



# An Analysis of the Fuzzy Delphi Method (FDM) for Developing Effective Parental Guidelines in Teaching Practical Solah at Home for 6-Year-Old Children

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**Abstract.** In Malaysia, the practice of solah (prayer) is introduced to preschoolers as young as five to six years old, in accordance with the National Standard Pre- school Curriculum 2017 (KSPK) under the Spiritual Pillar: Attitude and Values, which focuses on fostering the basics of worship. While studies have shown the importance of parental involvement in their children's education, obstacles such as time constraints and lack of knowledge can hinder parents from engaging in learning activities at home. A need analysis has been conducted in the first phase of the study and confirmed that parents acknowledge the need to develop guidelines for them to help their children's solah practices at home. This paper discusses the use of the Fuzzy Delphi Method (FDM) to determine the components required for developing the guidelines for practical prayer activities for six-year-old children attending the Pra Tahfiz class. A questionnaire instrument was used to collect research data from 12 experts in Early Childhood Education, Islamic Education, and Curriculum Development, to gain consensus on the four main components for building the guidelines: Knowledge, e-Module, facilities, and rewards. Results showed that the experts accepted all these elements through the expert consensus value above 75% for each component, and the threshold value  $(d) \leq 0.2$ , and the fuzzy score  $(A) \geq \alpha$  - cut value = 0.5. The next stage of the study involves evaluating the usability of the developed guidelines and obtaining parental feedback. This research provides valuable insights into developing practical guidelines for parents to engage their children in prayer activities at home, ultimately contributing to the continuity of their religious education. The findings of this study may be useful for early childhood educators, religious institutions, and parents in promoting children's religious education.

**Keywords:** Fuzzy Delphi Method (FDM), Early Childhood Education, Parental guideline, religious education

## 1 Introduction

### 1.1 Practical salah and parental involvement

Early childhood education (ECE) refers to the educational preparation provided to children before they enter primary school at the lower level [1]. In Malaysia, ECE is categorized into two types: Taska, which is intended for children aged four years and below, and Tadika, which is the context of this paper, which is designed for children aged four to six years, aimed at developing their potential in all aspects before entering primary school. The National Preschool Standard Curriculum 2017 outlines six pillars of learning, 1. Communication, 2. Humanity, 3. Physical and Aesthetic Development, 4. Spiritual, Attitudes and Values, 5 Science and Technology, and 6. Self-Skills.

The pillar of Spiritual, Attitude, and Value focuses on cultivating an appreciation for religious practices, beliefs, attitudes, and values. Specifically for the religion of Islam, the program emphasizes the importance of basic worship practices such as performing ablutions, understanding the practice of obligatory prayers, simulating prayer, and learning about the practice of fasting. It is based on the understanding of the Hadith, narrated by Abu Daud, that children should be taught to pray when they reach the age of seven years and disciplined if they leave prayers when they reach the age of ten years, suggesting that introduction about prayer can be given as early as the pre-school level.

Studies show that consistent prayer practices from a young age form good morals and character, serving as a barrier against moral damage when children reach adolescence. Study [2] found that the increasing and escalating problems of morals and personality among teenagers are strongly related to lack of prayer practices. Several studies show that teenagers who do not consistently perform prayers are more likely to be trapped in social problems [3], leading to involvement in various negative activities such as stealing, lying, wastefulness, smoking, rape, and arrogance [4]. There are also studies showing that school students face difficulties in practicing religious practices outside of school [5]. Hence, it is clear that the importance of practicing prayer needs to be introduced and applied from preschool age to strengthen the understanding of the importance of prayer as early as six years old.

Muslim parents in Malaysia are increasingly choosing Tadika programs that integrate Islamic teachings into their children's education, providing a comprehensive approach to academic and personal development. These programs focus on fundamental skills and values, including reading, writing, arithmetic, critical thinking, language, communication, Quranic reading, prayer, and Islamic values regarding manners and personality. The aim is to provide a comprehensive education that not only develops academic skills but also instills the values and principles of Islam, preparing children for the complexities of the modern world while staying true to their faith. It is the parents' responsibility to ensure their children are educated with Islamic values, and learning based on Islamic Sharia aims to foster character building alongside technical and academic fields.

