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Evaluating the Face and Content Validity of an Instructional Technology Competency Instrument for University Lecturers in Malaysia

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Abstract
The purpose of this study was to evaluate the face and content validity of an instrument that had been developed to assess the relevance and comprehensiveness of instructional technology competencies as perceived by Malaysian university lecturers. The face validity and content validity of the instrument was investigated based on the opinions of experts. The item content validity index (I-CVI) and scale content validity index (S-CVI) were calculated by adopting the mean approach and inter-rater agreement. The scale was revised based on comments from a panel of three experts in the qualitative review stage, and thereafter, evaluated by another group of five experts in the quantitative review stage. The findings at the face validity stage yielded 8 domains with 71 items being retained, based on 75 percent or more agreement from expert responses. The content validity of the instrument was assessed by S-CVI/UA and S-CVI/Ave, yielding scores of .81 and .90 respectively. Findings indicated that this instrument had excellent face and content validity and could thus be used to assess the relevance and comprehensiveness of instructional technology competencies as perceived by Malaysian university lecturers.
Keywords: *Instructional Technology, Competencies, Face validity, Content validity, Tertiary education, Measurement.*

Introduction

The International Board of Standards for Training, Performance and Instruction (IBSTPI) defines competency as “knowledge, skill, or attitude that enables one to effectively perform the activities of a given occupation or function to the standards expected in employment” (Koszalka et al., 2013; Richey et al., 2001, p. 31). This definition is often adopted as a basis for designing curriculum and measuring learning goals (Weber, 2013; Koszalka et al., 2013) because designing a curriculum or lesson plan requires understanding of how knowledge, skills, abilities, and other characteristics are integrated in order to successfully perform specific tasks or functions (Jones, 2001). Hence, competencies of instructors, administrators, teachers, or lecturers refer to their ability to use concepts or theories and skills to ensure that their students learn effectively (Hafizan at al., 2012; Varvel, 2007).

Seels and Richey (1994, pp. 1-9) define instructional technology as "the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning”. The definition, which places emphasis on processes and resources for learning, can be examined in three parts: the first phrase, “the theory and practice”, refers to the techniques or ways to make learning more efficient based on a theory (concepts, constructs, principles, and propositions that serve as the body of knowledge base through information gained from experience); the second phrase, “of design, development, utilization, management, and evaluation of processes and resources”, refers to both the areas of knowledge base and functions performed by professionals in the field; “processes” can be defined as a series of operations or activities directed towards a result, and “resources” are sources of support for learning, including support systems and instructional materials and environments; and lastly, “for learning” refers to the purpose of acquiring knowledge. Hence, this definition of instructional technology by Seels and Richey (1994) emphasizes learning outcomes; learning is the ultimate objective, and instruction is a means to achieve learning. According to these researchers, instructional technology can be examined in five domains, namely design, development, utilization/implementation, management, and evaluation. The interrelationships of these domains are presented as a wheel-cycle wherein each domain is connected to “the theory and practice”.

In view of this, it is vital that universities ensure that their academic curriculums or programs for students are aligned with job market requirements after graduation. Therefore, there is a need to identify the competencies that university lecturers should be equipped with so that they can produce more employable graduates.

Problem Statement

Many studies have been conducted on instructional technology competencies. Some focus on investigating the instructional design competencies that instructional designers must have (Kelly, 2016; Ritzhaupt & Kumar, 2015; Kang & Ritzhaupt, 2015; Klein & Jun, 2014), some examine the instructional technology competencies required in different work settings, such as business industry and higher education (Iqdami & Branch, 2016; Ritzhaupt & Kumar, 2015; Klein & Jun, 2014; Ritzhaupt & Martin, 2014; Cardullo, 2013), while others investigate specific types of competencies, for example multimedia competencies (Ritzhaupt & Martin, 2014; van Rooij, 2013; Sugar et al., 2011).

