HRMARS
Exploring Intellectual Capital

Students Perspectives on Adopting E-portfolio Among Malaysian Polytechnic Students: Exploratory Factor Analysis

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Abstract
This pilot study examines students perspectives about electronic portfolio or e-portfolio and factors strongly associated with the use of e-portfolio by polytechnic students. Referring to the Technology Acceptance Model (TAM), five mains variables were involved which are Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Behavioral Intention To Use (BITU), Attitude Towards Use (ATU) and Actual Use (AU). The analysis includes descriptive analysis, internal consistency reliability analyses and the validation of the instruments was done using principal component analysis. The data used have been collected randomly from 100 students. Based on the pilot study, the results showed the reliability coefficient with Cronbach's Alpha ranges from .792 to .912 which is above minimum requirement of .70 (Hair et al.,2010) and the mean value for each items is above 3.50 i.e for 5 point Likert scale. Meanwhile for instrument validation the result reporting the value of factor loading for each item is >.50, eigenvalue is above 50% of the total variance. This preliminary empirical study shows that e-portfolio can benefit students towards employability.

Keywords: E-portfolio; TAM; employability; polytechnic

1.0   Introduction

Graduates employability is an important element for any higher institution. Needs and requirements of employers placing criteria recruitment of candidates to work especially graduates who have diverse skills that not only focuses on academic achievements alone but also generic skills such as communication skills, critical thinking and problem solving skills, teamwork skills, continuous learning and management information, entrepreneurial skills, morals and ethics, and leadership skills. Emphasis on generic skills has also been incorporated into the curriculum of polytechnic education. In line with the development of information technology era, the multi-platform distribution of data was introduced. Electronic portfolio or e-portfolio in view will help the students to showcase elements of soft skills to prospective employers to assess. Therefore this study was to check the validity of the instrument that will be used to examine the extent of student perspective on the acceptance of e-portfolio career.

312

2.0   Literature Review
2.1   E-portfolio Usage Overview

Internet-based application development in higher education has provided new prospects for students, lecturers and administrators. A change in information delivery system from manual to the electronic version has helped to improve services more efficiently and effectively (Gunter, & Gunter, 2014). When the progress of ICT not only limit computer users use and store information personally, there are a variety of applications based on the Internet has been developed to deliver, receive and share information among students and educators for teaching and learning and guide students to be ready to step into the realm of career, and among them are e-portfolio applications (Rennie, & Morrison, 2013; Barrett, 2010).

A unique advantage of e-portfolio is that it is an online personal workspace that not only can be used to report on what has been achieved prior learning experience, but could report on the progress of work being done and what is planned in the future such as career (Abrami & Barrett, 2005; Barrett & Carney, 2005; Rennie, & Morrison, 2013; Wakimoto, & Lewis, 2014). With advances in ICT, multimedia technology helps transform the work such as assignment and artifacts to digital form for inclusion in the e-portfolio, enabling online feedback obtained from specific target groups for example teachers, employers and friends at anytime and anywhere (Abd-Wahab, Che-Ani, Johar, Ismail, & Abd-Razak, (2016). Although the e-portfolio has been introduced as early as the 1990s, however, the concept of portfolio development itself has been used in various fields of study such as art, music, science, architecture, education and medicine since the mid-1980s (Clark & Eynon, 2009).

There are different purposes based on user, application and importance of why e-portfolio needs to be developed. There are three main users, namely students, teachers and graduates. Students will use them to develop and show their learning outcomes (Tosh, Light, Fleming, & Haywood, 2005). This view reflects the actual achievement of their learning. Educators will use the e-portfolio to assess student learning achievement based on student e-portfolios developed. With that educators can use e-portfolio as a tool to improve their teaching and to monitor student achievement (Chau, & Cheng, 2010). Graduates will also use it to enable them to find work. E-portfolio helps graduates to designate the degree of their competence to potential employers (Leece, 2005; Zaharim, Yusoff, Omar, Mohamed, & Muhammad, 2009). Therefore, the employer can assess whether the applicant is eligible or not, because the e-portfolio allows comprehensive evaluations that include academic and non-academic achievements.