Although choosing an Islamic-based preschool is a step in the right direction, it alone is not sufficient in ensuring the holistic education of children. Parents have a crucial role to play in their child's education, not just by enrolling them in an appropriate Tadika but also by actively participating in their child's learning activities at home. According to [6], it is the shared responsibility of parents and educators to shape children's lives by providing comprehensive and suitable education. These findings are consistent with a study by [5], which highlights the significance of family and school in cultivating the personalities of children and adolescents, as emphasized by the philosophy of Imam Al-Ghazali.

## 1.2 The need for a guideline for teaching aolah at home

Parental involvement in preschool education is crucial for children's academic success, and research has shown that direct parental involvement in their children's learning activities is essential for improving their achievements. It is highly recommended that parents be involved in their children's learning process to help enhance their success in preschool education. However, there are many obstacles that hinder parents' efforts to involve themselves, resulting in a lack of continuity in the home or outside of school.

That's why it is essential to develop guidelines to help parents become more involved in their children's learning and practical activities such as prayer. Such involvement can have many benefits, including boosting children's self-confidence, improving their understanding of school activities and curriculum, and strengthening family relationships.

There are many studies on how parents can be involved in their children's learning at home. For example, a study by [7] identified six types of involvement that parents can have in their children's education: 1) basic obligations, such as making sure

children attend school regularly; 2) parenting, including providing emotional support and setting expectations; 3) communicating with the school, such as attending parent-teacher conferences; 4) volunteering at school or participating in school activities; 5) learning at home, such as helping children with homework and reading together; and 6) decision making, including being involved in school governance and decision-making processes.

Other studies have focused specifically on how parents can support their children's literacy development at home, such as through reading to them, discussing books with them, and helping them with writing activities [8, 9]. While these studies provide useful insights into how parents can be involved in children's education at home, none are specific to guidelines for teaching practice *solah* at home. This gap in the literature highlights the need for more research to develop guidelines that can assist parents in effectively teaching *solah* to their children at home. Such guidelines could be based on best practices and could provide parents with step-by-step instructions on how to teach and practice *solah* with their children. These guidelines could also address any challenges that parents may face in teaching *solah*, such as language barriers or lack of knowledge about the proper methods of performing *solah*. As the information related to practice *solah* is limited in the literature, Fuzzy Delphi Method will be used in developing this proposed guideline.

### **1.3 The Fuzzy Delphi Method (FDM)**

[10] stated that the Delphi method is a widely used approach to collect data for consensus-based studies on a particular issue. It is a structured approach for gathering expert opinions and achieving consensus [11, 12] by conducting multiple rounds of questioning and feedback to generate a set of structured questions to be answered by experts on an issue or matter being studied [13]. Thus, it can systematically seek agreement and expert consensus by using a set of questionnaires built on the opinions of experts [14] and also be a tool for making forecasts and predictions about an issue for the future based on the views of a group of experts related to that issue [15]. [16] also agrees that the Delphi method is very flexible because its goal is to make decisions based on the agreement from a group of experts.

However, the limitation of this method is it involves a lengthy and repetitive study that may result in incomplete data. In addition, the decisions made by experts depend on individual abilities, making it very subjective [17]. [18] proposed three weaknesses of the Delphi method, namely (i) unreliable data if the researcher fails to choose the right expert, (ii) boredom and loss of interest experienced by experts due to repetitive studies, and (iii) the number of experts involved in the study is too small to assess something large.

To overcome this limitation, the Fuzzy Delphi Method (FDM) technique has been developed by [19]. FDM is a measurement method that improves the Delphi method by adapting fuzzy numbering techniques consisting of values between 0 and 1 in a unit range (0, 1), instead of just binary (Yes or No), hence allowing experts to express their uncertainty and ambiguity in opinions [20]. In addition, FDM is not entirely new as it is still based on the classical Delphi method, in which the respondents involved must be experts in a particular field related to the study. However, this improvement makes FDM a more effective measurement approach for solving problems with uncertainty and ambiguity in a studied issue.

