

# Development and Validation of Mind Mapping Module in Teaching and Learning History Islamic Law Based on Metacognitive

Zeti Yusmira Binti Haji Jaludin\*

Kolej Universiti Perguruan Ugama Brunei Darussalam

zeti.yusmira@gmail.com

**Abstract.** The design and development (DDR) research in this phase is aimed to design and develop as well as validating the mind mapping module based on metacognitive in teaching and learning History Islamic Law, Sixth Level Syari'ah, Brunei Darussalam. The Fuzzy Delphi Method (FDM) analysis requires expert analysis to realize the third research question, whether the expert consensus on the suitability of the activity components for practical instruments in teaching and learning the History Islamic Law is based on metacognitive in regards to build a prototype module. The threshold value (d) that was analyzed using the Delphi fuzzy approach and the details of the study containing question items yielded the results of the analysis that the threshold value reached  $d \leq 0.2$ , expert group agreement with Expert Agreement Percentage reached  $\geq 75.0\%$ , fuzzy score (A)  $\geq$  value  $\alpha$  - cut = 0.5 and the rating status of all experts on 14 items in 4 components A1-A3; Level of planning, B1-B3; meta-focus and meta-understanding, C1-C5; information management and debugging strategies, D1-D3; metacognitive reflection, is that each item in this component has an "appropriate" rating status. This finding answers the research question because of the focus of development evaluation of 3M module components to produce prototype 3M module components that all components for the validation evaluation of all Module 3M components are in the appropriate level and can be applied at Sixth Level Center, Brunei based on the opinion and evaluation of the research experts. In total, 12 expert panels agreed that the module 3M is suitable for study at the Sixth Level Center, Brunei for History Islamic Law, Syari'ah subject.

**Keywords:** components of module 3M, fuzzy delphi method, threshold value, expert percentage, fuzzy score

## INTRODUCTION

This paper discusses the validation of four components of the 3M module in which each component is rooted in Flavell's metacognitive

model; Schraw and Dennison and Shahlan & Saemah 4-Metacognitive Strategy Model. The application of the Fuzzy Delphi (DDR) through its approach should be implemented to validate the module components to suit the current needs and context of today's education. This phase is considered the second and third phases of the study using the DDR approach. This phase usually consists of product development, which is a module consisting of the design and development required in a module that wants to produce a prototype module. In other words, product development will be achieved through this phase. This phase focuses on data acquisition starting with expert opinions and suggestions on the design and development of modules focusing on the structure, format and content of the 3M module analyzed using descriptive mean and cohen kappa agreement [1]-[3]. Meanwhile, the validation of the components of the 3M module was analyzed using the Fuzzy Delphi Method. On the structure of the module format, the analyzes analyzed include 3M module books, student books as student worksheets, 3M module guides and 3M module implementation teaching focusing on content, language and general assessment are adapted instruments [4]. The instrument subsequently received expert approval on the appropriateness and content of the content as a unit of study on the subject of Islamic Law in the time of the Prophet Sallallahu' Alaihi Wassalam. The delivery medium was assessed by observing the use of Prezi software as an learning activity and also evaluated by experts as the content of the 3M module. However, the focus of this paper is to discuss the analysis for component validation in this phase to answer the third study question, namely:

*What is the expert consensus on the suitability of the components of the activity for practice in teaching and learning the History of Islamic Law based on metacognitive as a module prototype?*

### 1.1 Component Module 3M

In the conceptual framework of the study, there are four components that are seen as important dimensions as shown in table 4.3.1 and in phase 2 and 3 analysis focus on the components of planning and also information management strategies using

metacognitive mind-mapping strategies. In response to the third study question, twelve panellists provided feedback on the questionnaire, improved list of elements, the suitability of metacognitive 3M module components for teaching and learning History Islamic Law, Syari'ah Sixth Form, Brunei Darussalam. However, for this purpose, the display of the components of the 3M module that has been developed is also presented in the diagram.

At this stage, the Fuzzy Delphi Method technique is used to answer the third question in order to obtain feedback and refinement, in particular, the expert consensus on the 3M module. The research question involved a group of experts, and the experts were selected based on their expertise in the context of this study. At this stage, 12 experts have been contacted face-to-face and internet media such as e-mail and Whatsapp messages.

Module component preference (Figure 1) on teaching module types are usually focused on teaching and learning at school, secondary, college or university. This type of module was introduced to help students who are poor in academics because of their learning strategies. This module focuses more on individual teaching, in that students will self-implement the module independently or privately, and the teacher is only a facilitator and does not have to spend all the time with the student. This module will be provided to students who will follow the module according to the instructions contained therein.