However, any teaching aids including e-portfolio will not be truly successful if students are not involved in the system (Khan, & Kabilan, 2013). Prior research has found that the implementation of e-portfolio failed because there was no continuation of students' involvement. Students discontinued because they were not tempted of its use (Abrami, Wade, Pillay, Aslan, Bures, & Bentley, 2008). Most previous studies on e-portfolio concentrate on its

faculty and institutional perspective, and, also the use of e-portfolio for students (Tosh et al., 2005; Balaban, Mu, & Divjak, 2012).

Therefore, the study must be conducted to identify elements that could encourage the continuous usage of e-portfolios by the students. As an example, many previous studies investigated the intrinsic value plays as a role of motivation in the learning process and the use of e-portfolios (Hsieh, Lee, & Chen, 2015; Koh, 2016). So, it is necessary for the ongoing study of the students need to understand why they use e-portfolio and what is in it for them (Beckers, Dolmans, & Van Merriënboer, 2016).

2.2   User perceptions of e-portfolios

Based on the theory of reasoned action (TRA) proposed by Fishbein & Ajzen, (1975), perception is a combination of attitude and influenced by the beliefs in behavior (i.e., beliefs about the results, evaluation results), then affecting the behavior intention. According to the TRA, the social element focuses on normative beliefs (i.e., social references, motivation), can affect consumer behavior intention (Fishbein & Ajzen, 1975). TRA focuses on exploring the impact of trust (both behavioral and normative), attitudes and social norms of subjective intent on consumer behavior. Thus, by using these variables, it can be used to predict the prospect of the use of e-portfolios.

However TRA has been modified by the TAM theory that puts the five fundamental which are perceived ease of use (PEOU), perceived usefulness (PU), attitude towards use (ATU), behavior intention to use (BITU) and actual use (AU) to predict the acceptance of an application technology (Figure 1). This theory has been used as the basis for this study.
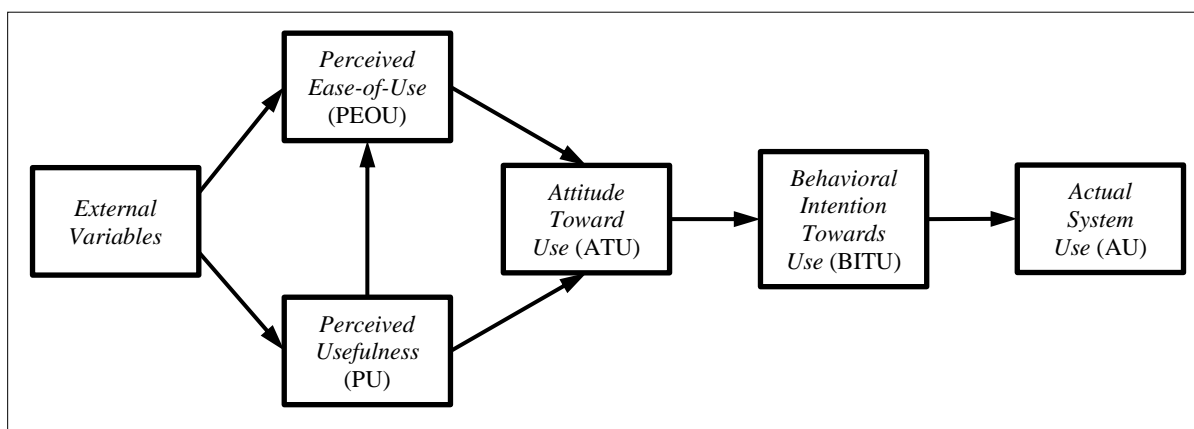

Figure 1. Technology Acceptance Model (TAM) (Davis, & Venkatesh, 1996)