#### **1.4 This study**

The main objective of this study is to develop and propose a guideline that can help parents engage in practical prayer activities at home, through a case study of six-year-old children in a private kindergarten in Telok Panglima Garang.. The study uses a Design Development Research (DDR) approach developed by [21] that focuses on designing solutions to problems through three phases: First, The Needs Analysis Phase, Second: The Design and Development Phase, and Third: The Usability Evaluation Phase.

The results of the first phase have confirmed that parents acknowledge the need to develop guidelines for them to help their children's solah practices at home. This paper focusses on the development of the second phase of the research which is the design and development of the guideline. According to [22], this phase is extremely important because the developed product is related to the education field, and its development and construction have scientific and practical values that can enhance teaching and learning practices in education.

The Fuzzy Delphi Method (FDM), a systematic approach that utilizes expert opinions and knowledge to reach a consensus on a particular topic was implemented in this phase. The purpose of this method was to determine the components and elements that could be utilized to develop the guidelines for the practical prayer activities for 6-year-old children attending the Pra Tahfiz class.

## **2 Methodology**

### **2.1 Research instrument**

This study implemented FDM approach and two research instruments were selected to gather data - open-ended interviews and questionnaires. The first approach involved conducting interviews on identified experts to obtain insights and opinions regarding

the formation of components and elements necessary for the development of Guidelines. This approach enabled the identification of critical components that would be incorporated into the questionnaire, in addition to those identified from the literature.

Then the questionnaire was distributed to gather data from a group of experts, who were asked to provide their assessment and validation on the identified components from the literature review and expert interviews. A Likert scale of 1 to 7 was used to rate the importance, where 1 indicated the least agreement and 7 indicated the highest agreement. By presenting the components in a structured manner, the questionnaire enabled the experts to rank the components based on their relevance and importance for the development of the Guidelines.

The results from the questionnaire were then analyzed, and a consensus was reached on the components and elements that would be included in the final version of the Guidelines. This approach ensured that the Guidelines were comprehensive and reflective of the collective opinions and expertise of the selected group of experts.

## 2.2 Expert selection

For the interview, 4 experts who have extensive experience in the field of Early Childhood Education and Islamic Education, as well as direct involvement in each respective field were selected. Three of the experts have been involved in the field for more than 15 years while only one with 5-9 years.

For the questionnaire, total of 12 panel experts consisting of five (5) early childhood education specialist teachers, six (6) experts in Islamic education, and one (1) curriculum expert. The selection is in line with [23] stating that an individual is considered skilled and knowledgeable in a field if they have experience in that field exceeding 5 years and can be categorized as an expert, where they continuously undergo education and management practices in the early childhood education industry.

The number of experts, which is 12 people is also in line with [24], who stated that the number of experts for Delphi studies is between 10 and 50 experts. [11] also support that the number of experts is between 10 and 15 experts if the agreement and consistency of the experts are high.

## 2.3 Data Analysis

To analyze the ratings gathered from the questionnaire using the FDM approach, the following steps were followed. First, the Likert scale data is converted to triangular fuzzy number (TFN) format (Table 1). This involves representing each category on the scale as a TFN. Then, the centroid value for each question by using the TFNs is calculated and compared to the threshold value. For this analysis, the threshold value (d) of

0.2 or less is considered acceptable [25], this is the first condition. The percentage of expert agreement with  $d \leq 0.2$  for each item is calculated. [26] and [27] recommended that only items that met the percentage of 75.0% or higher is selected, this is the second condition. Finally, the defuzzification process is performed on the data using average of fuzzy numbers @ average response method to obtain a fuzzy score value (A). The third condition must be met to ensure expert consensus acceptance, where the fuzzy score value (A) must be greater than or equal to the median value ( $\alpha$ -cut value) of 0.5 [28] [29].

