

FUZZY DELPHI APPROACH IN ASSESSING DIFFICULTY LEVEL OF EFFECTIVE TEACHING ITEMS FOR TEACHERS OF TRUST SCHOOL PROGRAM (TSP)

ABORDAGEM FUZZY DELPHI NA AVALIAÇÃO DO NÍVEL DE DIFICULDADE DE ARTIGOS EFICAZES DE ENSINO PARA PROFESSORES DO PROGRAMA ESCOLA DE CONFIANÇA (TSP)

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Abstract: This study aims to get an expert consensus on teachers' difficulty level of practical teaching items based on the Seven Pedagogical Pillars for Trust School Programme (TSP). The Seven Pedagogical Pillars consist of Lesson Planning and Content Delivery, creating a Positive Learning Environment, Assessment for Learning, Collaborative and Cooperative Learning, Questioning and Thinking Skills, Differentiation, and Professional Knowledge and Reflection. The quantitative method was selected for this study. A total of 15 experts were selected as the panel of experts for this study. The experts met the criteria of 10 years' experience in education services and were directly involved in monitoring the teachers' teaching in Trust Schools Programme. All data were obtained and analyzed using the Fuzzy Delphi Method. The findings show that all teaching and Learning Competencies have met the Fuzzy value criteria that are less than 0.2, and panel experts' percentage is more than 67%.

Keywords: Difficulty level; Effective teaching elements; Trust School Programme; Fuzzy Delphi Method.

Resumo: Este estudo tem como objetivo obter um consenso de especialistas sobre o nível de dificuldade dos professores em itens de ensino prático com base nos Sete Pilares Pedagógicos para Trust School Program (TSP). Os Sete Pilares Pedagógicos consistem em Planejamento de Aulas e Entrega de Conteúdo, criando um Ambiente de Aprendizagem Positivo, Avaliação para Aprendizagem, Aprendizagem Colaborativa e Cooperativa, Habilidades de Questionamento e Pensamento, Diferenciação e Conhecimento e Reflexão Profissional. O método quantitativo foi selecionado para este estudo. Um total de 15 especialistas foi selecionado como painel de especialistas para este estudo. Os especialistas atenderam aos critérios de 10 anos de experiência em serviços de educação e estiveram diretamente envolvidos no monitoramento do ensino dos professores no Programa Trust Schools. Todos os dados foram obtidos e analisados pelo Método Fuzzy Delphi. Os resultados mostram que todas as competências de ensino e aprendizagem atenderam aos critérios de valor Fuzzy que são menos de 0,2 e a porcentagem de especialistas do painel é mais de 67%.

Palavras-chave: Nível de dificuldade; Elementos efetivos de ensino; Trust School Program; Fuzzy Delphi Method.

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Introduction

Teachers have to be highly skilled to ensure that effective teaching can be implemented in the classroom (Ajayi & Bifarin, 2018). This view is in line with Darling-Hammond (2000) that quality teachers can produce quality pupils. By applying effective teaching elements during lessons enables the teachers to provide a comprehensive understanding to the pupils. Hence, evaluating teachers' teaching in the classroom can determine the excellent academic achievement of the pupils. Effective teaching elements that were being studied are based on the *Seven Pedagogical Pillars* of TSP pedagogy, namely: (1) Lesson planning and content delivery, (2) Creating a positive learning environment, (3) Assessment for learning (4) Collaborative and cooperative learning, (5) Questioning and thinking skills, (6) Differentiation and (7) Professional knowledge and reflection (Heiko, 2012).

Trust School Programme (TSP) has been implemented in Malaysia since it's launching in 2011 with a vision to drive the transformation of pupils' achievement. One of the TSP main missions is to promote excellence in the education system by improving the curriculum and lesson presentation. However, the TSP teachers' presentations are somewhat disturbed due to several factors such as time constraints, job responsibilities, and cognitive level differences among students and others. These disruptions lead to ineffective teaching, and the holistic self-development of the pupils is challenging to achieve. Teachers are the primary model for the role of implementing effective teaching as teachers have full control over the presentation of inputs to the pupils. There is a gap in the need to identify the difficulties of implementing the seven pillars profoundly. Once the difficulties are identified, this will enable the stakeholders to optimize the teacher's skills.

