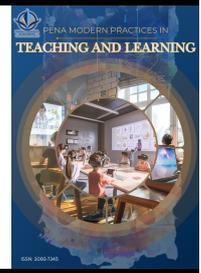




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Efficacy of Concept Mapping on Islamic Education Achievement Among Year 4 Students in Kuala Nerus

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ABSTRACT

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This study was conducted to evaluate the effectiveness of concept mapping compared to traditional teaching methods on the achievement of Islamic Education among Year 4 students in Kuala Nerus. The main objective of the study was to analyze the differences in students' academic achievement before and after the implementation of both methods, as well as to identify the level of student understanding. This research used mixed methods design, combining qualitative (pre- and post-form open-ended question questionnaires) and quantitative (four-point Likert scale questionnaire) approaches. The study participants consisted of 100 Year 4 students from two primary schools selected through purposive sampling. The study findings showed that the group that used the concept mapping method recorded a much more significant increase in achievement (46% increase in School A) compared to the traditional method group (16% increase in School A). The same pattern was also observed in School B (pp. 8-9). Descriptive analysis of student perceptions also showed high mean scores for the aspects of understanding (mean=3.20), memory (mean=3.29), and confidence (mean=3.12), although the aspect of seeing the relationship between concepts recorded a moderate score (mean=2.80). The study's conclusion confirmed that concept mapping is a more effective and meaningful pedagogical approach, in line with Ausubel's Meaningful Learning Theory, in systematically improving academic achievement and conceptual understanding compared to traditional methods.

1. Introduction

1.1 Background of the Study

The background of this study highlights the challenges in the teaching of Islamic Education in primary schools in Kuala Nerus, where traditional instructional approaches such as lecture-based teaching remain dominant, leading Year 4 pupils to rely on rote memorisation without achieving deep conceptual understanding [1]. Concept mapping, grounded in Ausubel's theory of meaningful

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learning, has been proven to enhance students' academic achievement through the visualisation of conceptual relationships in subjects such as science and Islamic Education [2]. Besides, A growing empirical literature indicates that concept mapping has a positive effect on student achievement across disciplines and educational levels. Recent meta-analytic syntheses report moderate to large effects: a 2025 meta-analysis focusing on STEM reported a moderate overall impact ($ES \approx 0.63$) and highlighted stronger effects when students constructed maps themselves and when used in inquiry-based contexts [3]. This study, therefore, compares the effectiveness of concept mapping and traditional teaching methods in improving achievement in Islamic Education, in line with the Malaysian curriculum's emphasis on high-order thinking skills [1].

1.2 Problem Statement

Year 4 pupils in Kuala Nerus have limited exposure to the use of concept mapping in classroom instruction, resulting in insufficient deep understanding of Islamic Education concepts and lower academic achievement compared to outcomes associated with more structured instructional approaches [1]. Traditional teaching methods fail to foster complex conceptual relationships among key components such as aqidah, ibadah, and akhlaq, leading to mechanical memorisation without meaningful application [4]. Accordingly, this study compares the effects of concept mapping and traditional instructional methods in addressing these issues [2].

1.3 Research Objectives

The objectives of this study are: i. to analyse the differences in pupils' academic achievement before and after the implementation of concept mapping and traditional teaching methods in Islamic Education; ii. to study the level to enhance the level of understanding among Year 4 pupils in the subject of Islamic Education through the use of concept mapping. These two primary objectives align with the need to promote deep conceptual understanding and to compare the effectiveness of visual instructional strategies with conventional teaching methods.

1.4 Research Gap

Although concept mapping has been shown to be effective in secondary-level Islamic Education and primary-level science education, there is a lack of studies that specifically compare concept mapping with traditional instructional methods for Year 4 pupils within the Malaysian Islamic Education context, particularly in Kuala Nerus [1]. Most existing research has focused on higher educational levels or different subject areas, leaving a clear gap in the application of concept mapping for primary Islamic Education, which emphasises abstract and interconnected concepts [2].