**Table 1.** Linguistic Variable and TFN

| Linguistic Variable |                      | Likert Scale | Fuzzy Scale (TFN) |
|---------------------|----------------------|--------------|-------------------|
| Rate                | Preference           |              |                   |
| Strongly Disagree   | Very Unimportant     | 1            | (0.0, 0.0, 0.1)   |
| Disagree            | Unimportant          | 2            | (0.0, 0.1, 0.3)   |
| Somewhat Disagree   | Somewhat Unimportant | 3            | (0.1, 0.3, 0.5)   |
| Neutral             | Neutral              | 4            | (0.3, 0.5, 0.7)   |

|                |                    |   |                 |
|----------------|--------------------|---|-----------------|
| Somewhat Agree | Somewhat Important | 5 | (0.5, 0.7, 0.9) |
| Agree          | Important          | 6 | (0.7, 0.9, 1.0) |
| Strongly Agree | Very Important     | 7 | (0.9, 1.0, 1.0) |

In addition to its use in determining the acceptance of expert consensus, the fuzzy score value (A) can also provide insights into the priority and importance of different elements based on the views of experts. By comparing the fuzzy score values of different elements, one can determine which elements are considered more important or have a higher priority by the experts. This information is useful in finalizing the components and elements to be included in the development of the guidelines. This approach allowed for a comprehensive and collaborative effort in developing the guidelines for the practical prayer activities, ensuring that they are evidence-based and effective in promoting the practical solah of 6-year-old children.

### 3 Results and Discussions

#### 3.1 Interview

From the interview and literature review, 4 main components and its elements have been identified to be included in the questionnaire for expert evaluation and assessment as presented in Table 2.

**Table 2.** Proposal for Main Components and Elements Identified from the Interview

| Component | Element  |
|-----------|--|
| Knowledge | <ul style="list-style-type: none"> <li>A. Parents have knowledge of the importance of performing Solat (devotion) to Allah SWT.</li> <li>B. Parents have knowledge of the pillars of performing Solat (parents need to know, understand, and practice Solat as a reference for their children).</li> <li>C. Parents are able to guide their children in performing Solat (e.g., the father acts as the imam for congregational prayer at home).</li> <li>D. Parents are able to monitor their children's Solat performance at home.</li> </ul> |
| E-Module  | <ul style="list-style-type: none"> <li>A. Providing a Solat schedule for children for monitoring and supervision purposes.</li> <li>B. Providing Solat reference materials for children.</li> <li>C. Providing audio and video content related to Solat and its related matters (e.g., how to perform Wuduk, recitation of intentions, and Solat readings).</li> <li>D. Providing attractive infographics related to Solat (e.g., how to perform Solat, such as Rukuk, Sujud, sitting for Tashahhud, and greeting)</li> </ul>                  |

|            |   |
|------------|---|
| Facilities | A. Parents provide appropriate Solat clothing for male or female children that covers the Aurat (e.g., Telekung, prayer mats, long-sleeved shirts, and pants).<br>B. Parents provide a special space suitable for performing Solat at home.<br>C. Parents provide guidance on the Qibla direction, posters, Solat time schedules, and reference books in the area designated for Solat at home. |
| Rewards    | A. Parents provide stickers for a chart to encourage their children to perform Solat.<br>B. Parents provide small gifts to encourage their children to perform Solat.<br>C. Parents offer a savings plan as a reward to encourage their children to perform Solat   |

**3.2 Questionnaire**

This section presents the results gathered from the questionnaire. Table 3 presents the expert demographics which is collected from the first part of the questionnaire.

**Table 3.** Expert Demographics

| No | Category   | Selection                           | Percentage (N) |
|----|------------|-------------------------------------|----------------|
| 1  | Gender     | Male                                | 41.7% (5)      |
|    |            | Female                              | 58.3% (7)      |
| 2  | Expertise  | Expert in Early childhood education | 41.7% (5)      |
|    |            | Expert in Islamic Studies           | 50.0% (6)      |
|    |            | Expert in Curriculum                | 8.3% (1)       |
| 3  | Experience | 5-9 years                           | 33.4% (4)      |
|    |            | 10- 14 years                        | 8.3% (1)       |
|    |            | 15 years and more                   | 58.3% (7)      |

The second part contributes to the analysis of expert agreement regarding the suitability of the four Main Components of the Guideline using the FDM. The findings obtained from interviews with the 12 experts are shown in Table 4.