In recent years, however, the attention of research has turned to instructional design competencies as a requisite part of the preparation of teachers or lecturers for instruction in curriculum processes (Barbour et al., 2013; Journell et al., 2013; Cardullo, 2013; Kennedy & Archambault, 2012b; Archambault, 2011). It has been found that educators who are competent in a subject or course do not always make effective instructors, i.e. their competency does not translate into good instructional practices during the teaching and learning process (Weber, 2015; Kim et al., 2008). Hence, it is necessary to ensure that lecturers or educators are equipped with related knowledge, skills, and understanding of instructional design and models when developing educational programs or curriculums to meet the needs of their students (Barbour et al., 2013; Cardullo, 2013; Crawford & Smith, 2012; Picciano & Seaman, 2009). Many studies in the past have failed to highlight the need to include competencies in instructional design as part of their subject or course offerings (Weber, 2015; Journell et al., 2013). Hence, the present study is aimed at establishing the face and content validity of an Instructional Technology Competencies Instrument specially designed to evaluate the educational needs and knowledge levels of instructional competencies as perceived by university lecturers in Malaysian higher education institutions.

Literature Review

Existing Scale Development and Measurement

The International Board of Standards for Training, Performance and Instruction (IBSTPI) Study

The IBSTPI, a non-profit corporation, was established in 1984 to set standards in training, performance and instruction. The three major competencies developed and published by IBSTPI are: (1) Instructional Design Competencies: The Standards (developed in 1986 and revised in 2000; (2) Instructor Competencies; and (3) Training Manager Competencies: The Standards (Koszalka et al., 2013). The IBSTPI instructional design (ID) has 23 updated competencies that have been developed based on findings from various research and studies conducted by: (1) the Atchison (1996) and Song (1998) studies which identified expert instructional designers' roles and competencies; (2) the focus groups of the 15 IBSTPI board members; (3) validation research and findings of the base competency list; and (4) review and revision by the IBSTPI Board of Directors (Koszalka et al., 2013; Richey et al., 2000). All the 23 competencies are "clustered into four domains, namely professional foundations, planning and analysis, design and development, and implementation and management, and are supported by 122 performance statements" (Richey et al., 2001, p. 45).

Competency Scale and Measures

Ridzwan et al. (2017) developed an instrument comprising a 122-item self-report scale to assess graduates' perceptions of the effectiveness of curriculum implementation to produce knowledgeable and skillful teachers. The instrument had 6 subscales: knowledge in education, job satisfaction, content of agricultural sciences, practical skills, teaching skills, and teaching profession. To gauge participants' scores, the instrument used a 5-point Likert-type scale ranging from (1) or very low to (5) or very high. The instrument was tested in a pilot study. A total of 111 graduates of Bachelor of Agricultural Science with Hons (BASH) from Faculty of Technical and Vocational participated in the study. The means and standard deviation for each item were used as indicators of the graduates' perceptions of the effectiveness of the implementation of the agricultural science program.

The findings showed that in (1) Curriculum Implementation of Agricultural Science Graduates, the highest score (mean=4.36, standard deviation=.30) was obtained for the item "the TnL knowledge criteria", while the lowest score (mean=3.25, standard deviation=0.73) was for the item “career knowledge criteria”. In (2) Effectiveness of Agricultural Science Program Implementation, the highest score (mean=4.16, standard deviation=.95) was obtained for the item “helps me in increasing interpersonal communication skill”, while the lowest score (mean=3.97, standard deviation=0.46) was for the item “helps me in increasing analytical skill”. The overall mean and standard deviation scores were high. The results suggested that the instrument was suitable for assessing the effectiveness of the program and curriculum implementation, and the level of knowledge of graduates.

Chen (2012) conducted a research to identify the domains, competencies, and performance statements expected of expert instructional designers in Web-based instruction (WBI) by the use of the IBSTPI model. Two instruments were developed for the study. The first instrument was an interview with Web-based instructional designers using 19 items with open-ended and structured questions designed to explore the domains in web-based instruction expert work, the competencies qualifying them as experts, impact of work environments on performance, and the future of Web-based instruction as perceived by the expert instructional designers. The second instrument was a survey questionnaire which incorporated a 20-item self-reported scale designed to measure the perception of the level of importance of competencies for instructional designers specializing in web-based instruction. Scoring was by a 5-point Likert-type scale ranging from (1) = not important to (5) = very important. Two separate pilots were conducted for both the interview and survey, with two participants and three participants, respectively.

The interview data yielded 91 performance statements to support 20 competencies in four domains, namely (1) Professional Foundations domain with six competencies and 29 supporting performance statements; (2) Planning and Analysis domain with four competencies and 14 supporting performance statements; (3) Design and Development domain with five competencies and 21 supporting performance statements; and (4) Implementation and Management domain with five competencies and 27 supporting performance statements. Next, these 20 competencies were validated and ranked by feedback obtained from the survey with regard to the degree of importance of these competencies as perceived by instructional designers in web-based instruction (WBI). The weighted average scores for professional foundations domain, plan and analysis domain, design and development domain, and implementation and management domain were 4.16, 4.00, 4.04, and 3.97 respectively. The results of this study suggested that both instruments were suitable for identifying the domains, competencies and performance statements as perceived by expert instructional designers in Web-based instruction (WBI).

