Validating Speaking Components for an Online Task-Based Speaking Module: A Fuzzy Delphi Study with Tvet Experts

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ABSTRACT

This study explores the validation of essential components of an online task-based speaking skills module tailored for learners in Technical and Vocational Education and Training (TVET). As effective communication becomes increasingly necessary in vocational fields, there is a need for targeted speaking instruction that reflects real-world workplace demands. To guide the design of a pedagogically sound and contextually relevant module, this research employed the Fuzzy Delphi Method (FDM) to obtain expert consensus on proposed instructional elements. A total of six experts, including language educators and TVET practitioners, participated in the study. They assessed ten proposed components, including task authenticity, fluency, pronunciation, interactive communication, and the integration of field-specific vocabulary. Using a structured 7-point scale, expert feedback was analysed using established FDM procedures, including threshold values, consensus percentage, and defuzzification. The findings indicate that all components achieved the required level of consensus, with task authenticity, interactive communication, and multimedia use recording the highest consensus levels. These outcomes support the inclusion of the validated components in the module design and underscore the role of expert input in developing targeted language instruction. The study demonstrates the value of using FDM in instructional development and contributes to ongoing efforts to enhance speaking proficiency among TVET learners through online, task-based approaches.

Keywords—Fuzzy Delphi Method, Speaking Skills, TVET Learners, Task-Based Learning, Module Development

INTRODUCTION

In today's globalised and digitally driven workforce, effective communication skills are indispensable for Technical and Vocational Education and Training (TVET) learners (Alias et al., 2022; Hamid et al., 2023). As industries increasingly demand employees who can collaborate, present, and interact in English, the gap in oral communication skills among vocational students has become more apparent (Yusof et al., 2021). However, speaking remains one of the least prioritised skills in many TVET programmes, often overshadowed by technical and written competencies (Abdullah & Ismail, 2023).

The growing shift towards digital learning in the post-pandemic era further emphasises the need for flexible, learner-centred speaking instruction. Task-Based Language Teaching (TBLT), with its emphasis on real-world communication, offers a promising approach for online instruction (Ellis, 2003; Gonzalez-Lloret & Ortega, 2014). Nevertheless, the successful implementation of a TBLT-based online speaking module for TVET learners requires systematic validation of its components to ensure relevance, effectiveness, and contextual alignment. Despite the proven value of task-based language learning approaches, the integration of TBLT into online speaking modules for TVET learners remains underexplored (Musa et al., 2025). Existing modules often lack alignment with industry communication needs and are seldom validated by subject-matter experts. Without a structured validation process, such modules risk becoming ineffective or irrelevant for the target learner group.

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Unlike previous studies that primarily examine speaking instruction or online learning independently, this study integrates Task-Based Language Teaching, online module development, and TVET workplace communication within a systematically validated instructional framework using the Fuzzy Delphi Method (FDM).

Research Questions

The following research questions were formulated:

i. What are the essential components of a task-based online speaking module for TVET learners?

ii. To what extent do experts agree on the relevance of these components?

By addressing these questions, the study aims to gather expert consensus on the instructional elements crucial to designing a pedagogically sound and contextually relevant online speaking module for Malaysian TVET learners. The validated components will serve as the foundation for the module's subsequent development and implementation phases. This study represents Phase 2 of a larger design and development research (DDR) project aimed at developing an online task-based speaking skills module for Malaysian TVET learners. Specifically, it reports on the validation of proposed speaking components using the Fuzzy Delphi Method (FDM). The purpose is to ensure that the final module is informed by expert input, relevant to learners' contexts, and grounded in evidence-based practice.