**Table 4.** Evaluation of Main Component and its Element of the Guidelines based on FDM

| Component and Element* | Threshold, d<br>( $d \leq 0.2$ ) | Percentage Of Expert Agreement<br>( $\geq 75.0\%$ ) | Fuzzy Score Value (A)<br>( $A \geq \alpha$ -cut value = 0.5 | Expert Consensus | Ranking |   |
|------------------------|----------------------------------|---|---|------------------|---------|---|
| Knowledge              | 0.057                            | 100.0%  | 0.942   | Accept           | 1       |   |
|                        | A                                | 0.057   | 100.0%  | 0.942            | Accept  | 1 |
|                        | B                                | 0.098   | 91.7%   | 0.911            | Accept  | 2 |
|                        | C                                | 0.134   | 100.0%  | 0.867            | Accept  | 3 |
|                        | D                                | 0.138   | 100.00%   | 0.836            | Accept  | 4 |
| E-Module               | 0.098                            | 91.7%   | 0.911   | Accept           | 2       |   |
|                        | A                                | 0.057   | 100.0%  | 0.942            | Accept  | 1 |
|                        | B                                | 0.098   | 91.7%   | 0.911            | Accept  | 2 |
|                        | C                                | 0.134   | 100.0%  | 0.867            | Accept  | 3 |
|                        | D                                | 0.138   | 100.00%   | 0.836            | Accept  | 4 |
| Facilities             | 0.134                            | 100.0%  | 0.867   | Accept           | 3       |   |
|                        | A                                | 0.057   | 100.0%  | 0.942            | Accept  | 1 |
|                        | B                                | 0.098   | 91.7%   | 0.911            | Accept  | 2 |

|         |   |       |         |       |        |   |
|---------|---|-------|---------|-------|--------|---|
|         | C | 0.134 | 100.0%  | 0.867 | Accept | 3 |
| Rewards |   | 0.138 | 100.00% | 0.836 | Accept | 4 |
|         | A | 0.057 | 100.0%  | 0.942 | Accept | 1 |
|         | B | 0.098 | 91.7%   | 0.911 | Accept | 2 |
|         | C | 0.134 | 100.0%  | 0.867 | Accept | 3 |

- Refer Table 3 for detail element for each components

#### 4 Discussion, Conclusion and Future Work

In this study, there are four main components that have been identified to be included in the Guidelines for involving parents in children's prayer practice., namely Knowledge, e-Module, Facilities, and Rewards. The necessary elements for each main component can be referred to in Table 2. In the Fuzzy Delphi analysis (FDM) shown in Table 4, these 4 main components and its elements have been agreed upon and accepted because they meet the criteria for a threshold value (d) less than or equal to 0.2, expert agreement percentage greater than or equal to 75%, and Fuzzy score (A) greater than or equal to 0.5.

The first component, Knowledge, has been given the top ranking because of the importance of parents understanding their responsibility in shaping Islamic values in children as early as possible. [30] argued that parents play an important role in ensuring that children are educated with Islamic values, while [31] shows that Shariah-based learning is not only about technical and academic skills but also involves nurturing values and character formation. Therefore, parental involvement in education is very important in early childhood education. Previous studies have shown that parents who are directly involved in their children's education tend to achieve success in education [32-34]. If parents fail to play their role and understand their responsibility as parents, it may lead to critical social problems in society and eventually result in the failure of the education process in schools.

The second component, e-Module / Reference, is ranked second because of the need for parents to have attractive references and guides for children. Nowadays, children are more inclined to use gadget applications such as mobile phones, tablets, computers, electronic devices, and so on, and need audio, video, or any infographic that is attractive to children. Therefore, e-Modules and references that can be adapted to modern technology become important in the Guidelines for parental involvement in children's practical prayer activities.

Then, the Facilities component such as prayer clothes, comfortable and appropriate environments, as well as the Rewards component play an important role in attracting children's interest in practical prayer activities. Therefore, the Rewards element is also considered an important factor that needs to be in these Guidelines as motivation for children to take an active part in practical prayer activities. Furthermore, the results show that all four main components have obtained expert approval.

To further improve the effectiveness of the guidelines, the next step would be to conduct a thorough Usability Evaluation Phase. This phase would involve testing the guideline with a group of parents and caregivers to gather feedback on how easy it is to



understand and follow. Additionally, it would be important to assess the parental acceptability of the guideline to ensure that it aligns with their values and beliefs. This feedback could then be used to make any necessary adjustments to the guideline before it is finalized and implemented.

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