An instrument was also developed by Umar and Su-Lyn (2011) based on the 23 competencies outlined by the International Board of Standards for Training, Performance and Instruction (IBSTPI) (Gustafson & Branch, 2002) to assess the subscales of perception of what an instructional design model designer used, the tasks and activities instructional designers performed and specify one reason as to why the tasks or activities were excluded or rarely performed in their work to determine the knowledge and skills possessed by instructional design (ID) practitioners in Malaysia. A total of 22 participants (17 women and 4 men) participated in the study. A pilot test was conducted with six instructional designers to evaluate the validity and reliability of the survey questionnaire. The internal consistency for subscale 1, α = 0.897 and subscale 2, α = 0.990 indicated that the questionnaire items were highly reliable. The results of this study also provided confirmation for the instrument’s validity in assessing the perception of what an instructional designer should do, on perception of what an instructional design model designer used, the tasks and activities instructional designers performed and specify one reason as to why the tasks or activities were excluded or rarely performed in their work.

Benjamin (2003) developed the Teacher Belief Survey, a 48-item self-report scale to assess the subscales of behaviorist management (BM), behaviorist teaching (BT), constructivist teaching (CT), and constructivist management (CM). The instrument is designed along a 6-point Likert-type scale anchored by (0) strongly disagree to (6) strongly agree. Examples of the items are: (a) It is important that I establish classroom control before I become too friendly with students; (b) I like to make curriculum choices for students because they can't know what they need to learn; (c) To be sure that I teach students all necessary content and skills, I follow a textbook or workbook; (d) I involve students in evaluating their own work and setting their own goals; (e) for assessment purposes, I am interested in what students can do independently. The TBS was assessed for face validity, internal consistency, and construct validity. Face validity was evaluated by using ratings from experts in the field of education. A total of 371 college freshmen and 290 student teachers participated in this study.

The research findings of construct validity were as follows: NFI=0.41, NNFI=0.46, CFI=0.51 AGFI=0.71, CN=80.80, chi square= 1812.45, df=435, thus showing that the hypothesized model was not confirmed. However, the researcher concluded that the additional items and construct did provide information to assess teachers' beliefs more adequately in relation to the learning theories of constructivism and behaviorism. In addition, the internal consistency reliability based on thirty items for constructivist teaching, behavioral teaching, constructivist management, and behavioral management construct were: r = .7170, .7416, .6701, and .5411, respectively. This shows that the internal consistency (alpha) level was adequate for research purposes.

Instrument Validation

The reliability and validity of a new instrument must be established to ensure its recognition and acceptance. A valid and reliable instrument should be free of bias to avoid inaccurate estimate of outcomes (Chiwarid et al., 2017; Sikorski & Noble, 2013). An instrument is considered reliable when there is a degree of similarity with results obtained every time the procedure is replicated (Chiwarid et al., 2017; Wong et al., 2012). The validity of an instrument refers to how well it measures what it is intended to evaluate or observe (Goldin et al., 2015; Wong et al., 2012).

Methodology

Research Design

In this study, a descriptive research methodology employing an online questionnaire was used to develop an instrument to evaluate instructional technology competencies as perceived by university lecturers in Malaysia. The study aimed to develop an instrument that was valid and reliable for this purpose.

Definition of Subjects and Inclusion Criteria

The subjects of this study were professors, associate professors, assistant professors, senior lecturers, and lecturers. They were from 20 public universities, 9 foreign branch universities, and 46 private universities in Malaysia. In addition, the subjects were also required to fulfill 4 criteria, namely (1) full-time tenure-track, (2) minimum of one-year teaching experience, (3) minimum of one-year experience in developing or modifying curriculum, and (4) valid teaching permit from the Ministry of Higher Education or equivalent qualification recognized by the Ministry of Education or Ministry of Higher Education.

Sample Methodology (and Size Determination)

A sampling technique based on Cochran's (1977) formula was used to determine the appropriate sample size. The sample selection was conducted using the stratified random sampling technique.