LITERATURE REVIEW

Speaking is a productive language skill that plays a key role in learners' communicative competence and career readiness (Hamid et al., 2023). For TVET learners, effective speaking skills are essential in real-life situations such as job interviews, workplace communication, safety briefings, and technical presentations (Yusof et al., 2021). However, studies continue to show that speaking instruction is often sidelined in favour of grammar, reading, and writing skills (Abdullah & Ismail, 2023). Task-Based Language Teaching (TBLT) offers a practical approach by engaging learners in meaningful, authentic, real-world tasks. It encourages learners to use the language actively, fostering both fluency and confidence (Willis & Willis, 2007; Ellis, 2003). More recent studies highlight the benefits of TBLT in TVET and ESP contexts, reporting improvements in learner motivation and task engagement (Hamid et al., 2023; Yusof et al., 2021).

Online TBLT enables flexible and multimodal delivery of speaking tasks and supports learner autonomy through asynchronous and blended learning models (Alias et al., 2022; Gonzalez-Lloret, 2020). However, its successful implementation depends on careful module design that incorporates authentic scenarios, scaffolded tasks, and meaningful interaction. For TVET learners, modules must align with industry-relevant communication needs, including field-specific vocabulary and situational dialogues, underscoring the need for context-specific instructional design that reflects workplace realities (Abdullah & Ismail, 2023; Rahman et al., 2018).

The Fuzzy Delphi Method (FDM) has emerged as a robust tool for validating instructional components in educational research. It enhances the classic Delphi technique by incorporating fuzzy logic to address uncertainty and variability in expert judgement, making it increasingly relevant in current educational research (Abdul Rahim et al., 2018; Lim et al., 2021; Rahman et al., 2021). Recent applications of FDM in curriculum design, educational technology, and language module development show its versatility and reliability (Mohd Noor et al., 2022; Lim et al., 2021). Building on past research, this study applies FDM to validate an online speaking module for Malaysian TVET learners.

METHODOLOGY

This study employed a quantitative, expert-based validation approach using the Fuzzy Delphi Method (FDM). The purpose was to determine expert consensus on ten proposed components of an online task-based speaking module tailored to the needs of Malaysian TVET learners. This phase corresponds to the design and development stage (Phase 2) of the larger Design and Development Research (DDR) framework.

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Instrument design

A structured FDM questionnaire was developed, consisting of ten items representing key components of speaking instruction. Each item was rated using a 7-point Likert scale, where 1 indicated strong disagreement, and 7 indicated strong agreement. The components were derived from the literature on Task-Based Language Teaching (TBLT), online language learning, and TVET-specific communication needs. To enhance clarity and ensure face validity, the instrument was pilot tested with two language instructors prior to its distribution to the expert panel.

Sampling and Expert Panel

Six experts participated in the FDM process. They were purposively selected based on their experience and expertise in language teaching, instructional design, and vocational education. The panel included university lecturers, English-language specialists, and TVET practitioners, each with at least 5 years of professional experience. Purposive sampling was appropriate given the study's objective of gathering informed judgements from individuals with relevant domain expertise.

Table 1: Demographic Profile of FDM Expert Panel

Expert ID	Position/Role	Field of Expertise	Years of Experience	Type of Institution
1	Senior Lecturer	TESL / Language Education	12	Public University
2	English Language Instructor	ESP / TVET English	10	TVET College
3	Instructional Designer	E-learning / Module Design	8	Polytechnic
4	TVET Lecturer	Technical Communication	9	Community College
5	Curriculum Developer	English Curriculum	15	Education Department
6	Industrial Trainer	Workplace Communication	7	Private Training Centre

Expert Criteria

Booker and McNamara (2004) explain that individuals qualify as experts when their knowledge is developed through a combination of formal education, practical experience, and self-directed learning. Their expertise is typically acknowledged by colleagues and superiors based on their academic background, training, and field experience (Mustapha & Darusalam, 2017; Nikolopoulos, 2004). Similarly, Cantrill et al. (1996) define an expert as an individual who has demonstrated a high level of competence in a particular area. The involvement of such experts is a crucial aspect of any Fuzzy Delphi study, as it ensures that the data collected are credible and informed by professional judgement.