314

2.3   E-portfolio Implementation in Malaysian Higher Education

Most studies that have been conducted previously discussed about the use of e-portfolios to resolve issues related to training performance and assessing students' learning (Yaakop, 2015). Target of the participants in this study were either students or class teachers (Khan, & Kabilan, 2013). Those studies have used mixed methods which include a qualitative approach (e.g., interviews and documents) and a quantitative approach (e.g., statistical analysis and survey) (Abrami & Barrett, 2005; Dalton, 2007). The more recent studies have adopted a mixed methods to explore consumer attitudes and perceptions about the use of e-portfolios; however, the scope of the study is geared to a specific curriculum or program, and all indicate that the use of e-portfolios is to meet the needs of the course or just as a tool for evaluating students' performance (Matsom, Duggan, Tracy, & Stott, 2015; Mohamad, Embi, & Nordin, 2015). To ensure the sustainable use of e-portfolios for students, the scopes of the study emphasize the need to assess the students' perception of actual use of the e-portfolio during class and outside the context of the campus, especially in Malaysia. Hence, this study intends to reveal the students' perceptions of e-portfolio as a tool to increase the chances of a job application.

3   Methodology

The purpose of this research is to run a pilot study for instruments validating and reliability and investigate the student's readiness towards the use of e-portfolio as an aid for employment. The research conceptual framework of this study is shown in Figure 2. Respondents were randomly selected among the students of Diploma in Quantity Surveying totaling a number of 100 people. The study was conducted by quantitative methods using questionnaires. Survey instrument built by TAM is divided into two sections. Section A asked about the demographic profile while Section B measured learner's readiness consisting of five variables and those were PEOU, PU, ATU, BITU and AU. These items were measured on five-point Likert scale ranging from (1) strongly disagree, (2) disagree, (3) neutral, (4) agree and (5) strongly agree.
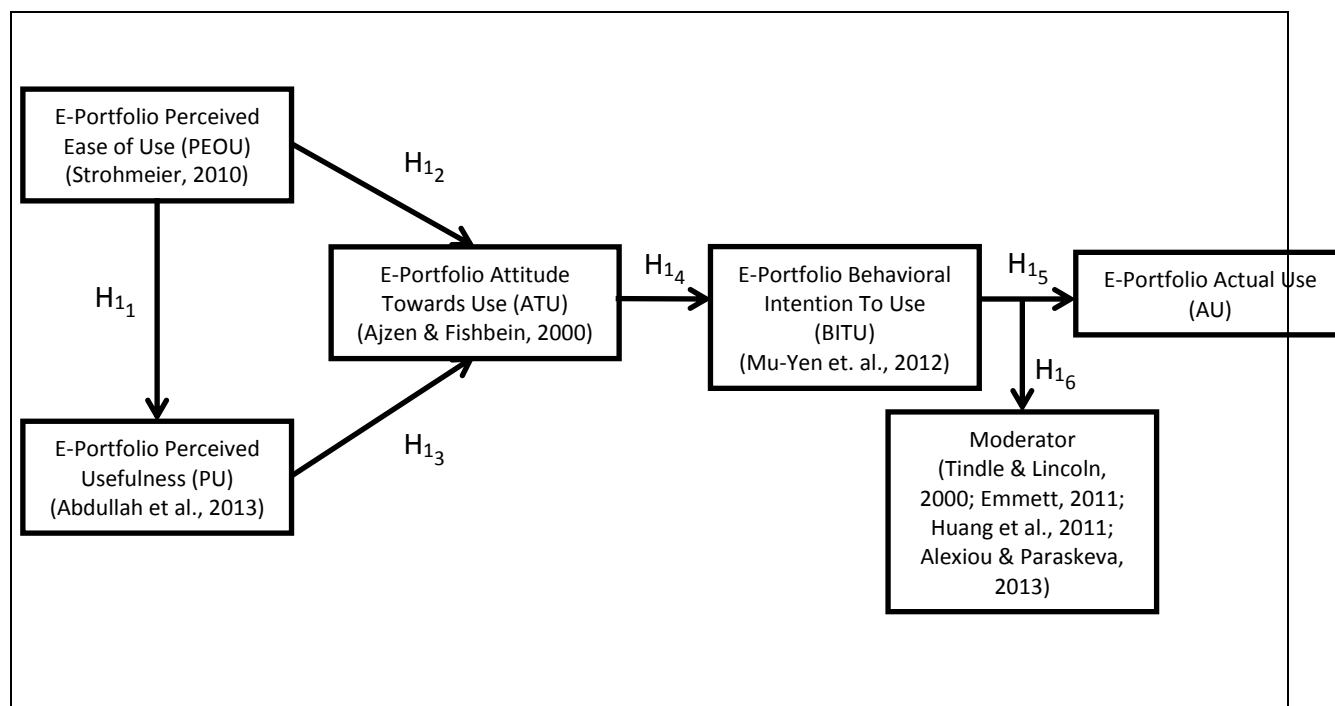
Figure 2. Conceptual Research Framework Based On TAM