Instrument Development

This instrument was developed in four major phases. In the first phase, the researchers focused on establishing the conceptual and operational definitions of the construct to ensure content validity. During the second phase, an item pool was generated. An appropriate scale was developed in the third phase. Finally, in the fourth phase, an expert review of the instrument was sought.

Step 1 of Scale Development - Developing Conceptual and Operational Definitions

The researcher employed a questionnaire to collect information from a panel of experts about their perceptions of the types of instructional technology competencies, their importance and educational relevance.

Relevant Analysis, Design, Development, Implementation, and Evaluation (ADDIE) instructional design model sources and theories were obtained from textbooks used in higher education institutions or e-books available online either through Google Books or free e-book websites. In addition, research articles were accessed with key words ADDIE, instructional design model, learning theory, validity, taxonomy was performed, from various databases such as ERIC, EBSCOhost, JSTOR, ProQuest Dissertations and Theses database, Google Scholar, and other online journals available in the databases.

The ADDIE Model is a basic model of instructional design that includes five phases. These phases, the first letter of each giving rise to the acronym ADDIE, are as follows: Analyze, Design, Develop, Implement, and Evaluate (Gagne et al., 2005). Instructional Design is defined as a "problem-solving process that has been applied to the creation of training since the 1940's" (The Herridge Group, 2004, p. 6). The Instructional Design theory is defined as "a theory that offers explicit guidance on how to better help people learn and develop" (Reigeluth, 1999, p. 5). Learning theory is conceptualized and defined as an "explanation on how learning takes place to achieve certain types of outcomes" (Morrison et al., 2004, p. 4).

Step 2 of Scale development—Generating an Item Pool

DeVellis (2012) explained that Step 2 of scale development involved a number of tasks related to generating a large pool of items that are candidates for inclusion in the scale for the construct under investigation. In this study the focus was on instructional technology competencies. Fifteen tasks extracted from two sources, namely the literature and input from selected experts, were used for the measurement of instructional technology competencies. These are shown in Table 1.

Table 1. Step 2 of Scale Development—Generating an Item Pool

1	Examine existing instruments that measure the construct of interest.
2	Choose items from existing instruments.
3	Create items.
4	Get ideas for items from reading the literature based on the research problem, from personal experience, etc.
5	Express only one idea in each item.
6	Collate a list of items for the item pool that appear to fit the definition of the construct of interest.
7	Ensure items are as short and uncomplicated as possible.
8	Ensure reading difficulty level matches that of the intended respondents.
9	Avoid colloquialisms, idiomatic and figurative expressions, and jargon.
10	Select items that match the specificity of the construct of interest.
11	Consider exclusion or inclusion of negatively and positively worded items.
12	Consider quantity of items to include in the item pool.
13	Consider expert involvement (for deriving items, assessing selected items, etc.).
14	Consider the number of items for the item pool.
15	Consider bias issues.

Step 3 of Scale Development—Designing the Scale

The initial instrument contained 73 items supporting 8 subscales as follows: (1) analysis phase (conduct a needs analysis, analyze curriculum or program scope, analyze delivery methods appropriate for determining instructional content, analyze learner profile, analyze learning and instructional environment), (2) design phase (determine instructional objectives, design and development model appropriate for learner, sequence the instructional content and strategies, apply theories in curriculum instructional materials), (3) development phase (develop instructional materials to meet learners needs, design instruction for learners needs), (4) implementation phase (plan instructional design and implement instructional materials), (5) evaluation phase (evaluate instruction and its implication), (6) instructional technology training, (7) instructional technology experience, and (8) perception on instructional technology. Items relating to general and epistemological beliefs were also included. The initial set of items for each domain and dimension were derived from related studies. All items on the scale and subscales were assessed for face validity, clarity (including double-barrel items), readability, theoretical relevance, and redundancy. Based on the feedback from experts, items were added, rephrased, or removed accordingly.

