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E-Learning Technology Effectiveness in Teaching and Learning: Analyzing the Reliability and Validity of Instruments

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E-Learning Technology Effectiveness in Teaching and Learning: Analyzing the Reliability and Validity of Instruments

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ABSTRACT: Over the years, the introduction of e-learning technology as been familiar among academicians, students, and even non-academicians in higher education institutions. E-learning is one of the learning tools in the education sector that greatly influences education, which emerged as a newmodern education paradigm and has successfully evolved around the world. However, limited attention has been paid to research on e-learning relative to the factors influencing the effectiveness of e-learning tools in the teaching and learning process. Therefore, using a quantitative approach, this study aims to review the reliability and validity of the applied instrumentsin assessing the factors influencing the effectiveness of e-learning tools in the teaching and learning ofentrepreneurship students'courses through a pilot study. Data involving 150samples from the questionnaires were analyzed using IBM SPSS version 24, while evaluations from experts were employed to check for content and face validity and reliability as well asthe normality of data. Based on theresults, the normality of the data as well as the reliability of the measuring instruments in this study are proven.As such, the measuring instrumentsproposed in this study warrant further research.

Keywords: Technology; E-Learning; Effectiveness; Teaching & Learning;Higher Education**.**

1. INTRODUCTION

Over the years, the introduction of e-learning has been popular among academicians and students. It is a phrasedefined as the use of variouscategories of computer and electronic media, a fewof which the Internet andcommunication tools are employed for training in certain topics. Additionally, e-learning refers to a specific course delivered through the internet to a location other than the classroom where the lecturers teach. E-learning interactively allows students to communicate with their lecturers or among themselves inside or outside the classroom (Aziz et al, 2019; Clark, & Mayer, 2016).

There arevarious terms have been used to explaine-learning, such as the learning that goes online, by the internet, through distance education, computerized electronic learning, and internet learning(Al-Rahmi et al., 2018; Masoumi&Lindström, 2012). Briefly, e-learning uses telecommunication technology to disseminate information for training and educationalpurposes. The term "e-learning" is rapidly changing in terms of its purpose as opposed to its content and approaches. Hence, e-learning, such asopen distance learning, has become a household name.The same also goes for Web-Based Training (WBT), Computer Based Training (CBT), technology-based learning, and

online learning (Arkorful&Abaidoo, 2014).

Even though technologies have grown faster in this new era of globalization (Hashim, Ramlee, Yusoff, Nawi, Awang, Zainuddin, Abdullah, Ahmad, Rahim, &Fatt, 2019; Hashim, Safri, Yusoff, Omar, Velayuthan, Hashim, Aziz, Awang, Ahmad, &Fatt, 2019; Hashim, Zulkiffli, Aziz, Nawi, Awang, Muhammad, &Yusoff, 2020), there are students and teachers who still do not know about e-learning as a modern way for teaching as well as a learning method (Goh et al., 2017; Lumadi, 2013). This shows that some students remainincognizant of e-learning effectiveness in the sense that they may find e-learning ineffectivebecause they were unable to interact face-to-face as they need to use modern tools in learning sessions (Diemer, Fernandez &Streepey, 2012). Numerous different variables have been introduced and applied by some researchers and marketers to understand the usefulness of e-learning tools in students' teaching and learning. Therefore, this study attempts to examine the reliability and validity of the measurement scale proposed in this study as well as the extent to whichthe instrumentsaffirmthe effectiveness of e-learning tools in teaching and learning among students through a pilot study. Accordingly, thekey priorities for ensuring that problems do not occur and disrupt the main research project are the reliability and validity of the instruments.

2. RESEARCH METHODOLOGY

2.1 Instrumentation and Measurement of Variables

The instrument used to collect the required data in this studyincludesquestionnaires. The questionnaires were used to interpret the abstract information needed into a set of specific responses that can be measured. The elements in the questionnaires were drawn up in line withthe objectives and questions addressed in this study. The questionnaires were divided into three parts, namely Part A, Part B, and Part C. Part Acovers the students'demographic information, whereasPart B includes questions on the independent variables, which are the motivational factors. Finally, Part C coverts the items of the dependent variable, which is the effectiveness of e-learning. All of the items included in the questionnaire would be measured using afive-point Likert Scale. Each scale has a minimum point(1) and a maximum point(5). While a point near "1" indicates a very strong attitude against the statement, the point near"5", however,indicates a very strong attitude towards the statement.As such, the scale is interpreted from 1= "very strongly disagree" to 5= "very strongly agree".

Table 1: Research Instrumentation

Section	Variable	No. of Items	Source
A	Demographic	4	-
B	ICT Skills	6	Aziz, et al. (2019) Jethro, Grace, & Thomas (2012)
	Time Management	5	Aziz, et al. (2019)
	Resources	5	Aziz, et al. (2019)
	Learning Techniques	5	Aziz, et al. (2019) Ismail et al., (2013)
C	Effectiveness of E-learning Tools	5	Aziz, et al. (2019) Venkataraman & Sivakumar (2015)

2.2 Data Distribution

This study employed a quantitative approach whereby questionnaires were used to conduct the pilot study. The data from the questionnaires were collected viaself-administered questionnaire distribution and a normality test was performed to avoid statistical errors that may yield invalid output. Skewness and kurtosis tests were also conducted and the values showed positive scores; hence, the data were slightly skewed to the rightand had leptokurtic distributionas opposed to a normal distribution (Std. Error), with skewness and kurtosis values of 0.406 and 0.787,respectively. Additionally, the numbers were both within a ±1.96 limit; thus, the distribution of all construct combinations is normal and this suggests that the departure from normality is not too extreme.