1.5 Significance of the Study

Many teachers continue to rely on rote memorization, which may limit conceptual understanding among younger learners. According to Zakaria *et al.*, [5] By demonstrating how concept mapping can enhance achievement, this study supports teachers in diversifying their pedagogy and aligning classroom practices with 21st-century learning approaches that emphasize active learning and cognitive engagement. It also serves as a guide for teachers to design more effective lesson plans and instructional materials for Islamic Education. This study contributes to the field of Islamic Education by providing empirical evidence on the effectiveness of concept mapping as an instructional strategy,

thereby enabling teachers in Kuala Nerus to integrate this approach to achieve improved conceptual understanding and higher academic achievement [1]. In addition, the study addresses curricular gaps by proposing a visual-based instructional strategy that enhances pupils' thinking skills and overall academic performance [2].

1.6 Literature Review

This literature review discusses theories, empirical research, and prior findings on the effectiveness of concept mapping in improving the academic achievement of school students. In the context of Islamic Education, Year 4 students need to understand interrelated concepts such as aqidah, worship and morality, manners, and sirah. Therefore, concept mapping has the potential to help students see the relationship between ideas and understanding in a clearer and more organized way. This study assesses the extent to which concept maps can improve Year 4 students' achievement in Kuala Nerus.

1.6.1 Theoretical basis supporting the use of concept mapping

The use of concept mapping dates back to Ausubel's [6] 'Meaningful Learning Theory', which emphasizes that new information must be linked to existing cognitive structures for learning to be more efficient and meaningful. Ausubel further emphasizes that effective learning occurs through the process of subsumption, which is the incorporation of new information into existing knowledge categories. Concept mapping facilitates this process because it builds a clear network of relationships between main concepts and subconcepts. In addition, Novak and Cañas [7], who developed concept mapping as a formal pedagogical tool, added that concept maps can visually show students' cognitive structures and promote reflective learning. They explain that meaningful learning occurs when students connect concepts hierarchically and build non-linear understanding. This is very relevant to the field of Islamic Education, which requires an integrative understanding between dalil, jurisprudence, manners, and applications in life.

1.6.2 The effectiveness of concept mapping in general education

Several international research studies have shown that concept mapping can improve students' understanding, memorization, and achievement in various subjects. Based on a metaanalysis study of concept mapping from Thamrin *et al.*, [8], it was found that using concept mapping for learning will be more varied. The selection of learning using concept mapping is in accordance with the learning objectives. Combining concept mapping with other learning methods will result in better results compared to those that are not combined. In another study, Abdul Waheed *et al.* [9] found that concept mapping is a technique for developing associations between concepts and their relationships. Research studies show that concept mapping can be chosen as the best option for teaching because it produces the desired results every time.

1.6.3 Concept mapping application in Islamic Education

The use of concept mapping in research has begun to attract the attention of Islamic Education researchers because of its suitability for content that requires mastery of related concepts. According to Lenny [10], her research shows that the lecturers of Islamic Religious Education courses chose to use the concept mapping model to help students achieve the predetermined learning objectives. In

addition, the results of Zarina's *et al.*, [11] study show that the “i-THINK Concept Mapping” not only needs to be applied to the Islamic Education subject under the title of Tayammum, but also needs to be used as a useful thinking tool and should be applied by all subject teachers in schools to improve the quality of student learning.

1.6.4 Concept mapping and academic achievement

Several empirical studies have found that concept mapping has a positive relationship with academic achievement. According to Romero *et al.*, [12], concept mapping has long been recognized as an effective teaching technique to support meaningful learning and has become an increasingly important field of study. Meanwhile, Marzetta *et al.*, [13] argue that the diverse and adaptive nature of concept mapping enables it to support a variety of students and learning styles. Using concept mapping is also an effective reading comprehension strategy for low-achieving students. The visual nature of concept mapping makes it more effective than text or verbal methods in increasing understanding, retention, and use of information. In fact, concept mapping is also a suitable tool for analyzing thought patterns and detecting conceptual errors among high-achieving students. Concept mapping is suitable for use in understanding how students connect, organize, and structure concepts.