Fuzzy Delphi Method

The Delphi Method (DM), originally introduced by Dalkey and Helmer in 1963, has undergone various refinements. As an extension of this approach, the Fuzzy Delphi Method (FDM) emerged as an enhanced version that incorporates fuzzy set theory to address limitations in the conventional Delphi process. While the traditional Delphi method relies on probability theory to interpret uncertainty in expert decision-making, FDM differs by integrating mathematical modelling through fuzzy logic, allowing for a more nuanced representation of expert opinions (Hsu et al., 2010).

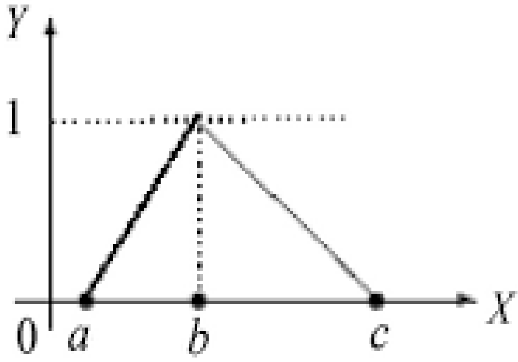
The development of FDM stems from efforts to address the inherent vagueness and subjectivity present in expert-based evaluations. Early contributions to this field include the integration of fuzzy theory with the classical Delphi framework by Murray et al. (1985), and further advancements by Kaufmann and Gupta (1988), who explored its application in forecasting. The method continues to evolve through enhancements such as fuzzy integration algorithms and max-min operations to improve predictive accuracy and accommodate uncertainty, particularly in technological forecasting (Ishikawa et al., 1993; Mustapha & Darusalam, 2022).

Subsequent refinements introduced weighted scoring mechanisms to account for variations in experts' knowledge and experience (Garai, 2013). More recent developments in FDM have incorporated fuzzy statistical techniques and mathematically defined continuous membership functions to enhance the precision and reliability of the iterative process (Chang et al., 2011). In this study, the steps in FDM include:

1. Six experts were identified to assess the relevance of the proposed speaking components within the context of online task-based instruction for TVET learners. They used their professional judgement to determine the appropriateness and importance of the components for inclusion in the module.

2. All linguistic variables were converted into triangular fuzzy numbers to facilitate expert evaluation. Following the approach outlined by Hsieh et al. (2004), fuzzy numbers were applied to represent expert responses more accurately. Each triangular fuzzy number consists of three values: *m1* (the minimum value), *m2* (the most plausible or median value), and *m3* (the maximum value). These values help define the range and central tendency of expert judgements. This fuzzy scale allows qualitative inputs to be translated into quantifiable data, which is essential for performing the Fuzzy Delphi analysis.

$$\mu_A(x) = \begin{cases} 0, & x \le a \\ \dfrac{x-a}{b-a}, & a < x \le b \\ 1, & x = b \\ \dfrac{c-x}{c-b}, & b < x \le c \\ 0, & x \ge c. \end{cases}$$



3. Once responses were collected from the selected experts, the Likert-scale ratings were converted into fuzzy numbers to reflect the corresponding linguistic variables. This step is crucial for enabling meaningful aggregation of expert judgements. In essence, the process involves averaging the fuzzy values derived from all expert responses to produce a collective fuzzy score for each component (Benitez et al., 2007).

4. Establishing a threshold value, commonly referred to as *d*, is a crucial step in determining the level of consensus among experts (Thomaidis et al., 2006). This value is calculated by measuring the distance between the fuzzy numbers assigned to each expert's response. By applying specific formulas, the level of experts' consensus can be quantified, allowing the researcher to assess whether consensus has been achieved for each item.

$$d(\bar{m},\bar{n}) = \sqrt{\frac{1}{3}\left[(m1-n1)^2 + (m2-n2)^2 + (m3-n3)^2\right]}$$

5. To determine the final fuzzy score for each item, the alpha threshold (*α-cut*) is used once expert consensus on the assigned fuzzy values has been achieved (Mustapha & Darusalam, 2017). The defuzzified value is then calculated using the following formula: $Amax = (4m1 + 2m2 + m3) / 7$, where m1, m2, and m3 represent the minimum, most likely, and maximum fuzzy values, respectively.

