED = 18$  cm

Asked : What is the difference of the shaded area?

Answer : Plane I = rectangular ABCD

Area I =  $l \cdot w$

=  $24 \cdot 10$

=  $240 \text{ cm}^2$

The shaded area of plane I is  $(240 - a) \text{ cm}^2 \dots$  (i)

Area II =  $l \cdot w$

=  $12 \cdot 18$

=  $216 \text{ cm}^2$

The shaded area of plane II is  $(216 - a) \text{ cm}^2 \dots$  (ii)

The difference of the shaded area obtained from equation (i) and (ii) that is  $((240 - a) - (216 - a)) \text{ cm}^2 = 24 \text{ cm}^2$

So, the difference of the shaded area is  $24 \text{ cm}^2$ .

## 4. Conclusions

The conclusions are (1) character values can be integrated in the process of learning mathematics; (2) tips of a mathematics teacher or lecturer of the Mathematics Education Study Program of integrating character values in the process of learning mathematics, is done by inserting character values into the command questions, government, and exemplary.

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