2. Methodology

2.1 Research Design

This study employed a mixed-method research design, integrating qualitative and quantitative approaches to examine the efficacy of concept mapping in Islamic Education among Year 4 students in Kuala Nerus. The mixed-method approach was selected to provide a comprehensive understanding of the intervention by capturing students’ learning experiences and conceptual understanding through qualitative data, while quantitatively measuring students’ perceptions of concept mapping [14].

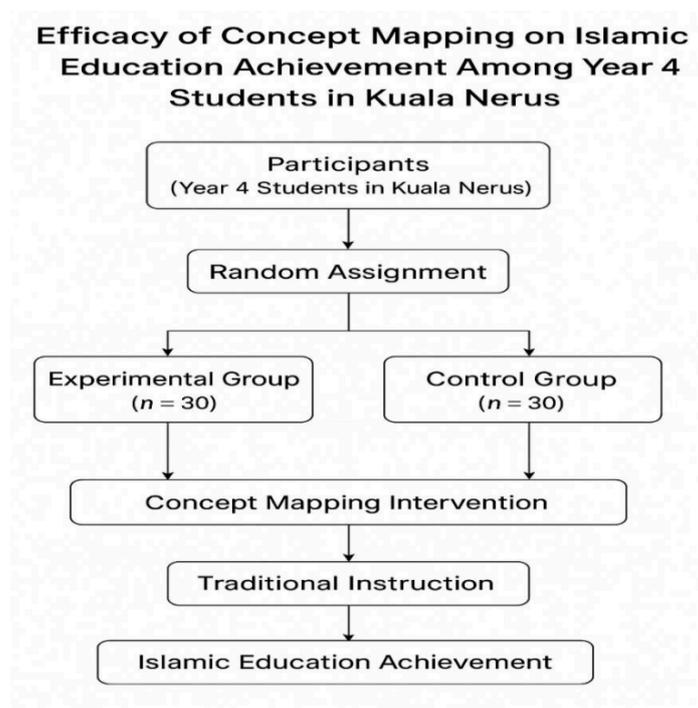


Fig. 1. Flowchart of the study process

2.2 Study Participants

The study participants consisted of Year 4 students in two selected primary schools in Kuala Nerus, Terengganu. The sample selection was done using purposive sampling based on the students' involvement in Islamic Education subjects and their suitability for the implementation of the concept mapping intervention. The involvement of 100 students in two schools was voluntary, and they received permission from the school.

2.3 Research Instruments

2.3.1 Pre and post forms (qualitative)

Qualitative data were collected using pre- and post-forms containing several open-ended questions. The pretest aimed to identify the initial level of students' understanding, learning experiences, and difficulties encountered in Islamic Education subjects before the use of concept mapping and traditional learning. The post-form was used to assess changes in students' understanding, learning experiences, and views after using the concept mapping learning method and traditional learning methods.

2.3.2 Likert Scale questionnaire (quantitative)

Rensis Likert developed a psychometric scaling method in 1932 that is widely used in research questionnaires to measure respondents' attitudes, opinions, or perceptions [15]. The quantitative instrument in this study was a four-point Likert scale questionnaire developed to measure the perceptions of fourth-year students on the effectiveness of using concept mapping in Islamic Education learning. This four-point Likert scale was used without neutral options to encourage students to make clear choices for each statement presented. The measurement scale used was as follows: 1) Strongly Disagree, 2) Disagree, 3) Agree, and 4) Strongly Agree. This questionnaire contained several items that covered aspects of concept understanding, interest in learning, and student involvement during the teaching and learning process using concept mapping.

2.4 Data Collection Procedure

The data collection process was carried out in three phases. The first phase involved the distribution of pre-forms before the use of the concept mapping learning method and traditional learning methods were implemented. The second phase was the implementation of the concept mapping strategy in teaching Islamic Education. The third phase involved the distribution of postforms and Likert scale questionnaires after the use of both learning methods was completed. Ethical aspects of the study, such as confidentiality of information and respondent consent, were fully complied with.

2.5 Data Analysis Methods

The tests were reviewed and analysed based on the scores achieved by students from the groups involved in producing an understanding of the purifying types of water. Data were collected and analysed by using the Pre and Post Forms and Likert Scale Questionnaire.

