

Construct validity and reliability of the Hybrid e-Training questionnaire

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Hybrid E-Training has become prevalent in the field of computer and educational technology for both who are in the field and not exactly in the field. We were interested to examine how well was the e-Training implementation conducted in a hybrid environment. Thus, we developed a questionnaire to measure meaningfulness of the Hybrid e-Training. The questionnaire has sections on demographic (section A), 21-item assessing meaningful learning (section B) and 61-item assessing perception towards the Hybrid E-Training system (section C). This paper discusses present study which examines the construct validity and reliability of section C. Based on the 213 sample data collection, the overall reliability coefficients for section C was 0.986. Reliability at the scale levels for section C were also acceptable ranging from 0.886 to 0.971. Overall analyses suggested that section C of the questionnaire is reliable to measure a hybrid e-Training system.

Keywords: e-training, ICT trainers, meaningful learning, e-training questionnaire

Introduction

The purpose of this study was to examine the validity and reliability of the Hybrid e-Training Questionnaire (HiTQ). The questionnaire consist of 61 items regarding e-Training for adult learners in a hybrid environment on a Likert-type scale. The constructs were adapted from the Demand Driven Learning Model (DDLm) inventory, a Web-based learning model designed for working adult learners by Mc Donald et al. (2002). DDLm was defined by five key constructs: Structure, Content, Delivery, Service and Outcomes. The items for each constructs were then modified and adapted for HiTQ to fit with the Asian and local university's culture. The following questions guided this study: (1) What is construct validity of the Hybrid E-Training Questionnaire? (2) What is the internal consistency reliability of the Hybrid E-Training Questionnaire that measures a superior hybrid e-Training system?

Methodology

This study established the validity and reliability of the Hybrid e-Training Questionnaire (HiTQ). The study was conducted in a higher learning institution. Construct validity was determined by internal consistency and content validity. To investigate the internal structure, an exploratory factor analysis (EFA) was run and yielded a five-factor, 61-items questionnaire. Based on the 213 sample data collection, the overall reliability coefficients for section C was 0.986. Reliability at the scale levels for section C were also acceptable ranging from 0.886 to 0.971.

Participants

A number of different communities of users are referred to in this study. Broadly speaking they are (i) ICT trainers appointed by the university ICT Center, whose role is to support and direct staff in the area of ICT and Computer Science; (ii) educational developers and learning technologists attached to the university's Computer Center, whose role is to work with or alongside practitioners to enable and enhance e-learning researchers into learning and e-learning, including academic researchers, action

researchers and research-project workers; (iii) appointed ICT trainers, teachers and teacher trainees and (iv) ICT educators in the country. Despite their internal complexities, these communities will be referred to in this paper, simply as ICT trainers. The sample consisted of 213 participants, 172 females and 37 males, studying at a public university in Malaysia. The trainees were enrolled in credit-bearing education and computer education courses. The age of trainees range from 20 to 48 years old. Highest frequency is in the range of 21-25 years old; that is 62% (132) of the whole sample. The trainees represented four origin, (31.9% (68) from East Malaysia, 51.6% (110) from West Malaysia, 1.4% (3) from Brunei and 14.6 (31) from main land China. They make up four main races with 71.4% (152) Malays, 23.9% Chinese, 2.8% (6) Indians and 1.4% (3) other from other races. All but 28.2% (60) of the participants had none or less than one year teaching experience.

The e-Training questionnaire

The questionnaire has sections on demographic (section A), 21-item assessing meaningful learning (section B) and 61-item assessing perception towards the Hybrid E-Training system (section C). This paper discusses present study which examines the construct validity and reliability of section C only. The questionnaire was edited by a professional language and education expert and most items were maintained except for some minor changes to make the English more consistent with local usage. During each administration of the questionnaire, some participants found various items to be ambiguous. After consultation with language expert, we replaced the original statement with a simpler phrase. For every changes we made, we number the version with a new code. To date, the questionnaire is version 6.2. Subsequent participants did not express any difficulty with the simpler phrases. Appendix 2 shows the contents of section C.

Analyses

Questionnaire data were entered into SPSS 12.0.1 (SPSS, Inc., Chicago, IL) and checked for accuracy. If a participant gave two answers to an item, the mean value was substituted. No other changes were made to the original data. Only completed questionnaires were included in each analysis. Analyses were then done in SPSS Version 12.0.1 (SPSS, Inc., Chicago, IL). Cronbach's alpha was used to determine internal reliability. Construct validity was examined by inter-correlating the five measures in section C: Hybrid e-Training System since they were presumed to be tapping similar underlying constructs.

Results and conclusion

To determine the, internal consistency and content validity, cronbach's alpha coefficient was conducted for the 61-item HiTQ. Appendix 2 presents the reliability analyses for the hybrid learning system measures. As seen in Appendix 2, the alphas of the Hybrid e-Training System measures were high in each of the five constructs (ranging from 0.886 to 0.971) and cronbach alpha for the whole section measures came out to 0.986. Overall analyses suggested that the E-training instrument is a reliable instrument used to measure meaningfulness and acceptance of the e-training materials.