Literature Review

The debate on effective teaching has been widely discussed around the world. Similarly, effective teaching elements have also been studied. Among them, Yahaya et al. (2014) examined the elements of knowledge, skills, attitudes and teaching in the Living Skills subjects, Tarmudi et al. (2016) emphasised on the aspects of teachers' preparation, teaching style and teachers' responsibilities. Similarly, Ajayi and Bifarin (2018) studied the element of teachers' skills. Therefore, it can be stated that these teaching elements could determine the teaching effectiveness in the classroom. However, the study on the effect of the Seven Pillars of Pedagogy elements towards effective TSP teaching has not been conducted. Therefore, it is conformable with the fact that this study is to be conducted and tested for its effectiveness (Ahmad & Ahmad, 2018; Ganisen, et al., 2015).

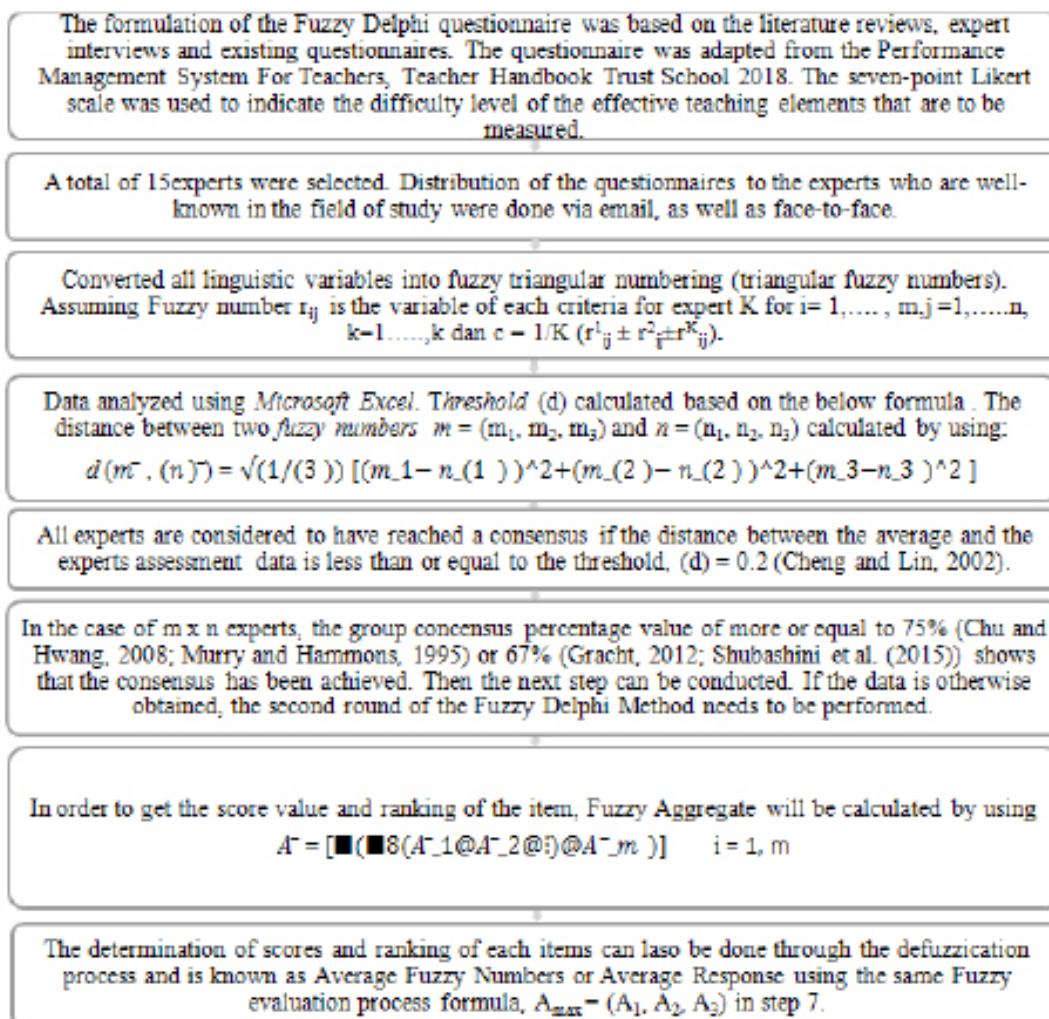
Methods

A quantitative study using the *Fuzzy Delphi* Technique was selected to get an expert consensus on the implementation of teaching elements for the TSP teachers. The expert criteria were determined based on Berliner's (2004) argument, saying that teachers who have served between five to ten years may be categorised as experts. The experts' selection process was based on the following criteria: (1) Serves more than ten years as a School Education Services Personnel. (2) Appointed and executes the assignments as Middle Leaders in the TSP. (3) Conducts and provides training to the teachers in the Teachsmart Programme (4) Monitors teaching in the classroom and conducts patrols according to the schedule. According to Jones and Twiss (1978), the number of experts in the Delphi study is from 10 to 50. However, Rowe and Wright (2001) have the opinion that the number of experts could be from 5 to 20 based on their expertise. The instrument contains 14 constructs of 65 items. The items are divided into 14 teaching and learning competencies covering the Seven Pedagogical Pillars. The items reliability test found that the Alpha Cronbach's value for this instrument was 0.9. In this study, the reliability value is 0.9 and conformed to the opinion of Sidek (2005). Therefore, items in this study are acceptable. It shows that the questionnaire items were able to produce consistent results.

Results and Discussion

There are steps to follow to implement the Fuzzy Delphi Technique in a particular study for it to be considered an empirical study (Jamil et al., 2017). The steps are as follows in Figure 1.

Figure 1. Steps of The Study



Based on Table 1 and 2, all items in the difficulty level of TSP teaching elements' questionnaire were agreed by the panel of experts based on the condition set in the Fuzzy Delphi Technique analysis that is the construct threshold value ($d_{construct} \leq 0.2$) and the experts' consensus $\geq 67\%$.