2.3 Data Analysis

Data analysis was conducted over the weekend in Kelantan. To answer the pilot test questions, a total of 150 entrepreneurship students'courses were acquired andIBM SPSS version 24 was used to analyze the data by calculating the Cronbach's alpha values. Table 4 shows the details of Cronbach's alpha score for each variable.

3. CONCEPTUAL FRAMEWORK

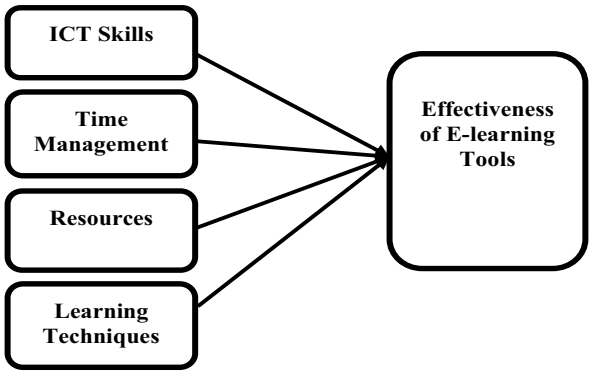

Figure 1: Conceptual Framework

4. RESEARCH FINDINGS

4.1 Demographic Profile

Table 2 presents the respondents' demographic profile. Based on the table, there are about 39.3% female respondents and 60.7% male respondents. The majority of the respondents are Malay, representing 44% of the total population, while the least group includes other races with 2.7%. Most of the respondents are alsosingle(92%), while 8% of the respondents are married. The major age range of the respondents is 20-25 years old with81.3% and followed by the age group of 26-30 years old with 13.3%, while those over the age of 36 are the lowest, representing 1.3% of the population.

Table 2: Demographic Profile

Variable	Frequency	Percentage (%)
Gender		
Male	91	60.7
Female	59	39.3
Race		
Malay	66	44
Chinese	22	14.7
Indian	12	8
Sabahan	25	16.7
Sarawakian	21	14
Others	4	2.7
Status		
Single	138	92
Married	12	8
Age		
20-25 years old	122	81.3
26-30 years old	20	13.3
31-35 years old	6	4
36 years old and above	2	1.3
Total	**150**	**100%**

4.2 Reliability and Validity

Prior to the actual process of data collection, reliability and validity tests were initially carried out in this study. To improve reliability, the researcher had applied four criteria. Firstly, all constructs were configured, and subsequently, the measurement levelswere improved.Next, several indicators were used, and finally, pilot studies were conducted. Following Hair, Celsi, Money, Samouel, and Page's (2015) rule of thumb (see Table3), a reliability value below 0.6 is deemed poor, while 0.70 is considered good, and a value that is more than 0.8 is deemed very good. Correspondingly, the items with the values fewer than 0.70 were removed from the questionnaires.

Table 3: Reliability of Instrument

Coefficient Range Value	Association Strength
Below 0.6	Poor
0.6 to 0.7	Moderate
0.7 to 0.8	Good
0.8 to 0.9	Very Good
0.9 and above	Excellent

Hair *et al.* (2015)

Table 4: Internal Reliability ofEach Questionnaire Section

Variable	Number of Items	Cronbach's Alpha Coefficient	Strength of Association
Skills ofICT	6	0.881	Very Good
Time Management	5	0.856	Very Good
Resources	5	0.892	Very Good
Learning Techniques	5	0.890	Very Good
Effectiveness of E-learning Tools among Students	5	0.841	Very Good

To ensure that the scales' validity content is used,the researcher has taken somerequired precautions. As such, the researcher sought assistance from the academician and expertsin some universities to review the validity content. Table 4 shows the resultsof the pilot study. As can be seen in the data, all of the measures yielded a high-reliability standard as follows: Skills ofICT (0.881), Time Management (0.856), Resources (0.892), Learning Techniques (0.890), and Effectiveness of E-learning Tools Among Students (0.841), which portrayed an excellent internal consistency. In fact, an instrument is believed to portray an average liability if it yields a coefficient value of 0.60 and above (Sekaran & Bougie, 2017). Therefore, the questionnairesare applicable for the actual future research as the questions can be considered official.

5. CONCLUSION

The pilot study was primarilyconducted to establish the reliability and validity of the measuring instruments relative to the factors influencing the effectiveness of e-learning tools in the teaching and learning ofentrepreneurship students'courses in Kelantan. A pre-test was conducted by gathering and assessing experts'opinions of the content validity and face validity of the questionnaires. Based on the findings of the pilot study, all of the items are deemed reliable as they yielded Cronbach's alpha above the value of 0.7, which means that there is no need for deleting any item. Furthermore, the values of skewness and kurtosis have proven the normality of the data,henceassuring the feasibility of the research protocol. Overall, the questionnairesare deemed valid following the reliability and validity of their measures upon examination. The actual study, which is further anticipated to gather the data from more than 400 entrepreneurship students'courses, would give a glimpse of the e-learning tools' effectiveness in teaching and learning among students in Kelantan. Besides contributing to the body of knowledge inrelevant areas,the findings of this study would alsoallow for the commencement of standard future research.

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