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6. During the defuzzification process, the formula $Amax = (4a1 + 2am + a3) / 7$ is commonly used to derive a single crisp score that represents expert consensus (Mustapha & Darusalam, 2017, 2022). This formula is particularly useful when average fuzzy numbers are applied, as it converts linguistic input into a numerical value between 0 and 1. The defuzzification method involves three core values: the lower bound ($a1$), the most likely value (am), and the upper bound ($a3$) of the triangular fuzzy number. These values are then used to generate a final score used for ranking or acceptance of each item.

In Fuzzy Delphi analysis, several formulas can be used to calculate the defuzzified value (A) for each item. The most commonly used formulas are:

- Formula 1: $A = \frac{1}{3} \times (m1 + m2 + m3)$
- Formula 2: $A = \frac{1}{4} \times (m1 + 2m2 + m3)$
- Formula 3: $A = \frac{1}{6} \times (m1 + 4m2 + m3)$

These equations are applied depending on the level of emphasis placed on the middle (most likely) value. Once defuzzification is performed, the resulting value is compared with an alpha (α) cut-off threshold, which determines item acceptance. In this study, the alpha threshold was set at 0.5, following the guideline proposed by Bodjanova (2006). If the defuzzified value of an item is less than 0.5, it is rejected due to insufficient expert consensus. Items with defuzzified values equal to or greater than 0.5 are considered to have achieved an acceptable level of consensus and are therefore retained.

$$x^* = \frac{\sum_{i=1}^{n} x_i \mu(x_i)}{\sum_{i=1}^{n} \mu(x_i)}$$

7. To determine the relative importance of each component, a ranking system based on defuzzified values is applied. Items are prioritised according to the level of expert consensus, with higher defuzzification scores indicating greater perceived importance. The item with the highest score is assigned the highest rank (Fortemps & Roubens, 1996).

RESULTS AND DISCUSSION

The analysis using the Fuzzy Delphi Method (FDM) revealed that all ten proposed speaking components achieved expert consensus. Consensus was determined based on a threshold value ($d \leq 0.2$) and a minimum agreement level of 75% among the experts. All components exceeded the alpha threshold (α-$cut \geq 0.5$), confirming their acceptance. The defuzzification values ranged from 0.774 to 0.957, indicating strong expert support for all items. The results are as follows:

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Table 2. Result of FDM analysis from FUDELO

(Fuzzy Delphi logic software)

Expert No.	Task Authenticity	Fluency	Pronunciation Clarity	Interactive Communication	Field-Specific Vocabulary	Clarity of Instructions	Feedback Opportunities	Scaffolding Support	Multimedia Use	CEFR Alignment
1	0.049	0.049	0.033	0.091	0.025	0.033	0.025	0.033	0.025	0.025
2	0.008	0.280	0.033	0.198	0.082	0.025	0.025	0.025	0.082	0.025
3	0.008	0.049	0.025	0.091	0.025	0.025	0.033	0.025	0.025	0.033
4	0.049	0.066	0.025	0.033	0.025	0.025	0.025	0.025	0.025	0.025
5	0.124	0.066	0.033	0.033	0.322	0.033	0.033	0.033	0.322	0.033
6	0.049	0.124	0.025	0.082	0.082	0.033	0.033	0.033	0.082	0.033
Items Value	0.058									
Item < 0.2	6	6	6	6	6	6	6	6	6	6
% Of item < 0.2	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Average of % consensus	100%									
Defuzzification (α-cut)	0.957	0.785	0.834	0.914	0.857	0.834	0.872	0.842	0.914	0.774
Ranking	1	9	7	2	5	8	4	6	3	10
Status of Agreement	Accept	Accept	Accept	Accept	Accept	Accept	Accept	Accept	Accept	Accept

Note: * Average of d Item: < 0.2.