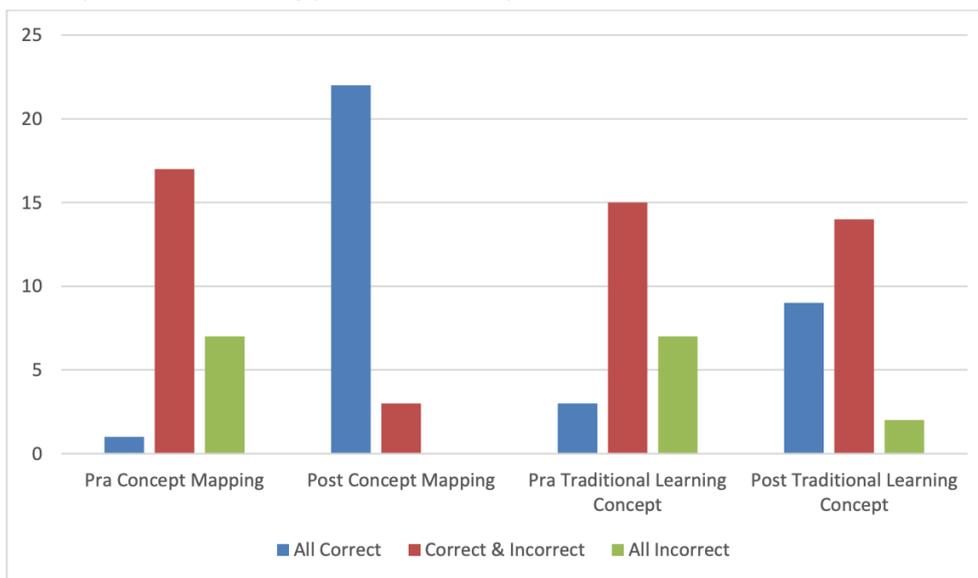
3. Results and Discussion

3.1 Description of Findings Based on Research Objectives

This analysis addresses the two main objectives of the study to evaluate the effectiveness of Efficacy of Concept Mapping on Islamic Education Achievement Among Year 4 Students in Kuala Nerus

3.1.1 Analyse the differences in pupils' academic achievement before and after the implementation of concept mapping and traditional teaching methods in Islamic Educationalize

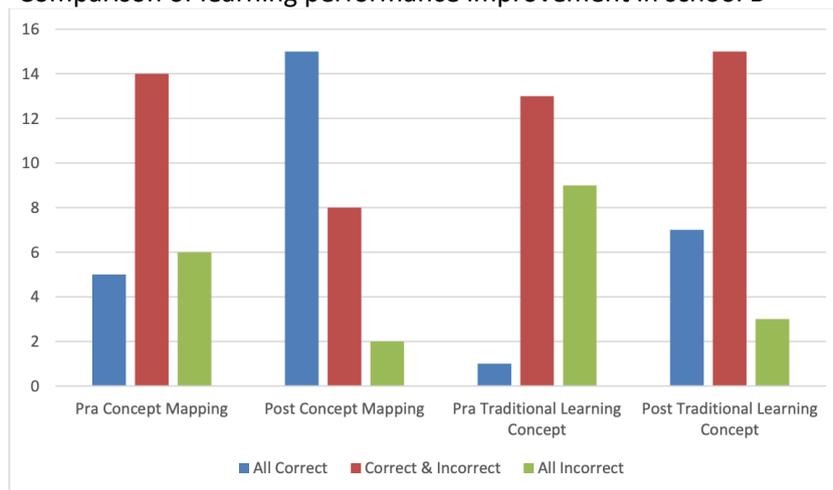
Table 1
 Comparison of learning performance improvement in School A