Meaningful learning in particular that teaching modules are a self-sustaining activity that helps

students to explore and create something of self-worth in order to achieve meaningful learning outcomes. It is acknowledged that each student has different levels of achievement, and the way in which the content of a subject is understood is different, so this 3M module is a self-teaching tool that helps students learn at their own pace. Therefore, if there are students who are slow or weak, they will achieve the same level of competence as good students only need less time [5].

**METHOD**

The analysis in the demographic section of the expert involved items regarding gender, education level, experience, position and area of expertise, including duration of the experience. The demographic segment's findings are about frequency and percentage. The expert panel is more prevalent in the male gender than the female 11: 1.

Table 1. Gender Expert

Gender	Frequency	Percentage(%)
Male	11	91
Female	1	9

The number of experts involved in the Fuzzy Delphi method, the number of experts varied from 10 to 15. The 3M module validation phase on Module components and module content including module format, module content, module learning goals, module training questions and module reflection are assessed through the comprehensive 3M module validation form within the module components. The following is a list of 12 expert

Table 2. Outcome *threshold Value* (d): Component Modul 3M using Mircrosoft excel

EXPERT	ITEM														
	A1	A2	A3	B1	B2	B3	C1	C2	C3	C4	C5	D1	D2	D3	
1	0.163	0.228	0.261	0.196	0.131	0.065	0.033	0.065	0.033	0.033	0.000	0.033	0.131	0.065	
2	0.228	0.228	0.131	0.196	0.261	0.065	0.033	0.326	0.033	0.033	0.000	0.359	0.261	0.065	
3	0.228	0.228	0.261	0.196	0.131	0.326	0.033	0.065	0.033	0.033	0.000	0.033	0.261	0.065	
4	0.228	0.163	0.261	0.196	0.261	0.065	0.033	0.326	0.033	0.033	0.000	0.033	0.261	0.065	
5	0.228	0.228	0.131	0.196	0.261	0.326	0.359	0.065	0.359	0.033	0.000	0.033	0.261	0.326	
6	0.163	0.163	0.131	0.196	0.131	0.065	0.033	0.065	0.033	0.033	0.000	0.033	0.131	0.065	
7	0.163	0.163	0.131	0.196	0.261	0.065	0.033	0.065	0.033	0.033	0.000	0.033	0.131	0.326	
8	0.163	0.163	0.131	0.196	0.131	0.065	0.033	0.065	0.033	0.033	0.000	0.033	0.131	0.065	
9	0.228	0.228	0.261	0.196	0.131	0.065	0.033	0.065	0.033	0.033	0.000	0.033	0.131	0.065	
10	0.163	0.163	0.131	0.196	0.131	0.065	0.033	0.065	0.033	0.359	0.000	0.033	0.131	0.065	
11	0.163	0.163	0.131	0.196	0.131	0.065	0.033	0.065	0.033	0.033	0.000	0.033	0.131	0.065	
12	0.163	0.163	0.131	0.196	0.131	0.065	0.033	0.065	0.033	0.033	0.000	0.033	0.131	0.065	
Threshold Value (d) of each item	0.190	0.190	0.174	0.196	0.174	0.109	0.060	0.109	0.060	0.060	0.000	0.060	0.174	0.109	

panels from the backgrounds of academic, teaching and professional or university backgrounds, including one from 5 years of experience in each of the areas of teaching practice, faculty, examiner and examination questions in curriculum evaluation aspects Syari'ah subjects, Sixth Form, Head of Department of the school and from the faculty of Education and Syari'ah.

**RESULT & DISCUSSION**

**Findings and Validation Analysis of 3M Module Components**

In this section, assessments of the usability and suitability of the 3M module components for the teaching and learning implementation activities contained in the 3M module book in this process are evaluated based on expert assessment. This is to answer the following three research questions; What

Table 3. 3M Module Activity Comparison Findings Based on Delphi Fuzzy Analysis (FDM)

Explicit Objectives to be achieved for all students (users) after the teaching and learning activities in the classroom using the 3M module, which is from the advanced point of view of the classroom objectives and the level of achievement to achieve efficiency values	Appropriate
Inspire and retain student attention	Appropriate
	Appropriate
Develops students' readiness to learn	Appropriate
Follow the 3M module's instructions and guidelines.	Appropriate
Actively follow the Group's Objectives	Appropriate
C1: According to the module lesson plan	Appropriate
C2: Mind Map Usage Guidelines	Appropriate
Arranging Ideas based on Keyword or Key Image	Appropriate
E1 Exercise Process by Drawing Mind Map, Presentation and Contribution Using Q&A	Appropriate
	Appropriate
D1: Users rate their satisfaction using the module 3M	Appropriate
Users provide level of training facilities and module activities.	Appropriate
Modules train users' ideas to think through the process twice.	Appropriate

is the expert consensus on the appropriateness of the proposed activity component for practical teaching and learning of Islamic Legal History based on Metacognitive Law as a module prototype?