** Average Agreement: > 75%.

***Alpha-cut :> 0.5

The three highest-ranked components were task authenticity, interactive communication, and multimedia use, reflecting the experts' prioritisation of real-world relevance, interactive engagement, and multimodal learning support. The findings of this study provide important insights into the prioritisation of instructional elements for an online task-based speaking skills module tailored for TVET learners. Notably, the top-ranked component, task authenticity, highlights the importance of integrating real-world and industry-relevant tasks that mirror workplace communication scenarios. It is consistent with prior studies that highlight authenticity as a key factor in promoting learner engagement and motivation in vocational education contexts (Rahman et al., 2021).

Interactive communication, ranked second, highlights the need for tasks that promote two-way exchanges, collaborative dialogue, and meaningful interaction. In a TVET setting, learners are expected to engage in teamwork and communicate effectively in professional environments, making this component particularly vital (Hamid et al., 2023; Yusof et al., 2021). The inclusion of multimedia use among the top three components reflects the shift towards multimodal learning environments in post-pandemic education. This finding aligns with Gonzalez-Lloret (2020), who emphasised the effectiveness of multimedia in enhancing language learning, especially in asynchronous or blended online platforms. Multimedia tools also support learners with different learning styles and help simulate authentic communication contexts.

The remaining components, namely feedback opportunities, scaffolding support, field-specific vocabulary, pronunciation clarity, CEFR alignment, clarity of instructions, and fluency, were all validated with strong expert consensus. Their inclusion suggests that a well-rounded speaking module should not only prioritise authenticity and interaction but also support learners with clear instructions, contextual vocabulary, and formative feedback.

Importantly, the high defuzzification scores across all components indicate strong expert consensus, demonstrating FDM's robustness as a tool for curriculum validation. These validated components will inform the next phase of the study, which involves the actual design and development of the online task-based speaking module. In addition to expert validation, the subsequent implementation phase will incorporate learner feedback to assess the module's practicality, usability, and perceived effectiveness. Integrating students' perspectives will provide valuable insights to refine instructional design and ensure the module aligns with learners' preferences and authentic communication needs.

CONCLUSION

This study employed the Fuzzy Delphi Method (FDM) to validate key components of an online task-based speaking module tailored to Malaysian TVET learners. Ten components were proposed and reviewed by six domain experts, all of which met the required threshold values and consensus criteria. Task authenticity, interactive communication, and multimedia use emerged as the most crucial elements, highlighting the importance of engaging learners in real-world tasks, fostering meaningful interaction, and leveraging digital tools.

These validated components provide the foundation for the subsequent design, development, and pilot implementation phases of the broader Design and Development Research (DDR) framework. Future research will focus on the development, pilot implementation, and empirical evaluation of the proposed online task-based speaking module among Malaysian TVET learners. Experimental or quasi-experimental designs may be employed to examine the module's impact on speaking proficiency, learner confidence, engagement, and workplace communication skills. In addition, learner feedback and user experience data will be incorporated to refine the module further and ensure its practical relevance to the target population.

Limitations And Future Research

Despite the positive findings, several limitations should be acknowledged. First, the study involved only six experts, which is within the acceptable range for Fuzzy Delphi studies but may limit the diversity of perspectives represented. Future studies may consider involving a larger and more diverse panel of experts from different TVET institutions and industries to further strengthen the validation process.

Second, this study focused exclusively on validating the essential components of the proposed online task-based speaking module and did not evaluate its effectiveness with actual learners. Future studies should therefore focus on pilot implementation and empirical evaluation among Malaysian TVET learners.

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