Table 1. Fuzzy Delphi Findings Based On Experts Agreement of 67%

| No. | Items/ E l e - m e n t s | Conditions for <i>Triangular Fuzzy</i> <i>Numbers</i> | | Conditions for Defuzzification Process | | | | E x p e r t s A g r e e m e n t |
|-----|--------------------------------|---|--|--|-------|-------|---------------------------|------------------------------------|
| | | Thresh- old Val- ue, d | Per cent of Experts A g r e e - ment, % | m1 | m2 | m3 | <i>Fuzzy Score</i> (A) | |
| 1 | BA11 | 0.2 | 87% | 0.047 | 0.127 | 0.287 | 0.153 | ACCEPTED |
| 2 | BA12 | 0.2 | 73% | 0.073 | 0.187 | 0.380 | 0.213 | ACCEPTED |
| 3 | BA13 | 0.2 | 67% | 0.060 | 0.167 | 0.353 | 0.193 | ACCEPTED |
| 4 | BA14 | 0.2 | 80% | 0.093 | 0.233 | 0.433 | 0.253 | ACCEPTED |
| 5 | BA15 | 0.2 | 73% | 0.113 | 0.260 | 0.460 | 0.278 | ACCEPTED |
| 6 | BA16 | 0.2 | 73% | 0.147 | 0.300 | 0.493 | 0.313 | ACCEPTED |
| 7 | BA17 | 0.2 | 80% | 0.080 | 0.207 | 0.407 | 0.231 | ACCEPTED |
| 8 | BA21 | 0.2 | 93% | 0.053 | 0.167 | 0.340 | 0.187 | ACCEPTED |
| 9 | BA22 | 0.1 | 87% | 0.040 | 0.127 | 0.300 | 0.157 | ACCEPTED |
| 10 | BA23 | 0.2 | 87% | 0.060 | 0.167 | 0.340 | 0.189 | ACCEPTED |
| 11 | BA24 | 0.1 | 80% | 0.060 | 0.200 | 0.200 | 0.213 | ACCEPTED |
| 12 | BA31 | 0.1 | 80% | 0.067 | 0.200 | 0.393 | 0.220 | ACCEPTED |
| 13 | BA32 | 0.1 | 86% | 0.073 | 0.220 | 0.420 | 0.238 | ACCEPTED |
| 14 | BA33 | 0.1 | 87% | 0.067 | 0.207 | 0.407 | 0.227 | ACCEPTED |
| 15 | BA34 | 0.1 | 100% | 0.060 | 0.220 | 0.420 | 0.233 | ACCEPTED |
| 16 | BA35 | 0.2 | 67% | 0.253 | 0.447 | 0.647 | 0.449 | ACCEPTED |
| 17 | BB41 | 0.1 | 93% | 0.020 | 0.107 | 0.287 | 0.138 | ACCEPTED |
| 18 | BB42 | 0.2 | 93% | 0.040 | 0.120 | 0.273 | 0.144 | ACCEPTED |
| 19 | BB43 | 0.2 | 73% | 0.067 | 0.200 | 0.380 | 0.216 | ACCEPTED |
| 20 | BB44 | 0.2 | 87% | 0.113 | 0.273 | 0.467 | 0.284 | ACCEPTED |
| 21 | BB51 | 0.1 | 80% | 0.080 | 0.227 | 0.420 | 0.242 | ACCEPTED |
| 22 | BB52 | 0.2 | 67% | 0.080 | 0.213 | 0.393 | 0.229 | ACCEPTED |
| 23 | BB53 | 0.1 | 80% | 0.067 | 0.207 | 0.393 | 0.222 | ACCEPTED |
| 24 | BB54 | 0.1 | 93% | 0.027 | 0.140 | 0.340 | 0.169 | ACCEPTED |
| 25 | BB55 | 0.2 | 73% | 0.107 | 0.260 | 0.460 | 0.276 | ACCEPTED |
| 26 | BB56 | 0.2 | 73% | 0.113 | 0.273 | 0.473 | 0.287 | ACCEPTED |
| 27 | BB61 | 0.1 | 87% | 0.127 | 0.313 | 0.513 | 0.318 | ACCEPTED |
| 28 | BB62 | 0.2 | 80% | 0.193 | 0.380 | 0.580 | 0.384 | ACCEPTED |
| 29 | BB63 | 0.2 | 67% | 0.193 | 0.380 | 0.580 | 0.384 | ACCEPTED |
| 30 | BB64 | 0.2 | 67% | 0.420 | 0.620 | 0.793 | 0.611 | ACCEPTED |
| 31 | BB65 | 0.2 | 67% | 0.407 | 0.607 | 0.780 | 0.598 | ACCEPTED |
| 31 | BB66 | 0.2 | 67% | 0.233 | 0.407 | 0.607 | 0.416 | ACCEPTED |
| 32 | BB71 | 0.2 | 93% | 0.047 | 0.147 | 0.313 | 0.169 | ACCEPTED |
| 33 | BB72 | 0.2 | 73% | 0.093 | 0.233 | 0.420 | 0.249 | ACCEPTED |
| 34 | BB73 | 0.2 | 93% | 0.147 | 0.300 | 0.500 | 0.316 | ACCEPTED |
| 35 | BB74 | 0.2 | 80% | 0.207 | 0.380 | 0.567 | 0.384 | ACCEPTED |