4   Results

Data collected were analyzed by descriptive analysis, internal consistency reliability and normality and exploratory factor analysis (EFA). EFA is to verify the conceptualization on the constructs and its dimensions. Quantitative analysis was carried out using SPSS Version 20.

4.1   Respondent's Profile

The descriptive result on demographic profile is shown as per Table 1. Male gender represent 49% (n=49), and 51% (n=51) of the respondents were female. Meanwhile for the firm chosen by the students for their internship training is 10% at multi-national company, 67% at medium firm and 23% at small firm. From the total of 100 respondent, 44% is from semester 5 and 56% is from semester 6 of the diploma program.

Table 1 Demographic (N=100)	Category	Frequency	Percent (%)
Gender	Male	49	49
	Female	51	51
Firm Size (Internship attachment)	Multi National	10	10
	Medium	67	67
	Small	23	23
Year of Study	Semester 5	44	44
	Semester 6	56	56

316

4.2 Internal Consistency Reliability and Normality

Cronbach Alpha results show the range of result between .792 and .921. (Table 2). The result meets the minimum requirement of the value < 0.7 (Hair et. al, 2010). It shows that each item was correlated. The response of the instrument for the value of the asymmetry and kurtosis shows the range between -2 and +2. It is considered acceptable for proving the univariate normal distribution (George & Mallery, 2003). Meanwhile the value of means and standard deviation for each construct as per tabulated in Table 3. The result shows that overall means value is above 3.50 which is above the average score for 5 point likert scale.

Table 2	
Results of Cronbach Alpha for Variables	
Variables/Construct	Cronbach's Alpha (α)
Perceived Ease of Use (PEOU)	.817
Perceived Usefulness (PU)	.921
Attitude Towards Use (ATU)	.864
Behaviour Intention Toward Use (BITU)	.903
Actual Use (AU)	.792
Note. Min. value of α is > 0.7.	

Table 3														
Results of Mean and SD for Items of PEOU, PU, AU, BITU and AU														
PEOU			PU			ATU			BITU			AU		
Item	Mean	SD	Item	Mean	SD	Item	Mean	SD	Item	Mean	SD	Item	Mean	SD
PEOU1	4.26	.799	PU1	3.96	.886	ATU4	4.230	.736	BITU8	4.040	.680	AU2	4.370	.786
PEOU3	4.14	.816	PU7	3.96	.851	ATU5	3.950	.715	BITU9	3.940	.749	AU5	3.990	.627
PEOU4	3.95	.716	PU8	4.09	.779	ATU7	4.240	.726	BITU10	3.810	.734	AU6	4.250	.796
PEOU6	3.98	.751	PU11	4.15	.821	ATU11	3.878	.824	BITU12	4.110	.802	AU12	4.010	.771
PEOU7	4.00	.651	PU12	3.95	.808	ATU12	3.939	.842	BITU14	3.960	.764	AU14	3.910	.865
PEOU8	4.01	.771	PU13	4.03	.771	ATU15	3.540	.936	BITU15	3.710	.782	AU17	3.900	.810