The questionnaire was developed in the English language and consisted of five parts. The first part measured the lecturer's perceived level of importance and level of knowledge of the ADDIE instructional design model, and consisted of five subscales, namely analysis phase, design phase, development phase, implementation phase, and evaluation phase. The second part was related to the perception of training on designing instruction. The third part was to solicit the lecturer's feedback on his or her perceived experience in designing instruction. The fourth part was related to the lecturer's perceived need for further training in designing instruction. The last part was aimed at collecting demographic information from the lecturer /respondent

A dichotomous scale was used with the categorical options of "Relevant" and "Not relevant". The assessment criteria were based on Oluwatayo (2012): (1) appropriateness of grammar, (2) clarity and unambiguity of items, (3) correct spelling of words, (4) correct sentence structure, (5) structure of instrument in terms of constructions and well layout format. In addition, a blank space was provided for each item statement should the panel of experts want to give additional suggestions to improve the instrument (Masuwai et al., 2016; Wynd & Schaefer, 2002). Item length, reading level, redundancy, positive or negative wording, and grammar were considered when selecting items for inclusion in the initial instructional technology competencies scale (DeVon et al., 2007; DeVellis, 2003). In addition, great care was taken to ensure that all the items that made up the pool were congruent with the construct under study (DeVellis, 2003) so as to ensure face and content validity.

Step 4 of Scale Development— Expert Review of the Instrument

Face Validity

In this study, the face validity of the instrument to evaluate university lecturers' perceptions of instructional technology competencies was established by the responses of the reviewers who indicated whether or not they considered the test items to be relevant with regard to instructional technology competencies (Yassir et al., 2016; Zamanzadeh et al., 2015).

Procedures

Recruitment of Participants

The target sample population was a convenience sample of postgraduate students at University Putra Malaysia. The first step was to make initial contact with participants by either meeting with them in person or emailing the instrument with a cover letter along with instructions to each participant. The cover letter explained the significance of the study, instructions to follow, the importance of each participant's response, and their need to respond promptly. A deadline was specified for each cycle in the cover letter. In addition, all the participants were assured of confidentiality throughout the survey process. The electronic data collection procedure enabled the researcher to identify who had or had not responded for non-respondent's follow-up purpose later. The second step was to email a gentle reminder to the non-respondent after the first email was sent out two or three weeks before. The final step of the data collection procedure was to input the data into statistical software for data analysis.

Content Validity

Content validity requires the evaluation of each test item for its relevance to the intended construct, i.e. whether the items are clearly and correctly worded, whether there is appropriate scoring and scaling of the scale to ensure that the items of the instrument "are representative samples of the universe of content and/or behavior of the domain being addressed" (Yassir, McIntyre, & Bearnm, 2016; Krikorian, 2016).

Survey Deployment and Completion

The first step was to approach shortlisted experts via email to seek their willingness to participate voluntarily in this study. Next, after obtaining their cooperation, the researcher emailed them the instrument with an introductory cover letter explaining the significance of the study and the importance of the participant's response. Also included in the email were instructions to follow and specific deadlines for each cycle. The participants were assured of confidentially throughout the survey process. In addition, they were also asked to add comments and suggestions for improvements so as to enhance the content validity of the instrument. The reviews were returned to the researcher via email. The third step was to send a gentle reminder email to follow-up with non-participants after the first email was sent two or four weeks before. The fourth step was to send second reminder email to follow-up with non-participants after the first reminder email. The last step was to input the data into statistical software for data analysis.

Judgment

At this stage, a decision had to be made by a panel of experts whether the instrument that had been developed had valid face and content validity. For such a purpose, determining the number of experts has always been inconsistent. For face validity, some researchers recommend at least seven to ten people to have sufficient control over chance agreement (Hernández-Garbanzo, 2011; Thomason, 2008; Ibrahim, 2003). For content validity, the number of experts should be not less than 2, but not more than 6 (de Alwis et al., 2016; Strickland et al., 2013; Kong, 2011; Umar & Su-Lyn, 2011; Singh, 2009). After determining 2 to 5 experts, the researcher collected and analyzed the viewpoints of the experts, who took into consideration the relevancy or representativeness, comprehensiveness, and clarity of the items that comprised the instrument. Considerable effort was taken to ensure that the construct was operationally defined to ensure the content validity of the instrument for this study.

Data Analysis

Measurement instrument

(a) Analysis, design, development, implementation, and evaluation phases

To establish face validity in the sixty-three items used, feedback from the experts was sought with regard to their perceptions of the relevance or otherwise of the items. The views of the experts were taken into consideration in the analysis, design, development, implementation, and evaluation phases to create a subscale that ensured the items in the instrument were relevant to the evaluation of instructional technology competencies. Responses to this subscale were summed, with higher scores indicating higher perceived relevance of item.

