

CONFERENCE PROCEEDING

Development of Al-Khawarizmi Number Base Module for Gifted and Talented Muslim Students

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ABSTRACT

Science and Mathematics are very enjoyable subjects if students can learn, understand, and apply them daily. However, many students are not interested in Mathematics compared to other subjects because it requires logical thinking and proving of basic concepts, where most students find it difficult to understand. A few gifted and talented Muslim students have a poor level of achievement in Mathematics. They think that Mathematics is a boring subject and thus unimportant in daily life. The main objective of this research is to develop Al-Khawarizmi Number Base Module for gifted and talented Muslim students at Kolej PERMATA Insan, Universiti Sains Islam Malaysia. This module helps students to enhance their understanding and achievement in Mathematics. This module is divided into four themes, namely Number Basis, Complex Number, Linear Equations and Algebra. The students involved in this module are assessed through four assessment methods which are, first, students must complete all the module given based on specific topics. Second, students must play a game card based on specific topics for analyzing their speed-thinking and understanding level. Then, students are also assessed through a pre and post-test for the topics that they have learned in the module. Lastly, students should fill out a survey form to find out their level of improvement and achievement in Mathematics. Improving the understanding of knowledge of mathematics among gifted and talented Muslim students will also encourage students to cultivate the knowledge of mathematics throughout their lives as well.

Keywords: Al-Khawarizmi Module; Mathematics field; Game Card; INAQ Gifted Education

INTRODUCTION

Science and Mathematics play a crucial role in the field of science and life application, triggering innovations and creativity that contribute to a country's progress. However, many students find mathematics challenging due to its reliance on logical thinking and basic concepts. According to Safura and Norziah (2014), many students view mathematics as boring and dreadful, therefore thinking it as a useless subject. This leads to low exam results among students. Factors contributing to this lack of interest include not learning mathematics early in life, not applying mathematics in daily life, thinking less, and not practicing during free time.

Students with problems in mathematics often lack number education or counting skills before school. To understand mathematics, students need to think, do exercises, and solve problems by writing answers to each solved problem. Scratch books can help students count, think, and note down formulas and draw cipher imaginations. Additionally, students need to plan, practice, and familiarize themselves with the answer time for each solved question. For example, students should solve a simple problem within an average of one to two minutes per question. If they cannot

solve the problem within the set time, they should practice solving the same problem repeatedly until it can be solved within the set time.

METHODOLOGY

Respondents

Gifted and talented Muslim students at Kolej PERMATA Insan aged between 13 to 17 years old with a poor level of achievement in Mathematics subjects are identified. Pupils will be given focused interventions by following a series of workshops. This Mathematics strengthening workshop is held for the purpose of strengthening and solidifying the knowledge of Mathematics to gifted and talented Muslim students who are less brilliant but have the potential to excel in the field of Mathematics.

Al-Khawarizmi Number Base Module

The Al-Khawarizmi Number Base module will be given to students who are weak in Mathematics throughout the workshop. Table 1 shows the titles contained in each module. In this module, there are various exercises and examples of questions that cover four themes of number base modules, namely:

- i) Al-Khawarizmi Number Bases Module
- ii) Al-Khawarizmi Complex Number Module
- iii) Al-Khawarizmi Linear Equations Module
- iv) Al-Khawarizmi Algebra Module

Table 1. Title in each theme of Al-Khawarizmi Number Base Module

THEME/TITLE	CONTENT STANDARD
MODUL	1.1 Rational Numbers (Form 1)
AL-KHAWARIZMI NUMBER BASIS	1.2 Factors and Multiples (Form 1)
RIZ N NIC (Flash Card)	1.3 Standard Form (Form 3)
MODUL	2.1 Squares, Square Roots, Cubes and Cube Roots (Form 1)
AL-KHAWARIZMI COMPLEX NUMBER	2.2 Ratios, Rates and Proportions (Form 1)
RIZ N CUBA (Monopoly)	2.3 Patterns and Sequences (Form 2)
MODUL	3.1 Perimeter and Area (Form 1)
AL-KHAWARIZMI LINEAR EQUATIONS	3.2 The Pythagoras' Theorem (Form 1)
RIZ N LEON	3.3 Linear Equations (Form 1)
(Snake and Ladder)	3.4 Linear Inequalities (Form 1)
MODUL	4.1 Algebraic Expressions (Form 1)
AL-KHAWARIZMI ALGEBRA	4.2 Factorisation and Algebraic

RIZ N ALEX

Fractions (Form 2)

4.3 Algebraic Formulae (Form 2)

4.4 Indices (Form 3)

The teacher will comprehensively explain the topic to students before beginning the exercises. Students will complete all module questions and exercises and discuss them in groups. A facilitator among intelligent Muslim students with an excellent level of achievement in mathematics will be appointed for each group, and each group will play a designated game for all four modules. Each student will be evaluated individually through a test for their understanding of the module. Their scores will be recorded for comparison and analysis. Each student will receive a survey questionnaire to evaluate and comment on the workshop's implementation. This approach aims to enhance students' understanding and achievement in mathematics.

RESULTS AND DISCUSSION

Smart intelligent Muslim students who are weak in mathematics will be identified at Kolej PERMATA Insan. The students involved are given a focused intervention by following a series of workshops to strengthen and solidify the knowledge of mathematics to intelligent and intelligent Muslim students. Students will be divided into several groups consisting of various ages and levels. Mathematics subject teachers will be appointed as guidance teachers and each group of students will be assigned a facilitator. Facilitators are students who have achieved excellent results in mathematics and are appointed by subject teachers.

Al-Khawarizmi's Basic Number Module is the first module that will be used for intelligent students who need focused intervention: Rational Numbers, Factors and Multiples, and Standard Form. Pupils are required to complete all the exercises and assignments found in this Al-Khawarizmi Basic Number Module throughout the workshop with the help of facilitators and mentor teachers.

In addition to that, students will also be tested with a card game named "Find and Match: Al-Khawarizmi Robot of Number (Riz and Ron)". This card game contains every topic found in the module, and the main purpose of this game given to the students is to see the student's thinking speed and understanding of the topics that have been discussed in this module. In this game, students must find a group of cards according to the objective of the content of each topic. Students must follow the game conditions that have been set, spend their cards fast, and they will be declared as winners.

CONCLUSION

Mathematics education is supposed to help and guide students to understand mathematical concepts, processes, and techniques and develop the ability to solve various mathematics problems (Mardiah and Nurzatulshima, 2020). Therefore, The Al-Khawarizmi Number Base module aims to improve mathematical knowledge among gifted and talented Muslim students at Kolej PERMATA Insan, Universiti Sains Islam Malaysia. The module will strengthen and solidify knowledge for students who struggle with mathematics, aiming to produce Muslim scholars who excel in Mathematical Sciences (Subani et al., 2021). The effectiveness of this module will be

analysed to develop future-ready Muslim scholars, aligning with the Kolej PERMATA Insan Strategic Plan and Malaysian Education Blueprint (PPPM 2013-2025).

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