Based on the analysis of pre-test and post-test results, the findings showed that the group that followed the concept mapping method recorded a much more significant increase in achievement compared to the traditional learning group. In the pre-test, only one student achieved all correct category, while the majority were in the correct incorrect and all incorrect categories. However, after the concept mapping intervention, the number of students who achieved all correct increased significantly to 47, with only a small number in the correct incorrect category. Overall, this group showed an increase of 46%, which reflects the effectiveness of the concept mapping method in helping students understand and relate learning concepts more systematically and meaningfully. On the other hand, the traditional learning group also showed an increase in performance, but at a more moderate level. The pre-test results showed that the majority of students were in the correct, incorrect, and all incorrect categories, with only three achieving all correct. After traditional learning was implemented, the number of students achieving all correct increased to 19, while there were still some students in the correct incorrect and all incorrect categories. The overall increase recorded by this group was 16%, which is much lower than that of the concept mapping group. This comparison clearly shows that the concept mapping-based learning approach is more effective in improving student achievement compared to traditional learning methods. The graph displayed shows the difference in percentage improvement between the two groups, thus reinforcing the finding that concept mapping has a greater impact on improving student understanding and learning achievement.

Based on the graph and analysis of the pre- and post-test results for School A, the findings show that the group that followed concept map-based learning recorded a very significant increase in achievement compared to the traditional learning group. The 46% increase in the concept map group, especially the sharp increase in students in the “all correct” category, proves that this approach is effective in helping students understand concepts comprehensively and systematically. This finding is in line with the Meaningful Learning Theory put forward by Ausubel, which emphasizes that learning becomes more effective when new information is connected to existing cognitive structures [5]. The use of concept maps has facilitated this process of association by visualizing the relationship between main concepts and subconcepts, thus increasing student understanding. In addition, the findings of School A also support the view of Novak and Cañas that concept maps help to build a hierarchical structure of knowledge and promote reflective learning [6]. The significant improvement in student performance shows that concept maps not only help to reduce conceptual errors but also enable students to answer questions more accurately and completely. These results are also consistent with the findings of previous empirical studies that found that concept maps are more effective than traditional methods in improving academic achievement, especially among primary school students.

Table 2
 Comparison of learning performance improvement in school B



Based on the graph shown, the comparative analysis of student performance for the concept mapping group and the traditional learning group can be clearly detailed through the results of the pre-test and post-test. For the concept mapping group, the pretest showed that the number of students who answered all correctly was low, while the majority were in the correct and incorrect and all incorrect categories. However, after the concept mapping intervention was implemented, there was a significant increase in the post-test when the number of students who achieved all correctly increased significantly, in addition to a clear reduction in the correct and incorrect and all incorrect categories. This pattern shows that the use of concept mapping has helped students build a more structured and in-depth understanding of concepts. In contrast, for the traditional learning group, the pre-test results showed that the majority of students were in the correct and incorrect and all incorrect categories, with only a small number achieving all correct. Although the post-test showed an increase in the number of students answering all correctly and a decrease in all incorrect category, the increase was more modest compared to the concept mapping group. Overall, this comparison shows that both learning approaches contribute to improving student achievement, but

the concept mapping method proved to be more effective in improving students' understanding and ability to answer questions completely correctly compared to the traditional learning method.

For School B, the graph analysis showed a similar pattern of findings, albeit with different levels of improvement. The concept map group still showed a higher increase in achievement compared to the traditional learning group, especially through the increase in the number of students who achieved the “all correct” category in the post-test. This shift proves that the use of concept maps has helped students build a deeper and more structured understanding of concepts, thus reducing the number of students in the “correct incorrect” and “all incorrect” categories. This finding is in line with the study by Muhammad Thamrin Hidayat et al., which emphasizes that concept maps are able to increase learning effectiveness when used in line with teaching objectives [7]. Although the traditional learning group in School B also recorded an increase in achievement, the increase was more modest compared to the concept map group. This shows that the traditional method still has a positive effect but is less effective in helping students understand the relationships between concepts as a whole. This finding reinforces the argument of Abdul Waheed Mughal *et al.*, [9] that concept maps are a more effective strategy because they help students build relationships between ideas [8], thereby improving understanding and academic performance. In the context of Islamic education, the findings of School B also support the study of Lenny Herlina and Zarina Ashikin Zakaria et al., who emphasized that concept maps are suitable for use in content that requires an integrative understanding of concepts, laws, and applications, thus strengthening the coherence between this study and previous literature studies [9-10].

