

## A Process for Validating a Web-Based Academic Application's Quality Model in Public Universities: Delphi Study

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**Abstract:** The Delphi method is an iterative, anonymous, and group-based process for seeking agreement or consensus from an expert panel. This approach is widely used in operation research by the researcher to represent their scientific results. This study explores the method of selecting an expert panel judgment to confirm a suggested high-quality model of academic application in higher education institutions. In order to minimize bias when validating the Web-Based Integrated Student Assessment (WBISA) quality model, experts are selected based on criteria designed to verify the correctness of the panel's chosen experts. The Delphi method is a widely used and respected way to collect information from respondents who are experts in the subject matter. Using a series of questionnaires disseminated across several iterations to gather data from a panel of chosen individuals, the Delphi methodology is an excellent choice for reaching a consensus. When planning and carrying out a Delphi survey, it is essential to consider the following factors: choosing the right experts, the length of time needed to conduct and complete the study, the possibility of low response rates, and unintentionally swaying the expert panel's feedback. The evaluations of six expert panels for the WBISA application quality model made up the study's findings. Here, the expert panel acted as a final decision-maker in approving the suggested quality model by critically analyzing preliminary findings. The findings suggest that the WBISA quality model, based on expert judgment consensus through the Delphi technique, could offer valuable insights that IT development teams can utilize when developing academic applications for higher education institutions.

**Keywords:** Academic Application, Delphi, Expert Panel, Higher Learning Institution, Quality Model, Web-Based Application

### 1. Introduction

According to Mohd Suradi et al.(2017)A Web-Based Integrated Student Assessment (WBISA) is an academic application used by public universities to monitor student performance in the academic field and non-academic matters. The list of characteristics and sub-characteristics have been identified through a literature review and a preliminary study conducted at the selected universities. The preliminary study was conducted using an online survey and a face-to-face platform to learn in-depth about the suitable characteristics of the WBISA application. This result obtained from the respondent has been analyzed using the Rasch measurement model (RMM). A quality model is proposed for WBISA. However, the quality model proposed needs to be verified and validated. A Delphi technique was used for this.

The Delphi method or technique occurs in two forms: a paper and pencil version, referred to as the “Delphi Exercise,” and a “Delphi Conference.” (Galanis, 2018). Many researchers have applied the Delphi technique in various applications to get a consensus from the expert panel. (Okoli & Pawlowski, 2004). The paper is organized as follows: First Introduction, Second Method, Results and Discussion, Conclusion, Acknowledgement, and References.

## 2. Method

According to Keeney et al. (2001) The Delphi method practices an iterative process to reach a consensus from various experts about a specified issue. Adnan et al. (2018) The Delphi technique is desired to validate the quality model because the panelists are knowledgeable and have expertise in providing reliable data. The expert panel is defined as an individual who is a subject matter expert in their domain.

The number of panels is determined by the panel, time requirement, and complexity of the issues. (Hsu & Sandford, 2007). The determination of the number of panel members will influence the validation result. (Preble, 2017; Woudenberg, 1991). According to Kezar and Maxey (2016), a minimum of 10 to 15 expert panels are required. However, other Delphi studies showed that three, four, and nine expert panels are sufficient. Four to six expert panels will be considered for this research. Expert panels in their field or domain were selected using purposive sampling. Purposive sampling techniques are typically suitable for the qualitative method. (Etikan et al., 2016). Adequate information can be gained through this technique, where the sample is chosen from the subject matter. The expert panels selected are unknown to each other to avoid biased results. Jones & Hunter (1995) Stated that the expert panels should be anonymous to each other, and the judgments of individual panels are not accessible to other panels. Besides that, the expert panel should be visible in the research topic to accomplish meaningful results and retain the failure rate as low as possible. (Hoermann et al., 2012).

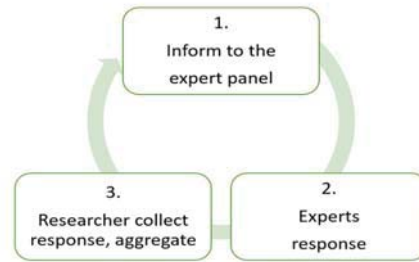
### 2.1 Sampling

The sampling strategy used in this research is purposive sampling. Purposive sampling can be used to get heterogeneous samples since the expert panels come from various IHLs and have experience developing web-based educational applications. Some of the following criteria are used in selecting the sample choice:

- a. The expert panels have a high level of knowledge due to their experience and involvement in web-based educational applications
- b. The expert panels were willing to participate and committed to providing good support for the study topics
- c. . cs
- d. The sample size of six is appropriate (Young & Temple, 2015)
- e. Respondents are always anonymous to each other but not ever anonymous to the researcher. This allows the researchers to follow up for explanations and further qualitative data.

### 2.2 Delphi Technique Implementation

The Delphi technique consists of several rounds. The traditional Delphi approach will have three rounds, whereas the modified Delphi technique consists of two rounds. There are three rounds for the Delphi technique based on previous studies. (Franklin & Hart, 2007; Preble, 2017). The modified Delphi process Murry and Hammons (1995) A three-step process was used to reach a consensus on all quality characteristics. The Delphi method has three major phases, as demonstrated in Fig.1.



**Figure 1:** Three rounds of the Delphi Method

The modified Delphi process was reduced from 3 to 2 rounds using open-ended questions. However, this study will occupy three rounds to validate the quality model using the Delphi technique. There are several steps involved in applying Delphi techniques. In the early steps, preliminary interview questions were prepared. The pilot study will be conducted before distributing the questionnaire to the expert panel. The pilot study's purpose is to ensure the validity of the questionnaire's content.

### 2.3 Results and Discussions

The expert panels were assigned with the code. There were six panels from different institutions. They are IT officers and have experience in developing educational WBA. Each was assigned a unique code such as E1, E2, E3, E4, E5 and E6. The word E1 refers to the first expert panel. The E1 is assigned to an expert panel regardless of their working institution.

Data about the demography of expert panels collected are the position, experience developing web applications, and experience developing web-based academic applications. There are two senior IT Officers, two IT Officers or web-based programmers, one IS Officer, and an IT technical officer. Most expert panels have more than ten years of experience developing web-based academic applications, whereas only one expert panel has six years of experience.

During the first round, the panels were asked to give feedback on the characteristics and sub-characteristics of the proposed quality model. In summary, all panels agreed with the proposed list of characteristics of web-based academic applications based on frequency. The characteristics are *Usability, Reliability, Efficiency, Functionality, Supportability, Availability, Security* and *Integrity*.

For the second round, the panels are shared with the result from round 1. Based on the panels' consensus, they agreed with the results. Later, they are given the proposed quality model diagram to show the relationship between each characteristic and their characteristic.

Lastly, in the third round, the panels share the new characteristics and sub-characteristics proposed, and the removed characteristics and sub-characteristics are eliminated from the proposed quality model. Finally, a list of the quality models of the WBISA application is proposed based on consensus from the panel experts.

### 3. Conclusion

This paper discusses validating a quality model for WBISA application in public institutions. A Delphi technique is applied to seek expert panel feedback and validate a proposed quality model of WBISA application in public institutions.

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