Table 2 shows the threshold values (d) analyzed using excel software, while table 3 summarizes the data for usability assessments for the suitability of activity component sequences by displaying module components, threshold values (d), expert group commitments, fuzzy scores (A) and rating status.

Rules:

Triangular Fuzzy Numbers

- 1) *Threshold value* (d)  $\leq 0.2$
- 2) Expert Consensus Percentage  $\geq 75.0\%$

Defuzzification Process

- 3) Fuzzy score (A)  $\geq$  Value  $\alpha$  – cut = 0.5

Referring to tables 2 and 3, it can be interpreted in its entirety that the sequence of activity components in Module 3M is well-received and appropriate for use based on the consensus and views of the experts involved. This means that all the experts involved stated that the components of the 3M module’s activities are acceptable and appropriate to the context of the study. When viewed as a whole, the fuzzy score (A) for all components (item 11) as shown in table 4 has the highest value. This suggests that teaching and learning activities will occur positively when all components are connected to one another. The threshold value analysis (d), Percentage of expert expertise and fuzzy score (A) on the 14 items of the planning, meta-focus and meta-understanding components, information management and debugging strategies and metacognitive reflection

were agreed upon to receive all items. Although item C5 had a threshold value less than 0.2, analysis of Percentage of the expert consensus reached  $\geq 75.0\%$ , fuzzy score (A)  $\geq \alpha$  - cut = 0.5 value reached 0.967. Therefore, this item is still being agreed between experts for item C5 on the components of the information management strategy and debugging strategy to be included in the 3M module prototype later.

**1.6 Design and Development Phase Study Findings: Validation Evaluation of 3M Module Components (FDM)**

In this section, we discuss the validation findings of 3M module development by obtaining user evaluation (expert review) throughout the implementation of 3M Module. The final stage of this development phase is to obtain expert consensus and expert opinion on the development of the module components in the context of validation prior to their implementation in teaching and learning. It may develop metacognition [6], [7]. This validation evaluation of the entire component of the 3M module answers the third question as shown in table 4 showing the threshold value (d) analyzed using the Delphi fuzzy approach and the details of the findings can be referenced in 1.4 and 1.5 where the study findings contain question items, values threshold (d), expert group agreement, fuzzy score (A) and rating status. The following table 5 summarizes the FDM analysis of the development evaluation of 3M module components to produce 3M module component prototypes.

Table 4. Value of Skor fuzzy (A) for item 11

Bil	Item/Element	Triangular Fuzzy Numbers		Requirement of				Expert Agreement
		Threshold Value, D	Percentage of Expert group	m1	m2	m3	Fuzzy Score (A)	
1	A1	0.190	100.0%	0.733	0.875	0.958	0.856	Accepted
2	A2	0.190	100.0%	0.733	0.875	0.958	0.856	Accepted
3	A3	0.174	100.0%	0.767	0.900	0.967	0.878	Accepted
4	B1	0.196	100.00%	0.700	0.850	0.950	0.833	Accepted
5	B2	0.174	100.00%	0.767	0.900	0.967	0.878	Accepted
6	B3	0.109	83.33%	0.833	0.950	0.983	0.922	Accepted
7	C1	0.060	91.67%	0.867	0.975	0.992	0.944	Accepted
8	C2	0.109	83.33%	0.833	0.950	0.983	0.922	Accepted
9	C3	0.060	91.67%	0.867	0.975	0.992	0.944	Accepted
10	C4	0.060	91.67%	0.867	0.975	0.992	0.944	Accepted
11	C5	0.000	100.00%	0.900	1.000	1.000	0.967	Accepted
12	D1	0.060	91.67%	0.867	0.975	0.992	0.944	Accepted
13	D2	0.174	100.00%	0.767	0.900	0.967	0.878	Accepted
14	D3	0.109	83.33%	0.833	0.950	0.983	0.922	Accepted