317

Table 3

Results of Mean and SD for Items of PEOU, PU, AU, BITU and AU

PEOU			PU			ATU			BITU			AU		
PEOU9	3.95	.808	PU14	3.94	.801	ATU16	3.64	1.02	BITU16	4.03	.784			
PEOU10	3.87	.812	PU15	4.04	.751	ATU17	3.770	.827	BITU17	3.970	.771			
			PU16	4.10	.822	ATU18	3.580	.830	BITU18	4.060	.749			
			PU17	4.06	.838	ATU19	3.990	.703	BITU23	4.180	.757			
			PU18	3.91	.842	ATU20	3.850	.880	BITU24	3.910	.954			
			PU20	4.19	.720	ATU22	4.110	.750	BITU25	3.830	.865			
			PU21	4.03	.717	ATU23	3.980	.909	BITU26	3.830	.739			
			PU22	3.93	.794	ATU24	4.040	.709	BITU27	4.000	.791			
			PU24	4.01	.674				BITU28	4.170	.739			
			PU25	3.93	.728									

Note. Perceived Ease of Use (PEOU), Perceived Usefulness (PU),Attitude Towards Use (ATU),
Behaviour Intention To Use (BITU), Actual Use (AU)

4.3 Exploratory Factor Analysis

To examine the underlying structure of the data from five variables, this study conducted EFA using principal component analysis and varimax rotation, as the factors were anticipated to be related.

4.3.1 Exploratory Factor Analysis on Perceived Ease of Use

The analysis performed on the test of Kaiser-Meyer-Olkin measure. The result was .820 exceeding the recommended cut off value of 0.6 (Kaiser, 1970). The Bartlett's Test of Sphericity meets the statistical significant (P<.05). Total variance explained showed two components with eigenvalues greater than 1, explaining a total of 58.081 per cent of the variance. After the varimax rotation, revealed the factor 1 contributing 31.604 percent and factor 2 contributing 26.477 percent. Item 2 and 5 have been removed due to the low factor loading (<.5). After

318

emerging the internal factor consistency, each retained loaded factor was calculated by Alpha Cronbach's measure which showed the value of .817 exceeded the cut off of 0.7 (Hair et al., 2010) (Table 4).

Table 4		
Results of EFA on PEOU		
Item	F1	F2
E-portfolio is the best method to display the learning evidence compared with showing the examination result.		.657
E-portfolio can help me towards the development of soft skills such as communication skills, creativity, etc.		.835
E-portfolio can help me towards the transformation of the development of soft skills.		.727
E-portfolio allows lecturers to evaluate and reflect on my learning.		.506
E-portfolio can facilitate the delivery of information between me and the lecturers.	.822	
E-portfolio can facilitate the delivery of information between me and the employer.	.795	
E-portfolio can facilitate the integration of information between me and lecturers.	.676	
E-portfolio can facilitate the integration of information between me and the employer.	.730	
Note. Eigenvalue = 4.647; % of variance = 58.081; Alpha Cronbach's = .817		

4.3.2 Exploratory Factor Analysis on Perceived Usefulness

The Kaiser-Meyer-Olkin measure value was .861 above the recommended value of .6 as the minimum value for a good factor analysis (Kaiser, 1970). The Bartlett's Test of Sphericity was below significance level, i.e. p<0.5. Principal component analysis has shown the existence of three factors with eigenvalue exceeding 1, explaining 26.26 percent, 17.64 percent and 15.33 percent of the variance respectively or a total of 59.24 percent of the variance which were above the inception of 50 percent suggested by Streiner (1994). It shows the high variance among the variables. From the total of 25 items only 17 items were retained and the balance was excluded due to the low factor loading i.e. < 0.5. Cronbach's alpha measure was carried out for the 17 items and resulting the value of .921 exceeding the minimum value of 0.7 (Hair et.al, 2010) (Table 5).