(b) Instructional Technology Training
Four items were used to measure the extent to which expert perceived the degree of relevance of this item in this subscale, i.e. the training previously attended had helped them in designing instruction for curriculum purposes.

(c) Instructional Technology Experience
Three items were used to measure the perceptions of experts regarding the relevance of this item, i.e. previous experience had helped them design instruction for curriculum purposes. Responses were summed; lower scores indicated low perceived relevance of this subscale to be included in the instrument.

d) Perception of Instructional Technology
Three statements were used to gauge the experts' perceptions of the degree of relevance of this item, i.e. involvement in the process of designing the curriculum. Responses were summed, with lower scores indicating low perceived relevance of this subscale to be included in the instrument.

Face Validity
Based on the responses by the panel of experts, items with 75 percent or more agreement as belonging to a specific construct were retained (Ohanian, 1990; Slama & Tashchian, 1985). Subsequently, the item pool was refined and revised based on the comments and suggestions by the reviewers.

Content Validity
Establishing content validity is a systematic and two-stage process. The first phase was a qualitative review of the instrument by a panel of experts to solicit feedback based on 5 questions: (1) Do you have any suggestions regarding the definition of the constructs / factors? (2) Do the test items appear to cover the full range of content within each construct / factor? (3) Are the instrument items clearly worded and unambiguous? (4) Are the items on the instrument appropriate for university lecturers? Do you have any suggestions for improving the items? (Please feel free to provide comments directly on the item regarding rewording and or removing the words.) Lastly, (5) do you have any new items that you would like to add? Please feel free to comment. In addition, experts were required to identify deficient areas by providing suggestions on ways to improve the sentence structure to ensure clarity and conciseness (Lynn, 1986).

Based on the experts' responses and comments, the instrument was revised and modified accordingly to be used for the second phase, i.e. the quantitative review of the instrument. Five experts were invited to select the most important and correct content in the instrument, which was quantified by the Content Validity Index (CVI). The experts were asked also to rate the instrument items for clarity and relevancy to the construct underlying the study as per the theoretical definitions of the construct of interest and its dimensions on a 4-point ordinal scale: 1 = not relevant, 2 = somewhat relevant, 3 = quite relevant, 4 = highly relevant (Chiwarid et al., 2017; Vrbnjak et al., 2016; Davis, 1992).

To obtain content the validity index for relevancy and clarity of each item (I-CVIs), the number of those judging the item as relevant (rating 3 or 4) was divided by the number of content experts but for relevancy, content validity index was calculated both for item level (I-CVIs) and the scale-level (S-CVI). In this study, 1.00 for two experts was considered as evidence of acceptable content validity (Kong, 2011; Strickland et al., 2013).

The scale level content validity (S-CVIs) is defined as the "the proportion of total items judged content valid" (Peirce et al., 2016; Zamanzadeh et al., 2015; Lynn, 1986), and computed by using two methods. The first method requires universal agreement among experts (S-CVI/UA) (Chiwarid et al., 2017; Peirce et al., 2016; Zamanzadeh et al., 2015). The second method uses the average of the item-level CVIs (S-CVI/Ave). Hence an S-CVI/UA that reaches 80% or better agreement among panelists (Polit & Owen, 2007; Waltz et al., 2005; Davis, 1992), and an S-CVI/Ave of greater than 0.90 would qualify the questionnaire to be content valid for a study (Chiwaridzo et al., 2017; Peirce et al., 2016; Vrbnjak et al., 2016).

Results

Agreement among Experts for Face Validity

All the 10 invited reviewers returned their responses. After analyzing the responses, eight constructs/domains with 71 items were retained for subsequent assessment of content validity as they showed 75 percent or more agreement (Salavati et al., 2016; Obermiller & Spangenberg, 1998); four items that showed less than 75 percent agreement were eliminated from the final instrument for preliminary test as shown in Table 2.

Table 2. Results of Agreement among Experts

Phase	No of items in initial instrument	No of items showed lower than 75% agreement	Total
Analysis	22	2	20
Design	27	0	27
Develop	6	0	6
Implement	5	1	4
Evaluate	5	0	5
Instructional Technology Training	4	0	4
Instructional Technology Experience	3	0	3
Perception on Instructional Technology	3	1	2
Total	75	4	71

The panel of experts discussed the adequateness of the instrument and reviewing the wording of some items for clarity, and so forth. Following the revision, the initial instrument was ready for content validity evaluation.