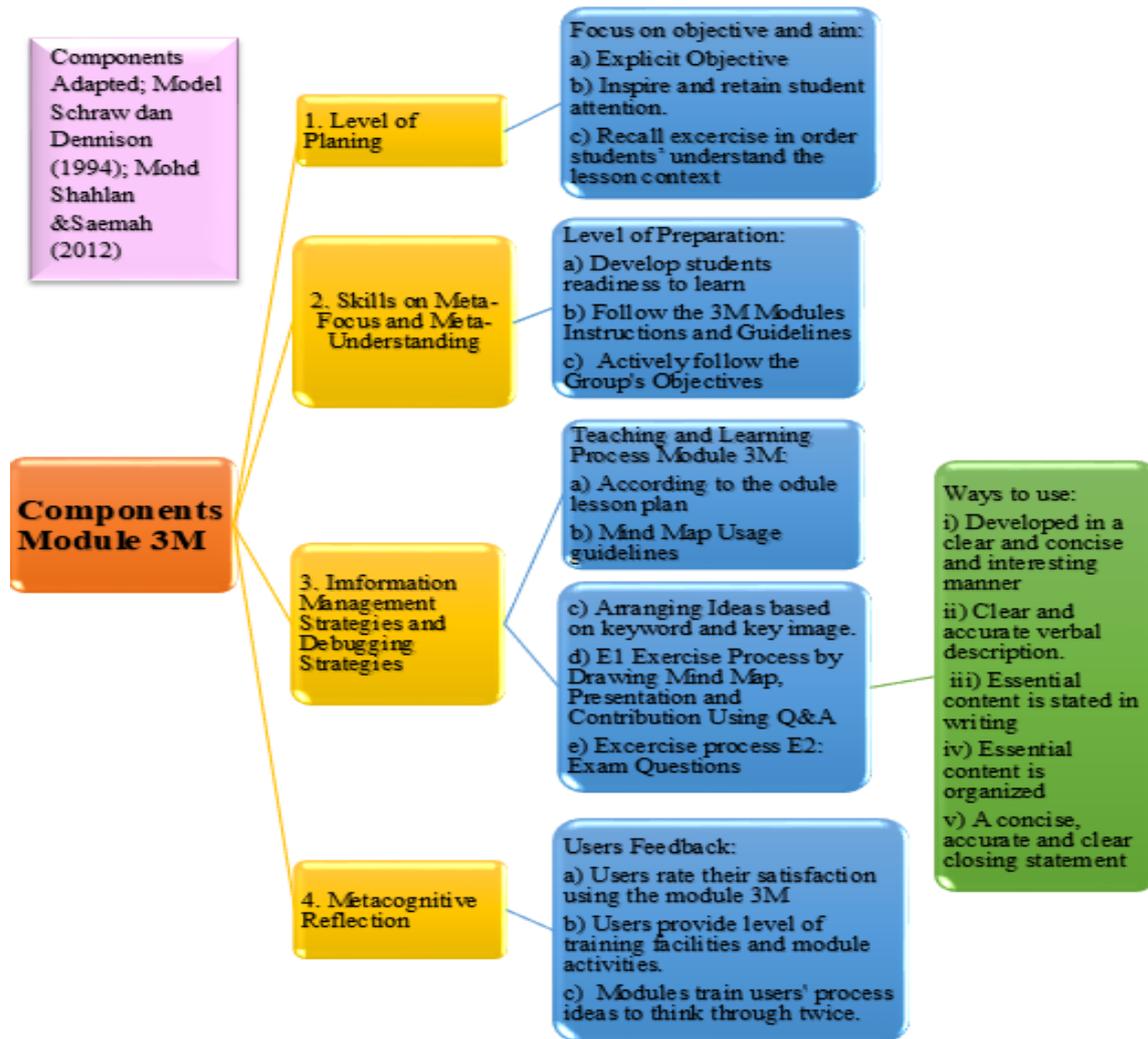


Figure 1: Four Four Components Module 3M Diagram

Table 5: Fuzzy Delphi (FDM) Analysis of Overall Development of 3M Module Components