Table 5			
Results of EFA on PU			
Item	F1	F2	
E-portfolio allows me to showcase my achievements on websites.		.616	
E-portfolio can improve my self-confidence.		.799	
E-portfolio can enhance my academic and extra-curricular skills.		.844	
E-portfolio enlightens me about what I wanted to achieve for my career goals.		.567	
E-portfolio would be able to help me in my career or during job application.			.740
E-portfolio would help me to show evidence of interpersonal skills necessary to work with prospective colleagues.			.840
E-portfolio would help me to prove my skills built involving volunteer programs, sports, projects, entrepreneurs, part-time work, training and other industry.			.708
E-portfolio would help me to show the evidence that can be applied to various fields of work.	.730		
E-portfolio would help me to show the evidence needed to get a job.	.625		
E-portfolio would help me to communicate with prospective employers.	.582		
E-portfolio would help me to prepare in finding a job and during interviews	.685		
E-portfolio would be able to help me during the interview process.	.564		
Potential employers would know more about my background and accomplishments through e-portfolio that I send via email.	.612		
E-portfolio would give me the chance to organize and showcase my skills in the most interesting presentation.	.776		
E-portfolio would help me to exhibit my personal information and the overall achievement in academic and co-curricular.	.593		
E-portfolio would help me to demonstrate my soft skills achievement.	.584		
Note. Eigenvalue = 10.072; % of variance = 59.245; Alpha Cronbach's = .921			

4.3.3 Exploratory Factor Analysis on Attitude to Use

The significance level of Bartlett's test (0.00) indicated that the overall inter-correlation assumptions are met (p< 0.05). The value of Kaiser-Meyer-Olkin measure yielded an acceptable score of .811 and met the cut off of 0.6. Principal Component analysis has shown the presence of five factors with the eigenvalue of more than 1. The total variance explained represents the five factors with 20.11 percent, 14.783 percent, 13.603 percent, 7.531 percent and 6.391 percent respectively. After the varimax rotation only three factors can be retained with the overall factor loading above 0.5, two factors has been discarded due to only one item left for both factors to be measure. Cronbach's alpha measure was carried out for the 18 items and resulting the value of .864 exceeding the minimum value of 0.7 (Hair et.al, 2010) (Table 6).

Table 6			
Results of EFA on ATU			
Item	F1	F2	F3
I found that using e-portfolio is very interesting.		.509	
I found that the e-portfolio display is very attractive.		.618	
I would use e-portfolio to get the best job for my future.		.661	
I would allow potential employers to access my e-portfolio at any time.		.809	
Employers could access the work and achievements that I have accomplished at any time.			.617
I would upload my achievements in extra-curricular like sports and entrepreneurship into the e-portfolio.			.813
I would upload my involvement in community work such as CSR, etc.			.605
I could spend a long time developing the e-portfolio.	.559		
I feel more excited to attend learning sessions that use e-portfolio.	.790		
E-portfolio is interesting because it is dynamic and interactive.	.735		
I do not feel tired even during the development of e-portfolio and delight me.	.774		
I became more motivated to produce better quality coursework / assignments.	.535		
E-portfolio building process is an interesting experience.	.63		

Table 6			
Results of EFA on ATU			
	0		
I can share ideas with colleagues while building e-portfolio.	.56 6		
Note. Eigenvalue = 9.088; % of variance = 50.490; Alpha Cronbach's = .864			