Content Validity Index for Content Validity

The content validation of the instrument was conducted by a panel of 3 experts in a qualitative review and 5 experts in a quantitative review, following the guidelines by Lynn (1986). Of the 13 experts who agreed to participate, 8 returned their responses while the remaining 5 did not, resulting in a return rate of 53.8%. It is generally agreed that three and two responses from experts for both the qualitative and quantitative rounds respectively are valid for this purpose (Zamanzadeh et al., 2015; Strickland et al., 2013; Kong, 2011, Umar & Su-Lyn, 2011; Singh, 2009), One rater did not provide any input for 8 item statements, while three experts returned the instrument with suggestions for removing the double-barrel questions and reviewing the wording of items for clarity, and so forth.

The Item Level- Content Validity Index (I-CVI)

Based on the expert review panel, twenty items (Table 3) were deleted from the 104-item instrument because these did not meet the I-CVI nor were they related to the eight subscale domains of the instrument. Hence, 84 items with excellent I-CVI were left.

Table 3. Twenty items that did not meet the content validity indices (I-CVI)

Content-related Validity Index			
Item No	Rater 1	Rater 2	Item CVI
1.1.2	-	X	0.50
1.1.3		X	0.50
1.1.4	-	X	0.50
1.2.3	-	X	0.50
1.2.4	-	X	0.50
1.2.5	-	X	0.50
1.3.1	-	X	0.50
1.3.3	-	X	0.50
2.1.1.7	-	X	0.50
2.1.2.2	-	X	0.50
2.1.2.3	-	X	0.50
2.1.2.4	-	X	0.50
2.1.3.5	-	X	0.50
2.1.3.7	-	X	0.50
2.1.3.8	-	X	0.50
2.1.3.9	-	X	0.50
2.1.3.10	-	X	0.50
2.4.1	X	-	0.50
3.1.1	X	-	0.50
	.83	.98	

The Scale Level Content Validity

The S-CVI/UA (universal agreement) for these data was .81; two experts agreed universally that 84 out of the 104 items had content validity, while the averages item-level CVIs (S-CVI/Ave) was .90; two experts agreed that 84 items were relevant (I-CVI=1.00) and I-CVIs had a value of .81. Averaging across the I-CVIs (S-CVI/Ave), a value of .90 was obtained. In addition, some items or item statements were restructured or rephrased, based on the feedback and suggestions received.

With S-CVI/AV = .90, the instrument had good face validity and good content-related validity. The results indicated that the instructional technology competencies instrument developed in this study presented a valid and reliable assessment tool for the examining instructional technology competencies as perceived by university lecturers in the Malaysian context. Finally, at the end of the content validation and face validation process, the instrument had eight domains and 84 items for the pilot study.

Discussion

This paper evaluated the face and content validity of a newly constructed instrument designed to assess instructional competencies. Results showed that the face validity of the instrument was established; the questionnaire reviewed by the panel of experts indicated that it was appropriate for this study purpose. In addition, the content validity of the instrument was also evaluated. Based on the feedback received from the panel of experts, the questionnaire was revised and modified in selected parts to ensure that the degree of relevancy and representativeness of each item of questionnaire was adequate. Items with lower than acceptable levels of content validity were discarded. The original pool that consisted of 75 items measuring eight domains of competencies was increased to 104 items after the qualitative review phase but was subsequently reduced to 84 after the content validation exercise. Subsequently, this instrument was judged as having excellent content validity.

Conclusion

An instrument to evaluate instructional technology competencies as perceived by university lecturers in the Malaysia context was developed in this study. To ensure face and content validity of the instrument, the item pool was revised and modified based on an extensive review of the literature and feedback from a panel of experts. The content validity study revealed that this instrument attained an appropriate level of content validity. The overall content validity index of the instrument had high S-CVI value of 0.90. Nevertheless, with further research, the instrument might be refined to improve its reliability and validity further as an effective instrument to evaluate relevant constructs in instructional technology competencies.

Implications of this Findings

Two important implications can be concluded from the findings of this study. First, the validation of the instrument provided a stable and appropriate measurement of constructs related to instructional technology competencies in interdisciplinary subject matters.

Second, this study also has implications for instructional design practice. The study gives the instructional designer a better idea of what competencies she or he needs to have when editing and creating content for the curriculum. Hence, the findings will help improve professional development opportunities essential for overcoming the perceived deficiency in instruction when designing the curriculum for technological instruction.

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