Expert	ITEM														
	A1	A2	A3	B1	B2	B3	C1	C2	C3	C4	C5	D1	D2	D3	
1	0.163	0.228	0.261	0.196	0.131	0.065	0.033	0.065	0.033	0.033	0.000	0.033	0.131	0.065	
2	0.228	0.228	0.131	0.196	0.261	0.065	0.033	0.326	0.033	0.033	0.000	0.359	0.261	0.065	
3	0.228	0.228	0.261	0.196	0.131	0.326	0.033	0.065	0.033	0.033	0.000	0.033	0.261	0.065	
4	0.228	0.163	0.261	0.196	0.261	0.065	0.033	0.326	0.033	0.033	0.000	0.033	0.261	0.065	
5	0.228	0.228	0.131	0.196	0.261	0.326	0.359	0.065	0.359	0.033	0.000	0.033	0.131	0.326	
6	0.163	0.163	0.131	0.196	0.131	0.065	0.033	0.065	0.033	0.033	0.000	0.033	0.131	0.065	
7	0.163	0.163	0.131	0.196	0.261	0.065	0.033	0.065	0.033	0.033	0.000	0.033	0.131	0.326	
8	0.163	0.163	0.131	0.196	0.131	0.065	0.033	0.065	0.033	0.033	0.000	0.033	0.131	0.065	
9	0.228	0.228	0.261	0.196	0.131	0.065	0.033	0.065	0.033	0.033	0.000	0.033	0.131	0.065	
10	0.163	0.163	0.131	0.196	0.131	0.065	0.033	0.065	0.033	0.359	0.000	0.033	0.131	0.065	
11	0.163	0.163	0.131	0.196	0.131	0.065	0.033	0.065	0.033	0.033	0.000	0.033	0.131	0.065	
12	0.163	0.163	0.131	0.196	0.131	0.065	0.033	0.065	0.033	0.033	0.000	0.033	0.131	0.065	
<b>Threshold Value (d)</b>	<b>0.190</b>	<b>0.190</b>	<b>0.174</b>	<b>0.196</b>	<b>0.174</b>	<b>0.109</b>	<b>0.060</b>	<b>0.109</b>	<b>0.060</b>	<b>0.060</b>	<b>0.000</b>	<b>0.060</b>	<b>0.174</b>	<b>0.109</b>	
<b>Expert Consensus Percentage</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>83.3</b>	<b>91.67</b>	<b>83.3</b>	<b>91.67</b>	<b>91.67</b>	<b>100</b>	<b>91.67</b>	<b>100</b>	<b>83.3</b>	

## CONCLUSION

Based on table 5 the findings clearly show that all components of the overall Usability Assessment for the 3M module are in good standing and can be applied at the Sixth Level Center, Brunei based on the views and evaluations of the research experts. Overall, experts agree that the 3M module is suitable for implementation at Level Six, Brunei. Therefore, the 3M module is as an appendix to the content of the module that incorporates the training and guidance of using the 3M module.

### Analytical Formulation

The consensus of experts on each component extracted from Flavell's model in Schraw and Dennison and Shahlan and Saemah's model has obtained expert approval on 14 items in each component of the 3M module including planning level components, meta-focus and meta-understanding components, information management and debugging strategy components and metacognitive reflection components were threshold values up to 0.2, expert group agreement with Percentage Expert Expert reached  $\geq 75.0\%$ , fuzzy score  $(A) \geq \alpha$  - cut = 0.5 values were obtained in accordance with the Fuzzy Delphi analysis in design and development [8]. In this instance, the 3M module utilizes four components validated by 12 expert panels for the development and usability phase of the module [1]-[3].

## REFERENCES

- [1] J. H., Flavell, *Metacognition aspects of problem solving*. In L. B. Resnick (Ed.), *The nature of intelligence*. Hillsdale, NJ: Erlbaum. <http://tip.psychology.org/meta.html>, 1976.
- [2] G., Schraw, & Sperling-Dennison, R. Assessing metacognitive awareness, *contemporary Educational Psychology*, 19, 460-470, 1994.
- [3] S. Surat, S. Rahman. *Strategi Metakognitif dalam Penulisan*. Bangi: Penerbit Universiti Kebangsaan Malaysia, 2017.
- [4] A. In'am (2011). *Pembangunan dan Validasi Model Pengajaran dan Pembelajaran Matematik Berasaskan Metakognitif*. Thesis Universiti Pendidikan Sultan Idris, Malaysia
- [5] S. Mohd Noah, Jamaludin Ahmad. (2017). *Pembinaan Modul Bagaimana Membina Modul Latihan dan Modul Akademik*. Kuala Lumpur, Penerbit Universiti Putra Malaysia
- [6] J.F. Flavell, *Metacognition and Cognitive Monitoring*, *American Psychologist*, 34, 906- 911, 1976.
- [7] J.F. Flavell, *Speculations about the nature and development of metacognition*. In F. Weinert & R. Kluwe (Eds.). *Metacognition, Motivation and Understanding*. (21-29). London: LEA, 1987.
- [8] M. Ridhuan, S. Siraj, Zaharah, N. Rabihah, Ahmad. *Pengenalan Asas Kaedah Fuzzy Delphi Dalam Penyelidikan Reka Bentuk Pembangunan*. Minda Intelek Agency, Baru Bangi, 2019.