4.3.4 Exploratory Factor Analysis on Behavior Intention to Use

The suitability of data was assessed prior to performing factor analysis for BITU. The Kaiser-Meyer-Olkin value was .865 and above the minimum value of good factor i.e. 0.6 (Kaiser, 1970). The Bartlett's Test of Sphericity was below the significance level, i.e. $P < 0.05$, indicated that sufficient correlations exist among the item (Hair et al., 2005). Principal component analysis reveal the presence of four factors with the eigenvalues exceeding 1, explaining 43.020 percent, 7.949 percent and 6.850 percent of the variance respectively or a total of 57.819 percent of the variance. From the total of 28 items only 15 items were retained and the balance was omitted due to the low factor loading i.e. < 0.5. Cronbach's alpha measure was carried out for the 15 items and giving the value of .903 exceeding the minimum value of 0.7 (Hair et.al, 2010).

Table 7			
Results of EFA on BITU			
Item	F1	F2	F3
I would share ideas with colleagues about the development of attractive e-portfolio.		.817	
I would save every course work into the e-portfolio.		.761	
I would always maintain my e-portfolio from time to time with interesting ingredients.		.708	
I would use e-portfolio for future career planning.	.697		
I would use my e-portfolio to plan for my future goal.	.695		
I would upload the curriculum vitae into the e-portfolio.	.788		
I would upload the summary of project final report into the e-portfolio.	.726		
I would upload the summary of industrial training final report into the e-portfolio.	.729		
I would upload activity pictures related to CSR, academic visits, sports and others into the e-portfolio.	.625		
I would build the e-portfolio using selection of interesting images and graphics.			.708
I would upload interesting videos / animations into the e-portfolio.			.875
I would organize the information accordingly and easy to understand.			.648
Note. Eigenvalue = 8.672; % of variance = 57.819; Alpha Cronbach's = .903			

4.3.5 Exploratory Factor Analysis on Actual Use

The value of Kaiser-Meyer-Olkin is .760 exceeding the recommended value of .6 as the minimum value for a good factor analysis (Kaiser, 1970). The Bartlett's Test of Sphericity was below significance level, i.e. $p<0.5$. Principal component analysis revealed the presence of two factors with eigenvalue exceeding 1, explaining 49.202 percent and 19.10 percent of the variance respectively or a total of 68.302 percent of the variance which were exceeding the inception of 50 percent suggested by Streiner (1994). It shows the high variance among the variables. From the total of 17 items only 6 items were retained and the balance was excluded due to the low factor loading i.e < 0.5. Cronbach's alpha measure was carried out for the 6 items with the value of .792 and exceeding the minimum value of 0.7 (Hair et.al, 2010). After the varimax rotation, only one factor can be retained with the overall factor loading above 0.5, the second factors has been discarded due to only one item left to be measured.

Table 8

Results of EFA on AU

Item	F1	F2
I'm interested in using the e-portfolio when applying for a job.		.858
I would always make improvement to my e-portfolio development.		.743
I intent to use e-portfolio when applying for a job.		.773
The use of e-portfolio allows me to organize my work.	.806	
E-portfolio helps me to organize all my ideas.	.831	
By using e-portfolio, I would feel very confident when attending an interview.	.788	
Note. Eigenvalue = 4.098; % of variance = 68.302; Alpha Cronbach's = .792		

5.0 Conclusion

The purpose of the study was to demonstrate the construct validity and reliability of the instruments for each factor. The results have confirmed the items that can be used for the next stage of this research which is the field study. The result has revealed a highly internally consistent (Cronbach's > 0.7). Furthermore, the relationships amongst all involved factors and continuous use of e-portfolio need to be investigated in forthcoming research. This paper can also be used as a framework for the development of e-portfolio from planning to implementation level. Because the e-portfolio aims to generate student-centered learning, data collected on behalf of the student perspective can provide input to the plan to develop and implement e-portfolio. The success of e-portfolio will happen when students remain interested in using it. Data representing the student perspective will also contribute to assess the extent of the effort to develop an e-portfolio. At any time, efforts to develop e-portfolios can be improved and continues as long as the students are interested and feel the need to use it.

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