References

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Please cite as: Din, R., Zakaria, M.S., Mastor, K.A. & Embi, M.A. (2008). Construct validity and reliability of the Hybrid e-Training questionnaire. In *Hello! Where are you in the landscape of educational technology? Proceedings ascilite Melbourne 2008*.
<https://doi.org/10.14742/apubs.2008.2525>

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APPENDIX 1

Table 1: Contents of the e-training questionnaire (Section C)

Factors indicating a superior hybrid e-training system	Item	Total items
Content	C01 - C09	9
Delivery	C10 – C18	9
Servive	C19 - C25	7
Outcome	C26 - C37	12
Structure	C38 – C61	24

*Total items = 61

APPENDIX 2

Table 2: Reliability analysis with overall reliability coefficient equals 0.986.

Cronbach's alpha for construct measure	Item	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Cronbach's alpha if item deleted
0.933 for Content measures of the hybrid e-Training system N of items = 9	I am aware of the prerequisites for this course	31.9859	27.929	.747	.925
	I had the prerequisite knowledge and skills for the course.	32.0141	28.372	.750	.925
	I was well informed about the course objectives.	32.1502	27.685	.787	.923
	The course lived up to my expectations.	32.3991	27.543	.761	.924
	The course is relevant to my job.	32.0704	28.670	.700	.928
	Reading materials are relevant to the course.	32.1972	28.225	.699	.928
	There are strong links between theory and practice.	32.0000	28.123	.755	.925
	The content includes knowledge applicable in life.	31.9484	27.889	.765	.924
	The content covers current technology use.	32.0235	27.995	.786	.923
0.921 for Delivery measures of the hybrid e-Training system N of items = 9	The computer education blog at rosseni.wordpress.com: is concise and uncluttered.	30.7089	30.151	.703	.913
	uses appropriate style for display.	30.5869	30.074	.796	.908
	features aesthetically pleasing graphics	30.5775	30.792	.768	.910
	provides descriptions to all links.	30.5775	29.490	.724	.912
	provides materials that stimulates curiosity.	30.6291	30.414	.687	.914
	has useful functions.	30.5493	29.164	.780	.908
	support face to face lecture	30.5258	28.581	.732	.912
	uses appropriate technology	30.4460	30.824	.735	.912
	features reasonably fast download of files	31.0423	29.154	.628	.921
0.886 for Service measures of the hybrid e-Training system N of items = 7	The instructor was well prepared.	23.9343	16.307	.719	.864
	Face to face instruction was helpful.	23.8685	16.360	.760	.860
	The online resources are useful.	23.8685	16.152	.741	.862
	The online support from peers were helpful.	23.8592	15.933	.789	.856
	Sufficient time was given to complete the project.	24.0798	16.357	.620	.876
	Comments are responded to within reasonable time.	24.4131	16.234	.501	.898
	Suggestions are quickly responded to.	24.3146	16.405	.696	.867
	The online support from peers were helpful.	42.7324	55.084	.678	.946
	The course project is in line with my expectations.	42.6995	53.268	.795	.942
0.948 for Outcome measures of the hybrid e-Training system N of items = 12	I have gained more knowledge about technology	42.7277	53.775	.727	.945
	I have acquired proficiency in blogging with wordpress.	42.4225	53.745	.781	.943
	I have developed new skill in ICT	42.3146	53.830	.783	.943
	My attitude has changed.	42.2394	54.598	.767	.943
	I will be able to use the new skill throughout my career	42.9343	52.788	.746	.944
	I have applied the new knowledge in my life.	42.4131	53.913	.813	.942
	I initiated new ideas from the new knowledge	42.3333	54.525	.718	.945
	Interactive blogging was essential in the course.	42.4977	53.732	.787	.943
	The assessment criteria is fair.	42.6009	53.316	.749	.944
0.971 for Structure measures of the hybrid e-Training system N of items = 24	I completed the required tasks for the project	42.6291	53.687	.734	.944
	Free wireless connection is important for learning	89.9155	258.653	.757	.970
	The university provides free wireless connection.	89.0282	265.443	.499	.972
	The course content meets my need.	90.3286	261.325	.381	.976
	The course uses interactive technology.	89.9108	261.978	.651	.971
	The course engages me in the learning experience.	89.6385	259.722	.780	.970
	The course builds my confidence in problem solving.	89.7606	255.079	.855	.969
	The course builds my confidence in planning.	89.9296	253.490	.791	.970
	The course is interactive	89.9953	252.590	.766	.970
	The instructor act as a partner in learning	89.7512	256.622	.840	.970
	My opinions are considered in the course	89.6526	258.341	.774	.970

	The instructor was empathetic to my needs	89.7371	258.214	.748	.970
	The course creates a positive learning environment	89.7512	257.839	.747	.970
	The course content activities support learning goals	89.5211	257.694	.829	.970
	The instructor facilitates self-directed learning	89.6432	255.872	.746	.970
	The instructor makes his/her expectations clear	89.5962	258.855	.798	.970
	The instructor embeds learning in realistic contexts	89.5775	258.556	.823	.970
	The course allow me to make choices	89.5540	257.994	.800	.970
	The course provides sufficient practice opportunity	89.6103	256.192	.840	.970
	The course provides opportunities for self-reflection	89.6244	256.971	.856	.970
	The course provides opportunities for self-evaluation	89.5446	256.598	.881	.969
	The course supports exploratory learning	89.5962	256.798	.837	.970
	The course enhanced my learning	89.5962	255.836	.845	.970
	The course provides steps/links to further my learning	89.6667	253.384	.856	.969
	The course blog provides access to online resources	89.5681	256.699	.818	.970