3.1.2 Study the level to enhance the level of understanding among Year 4 pupils in the subject of Islamic Education through the use of concept mapping

This section provides a comprehensive examination of the study's findings, categorized according to established themes. The discussion integrates descriptive statistical analysis, specifically mean, median, and mode, alongside an in-depth interpretation of Year 4 pupils in the subject of Islamic Education through the use of concept mapping

Mean Score Interpretation Guide:

- i. 1.00 – 2.00 Low
- ii. 2.01 – 3.00: Moderate
- iii. 3.01 – 4.00: High

Table 3
 Descriptive analysis of perception and existing knowledge

Item / Statement	Mean	Median	Mode	Interpretation
Concept mapping helps me understand the topic of Islamic education more clearly	3.20	3	4	High
I find it easier to remember important content when the teacher uses concept maps	3.29	3	3	High
Concept mapping helps me see the relationship between one concept and another	2.80	3	4	Moderate
I am more I find it easier to remember important content when the teacher uses concept maps	3.06	3	3	High
High confident in answering questions after the intervention using concept mapping	3.12	3	3	High

In summary, the descriptive analysis findings presented in Table 1 indicate that respondents' perceptions regarding the effectiveness of concept mapping as a pedagogical tool in Islamic education are at a high level. Most items recorded mean scores exceeding 3.00, specifically "Concept mapping helps me understand the topic of Islamic education more clearly" (3.20), "I find it easier to remember important content when the teacher uses concept maps" (3.29), "I am more I find it easier to remember important content when the teacher uses concept maps" (3.06), and "confident in answering questions after the intervention using concept mapping" (3.12), which are supported by median and mode values that lean towards positive values on the scale. However, the item "Concept mapping help me see the relationship between one concept and another" registered a lower mean score of 2.80, interpreted as "Moderate," suggesting that this specific aspect may require improvement or further attention in instructional implementation.

This data discussion confirms the effectiveness of using concept mapping in Islamic Education pedagogy, consistent with existing literature findings. The high mean scores across items related to student comprehension, memory, and confidence support Ausubel's Theory of Meaningful Learning, where new information is linked to existing cognitive structures for more efficient and meaningful learning [5]. These findings are in line with studies by Thamrin *et al.*, [7] and Abdul Waheed *et al.*, [8] which indicate that concept mapping is an effective technique for developing associations between concepts and improving academic achievement in general. However, the moderate mean score (2.80) in the aspect of seeing the relationships between concepts indicates a challenge in the visualisation of complex conceptual links, which slightly contradicts the argument by Novak and Cañas that concept maps can visually display students' cognitive structures [6]. This limitation may stem from the implementation method or the design of the concept maps themselves, rather than the intrinsic method, and warrants further investigation to ensure the full potential of concept mapping in integrating various components of Islamic Education such as aqidah, ibadah, and akhlaq can be realised.

5. Conclusion Overall, the results and discussion of this study prove that the use of concept mapping has a more significant impact on students' achievement and understanding in Islamic Education compared to traditional teaching methods. In School A, the concept mapping group showed an increase in achievement by 46%, with the number of students in the "all correct" category increasing significantly from 1 person during the pre-test to 47 people in the post-test, while the traditional group only recorded an increase of 16% with an increase from 3 people to 19 people in the same category. A parallel pattern of findings was also shown in School B, when the concept mapping group recorded a higher increase in achievement and a clear reduction in the "correct incorrect" and "all incorrect" categories compared to the traditional group. These quantitative findings are supported by descriptive analysis of student perceptions which recorded high mean scores for understanding (mean = 3.20), memory (mean = 3.29) and confidence in answering questions (mean = 3.12), although the aspect of seeing the relationship between concepts recorded a moderate score (mean = 2.80). In conclusion, these findings confirm that concept mapping is an effective and meaningful pedagogical approach, in line with Ausubel's Meaningful Learning Theory, in improving students' academic achievement and conceptual understanding systematically and comprehensively.

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