| | | | | | | | | |
|----|-------|-----|------|-------|-------|-------|-------|----------|
| 36 | BB81 | 0.1 | 80% | 0.073 | 0.227 | 0.407 | 0.236 | ACCEPTED |
| 37 | BB82 | 0.1 | 67% | 0.113 | 0.273 | 0.46 | 0.282 | ACCEPTED |
| 38 | BB83 | 0.2 | 67% | 0.167 | 0.333 | 0.527 | 0.342 | ACCEPTED |
| 40 | BB84 | 0.2 | 67% | 0.260 | 0.440 | 0.633 | 0.444 | ACCEPTED |
| 41 | BB91 | 0.1 | 80% | 0.080 | 0.233 | 0.420 | 0.244 | ACCEPTED |
| 42 | BB92 | 0.2 | 67.% | 0.207 | 0.380 | 0.573 | 0.387 | ACCEPTED |
| 43 | BB101 | 0.2 | 93% | 0.047 | 0.140 | 0.300 | 0.162 | ACCEPTED |
| 44 | BB102 | 0.1 | 80% | 0.073 | 0.220 | 0.407 | 0.233 | ACCEPTED |
| 45 | BC111 | 0.1 | 86% | 0.227 | 0.420 | 0.620 | 0.422 | ACCEPTED |
| 46 | BC112 | 0.2 | 73% | 0.433 | 0.633 | 0.807 | 0.624 | ACCEPTED |
| 47 | BC113 | 0.2 | 67% | 0.473 | 0.647 | 0.793 | 0.638 | ACCEPTED |
| 48 | BC114 | 0.1 | 87% | 0.347 | 0.540 | 0.740 | 0.542 | ACCEPTED |
| 49 | BC115 | 0.1 | 73% | 0.133 | 0.313 | 0.513 | 0.320 | ACCEPTED |
| 50 | BC121 | 0.1 | 93% | 0.367 | 0.567 | 0.767 | 0.567 | ACCEPTED |
| 51 | BC122 | 0.2 | 67% | 0.133 | 0.287 | 0.467 | 0.296 | ACCEPTED |
| 52 | BD131 | 0.1 | 87% | 0.347 | 0.540 | 0.740 | 0.542 | ACCEPTED |
| 53 | BD132 | 0.2 | 73% | 0.433 | 0.633 | 0.807 | 0.624 | ACCEPTED |
| 54 | BD133 | 0.1 | 87% | 0.333 | 0.527 | 0.727 | 0.529 | ACCEPTED |
| 55 | BD134 | 0.1 | 87% | 0.340 | 0.540 | 0.740 | 0.540 | ACCEPTED |
| 56 | BD135 | 0.1 | 87% | 0.333 | 0.527 | 0.727 | 0.529 | ACCEPTED |
| 57 | BD136 | 0.1 | 100% | 0.353 | 0.553 | 0.753 | 0.553 | ACCEPTED |
| 58 | BD141 | 0.2 | 67% | 0.060 | 0.173 | 0.353 | 0.196 | ACCEPTED |
| 59 | BD142 | 0.2 | 87% | 0.060 | 0.160 | 0.327 | 0.182 | ACCEPTED |
| 60 | BD143 | 0.2 | 67% | 0.087 | 0.220 | 0.407 | 0.238 | ACCEPTED |
| 61 | BD144 | 0.2 | 73% | 0.153 | 0.327 | 0.527 | 0.336 | ACCEPTED |
| 62 | BD145 | 0.2 | 80% | 0.073 | 0.207 | 0.407 | 0.229 | ACCEPTED |
| 63 | BD146 | 0.2 | 73% | 0.087 | 0.220 | 0.420 | 0.242 | ACCEPTED |
| 64 | BD147 | 0.1 | 73% | 0.120 | 0.287 | 0.487 | 0.298 | ACCEPTED |
| 65 | BD148 | 0.1 | 87% | 0.060 | 0.193 | 0.393 | 0.216 | ACCEPTED |

Table 2. Ranking Of Three Items Based On Difficulty Level

| Item No. | Teaching Competencies | Fuzzy Score | Ranking |
|----------|--|-------------|---------|
| BC113 | Teachers use a variety of relevant and quality activities throughout the lesson that could challenge pupils' thinking. | 0.638 | 1 |
| BC132 | Teachers implement lesson differentiation in term of content, process, product or context. | 0.624 | 2 |
| BC112 | Teachers adopt questions that are at a suitable level of high or low. | 0.624 | 3 |

Conclusion

The findings showed that BC113 is the most difficult item to be implemented in the class. It shows that even though the pupils enjoy a variety of relevant and quality activities conducted by the teachers during teaching and learning sessions in class, it is a difficult task to implement. Teachers should be aware that pupils are motivated to do and explore more things

that could develop their capabilities (Fitzsimmons & Lanphar, 2011; Ahmad & Ahmad, 2019). In the second-ranking is item BC132. Titchmarch (2013) found that pupils could improve their social skills by learning in groups of pupils of different backgrounds, abilities, and intelligence. Differentiation can be termed as different individual capabilities to cater to the curriculum and learning in class. Item BC112 is in the third-ranking. The study found that the teachers do not use appropriate forms of questioning while teaching in the classroom (Peng & Hamad, 2018). Questioning at the teachers' level encourages the pupils' high-level thinking and forms innovative thinking (Amrullah et al., 2018).

This study is limited to TSP as it utilised the instrument that is adapted from the Performance Management System For Teachers, Teacher Handbook Trust School 2018 (*LeapEd Services* 2018). Therefore, this study is limited to use only TSP experts to measure experts' consensus using the Fuzzy Delphi method. The findings reflect on the difficulty level of the effective teaching elements implementation of the TSP teachers. Furthermore, this study is crucial for developing a strategic plan of practical teaching elements for the Trust Schools' teachers. Future research is expected to be able to investigate the factors that contribute to teachers' difficulties in implementing those elements in the classroom.

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