

E-Portfolio MSC Indicator for a Virtual Learning Environment

Mohd Bekri, R.^{1*}, Ruhizan, M. Y.², Saiful Hadi, M.³, Faizal Amin Nur, Y.¹ and Jamil, A. B.¹

¹*Department of Engineering Education, Faculty Technical and Vocational Education, Universiti Tun Hussein Onn Malaysia, 86400 Parit Raja, Batu Pahat, Johor, Malaysia*

²*Department of Innovation in Teaching and Learning, Faculty Education, National University of Malaysia, Bangi, Selangor, Malaysia*

³*Department of Vocational Education, Faculty Technical and Vocational Education, Universiti Tun Hussein Onn Malaysia, 86400 Parit Raja, Batu Pahat, Johor, Malaysia*

ABSTRACT

This study was conducted to identify indicators for the use of e-portfolio for a virtual learning environment in the Malaysian Skills Certification (MSC) system. The approach is through a modified Delphi technique run in three stages. The first stage is analysis of past research material and documents as guidelines in the development of questionnaire items. In the second and third stages, the developed questionnaire is distributed to experts for approval in determining e-portfolio indicators for implementation of the Malaysian Skills Certification system. The sample selected consists of 11 experts in the field of skills certification in Malaysia. Feedback from the experts was analysed using descriptive statistics (mean, median and interquartile range). The findings identify four elements (Assessment, Personal Space, Exhibition and Learning Management) and 32 indicators through a literature review. In conclusion, there are 22 indicators were identified as necessary for the implementation of the use of the e-portfolio in the Malaysian Skills Certification system.

Keywords: E-portfolio, indicator, Malaysia Skills Certification (MSC)

ARTICLE INFO

Article history:

Received: 01 November 2016

Accepted: 15 April 2017

E-mail addresses:

bekri@uthm.edu.my (Mohd Bekri, R.),
ruhizanmy@gmail.com (Ruhizan, M. Y.),
saifulm@uthm.edu.my (Saiful Hadi, M.),
faizaly@uthm.edu.my (Faizal Amin Nur, Y.),
jamil@uthm.edu.my (Jamil, A. B.)

* Corresponding author

INTRODUCTION

The e-portfolio is a collection of information in the form of digital, interactive and systematic material in monitoring student's knowledge and achievements in learning that is easier to use for publishing such information online (Bullock & Hawk,

2005; Handa, Arame, Goda, Naganuma, & Gondo, 2011; Kilbane & Milman, 2005; Young & Morriss, 2007). Halstead and Sutherland (2006) explained that written portfolios should be converted into electronic portfolios because: (i) the work of the students are now mostly in electronic form; (ii) most of the students have access to the web; and (iii) the database available through the Web allows students to store information more widely and easily.

E-portfolios now available seem to function only as a repository of information without connection to the learning process. As a result, although e-portfolios now can provide convenience and comfort to users through the use of technology, they still cannot achieve the real use of e-portfolios. Zeichner and Wray (2001) listed seven questions that must be asked before building an e-portfolio namely: (i) What are the objectives of e-portfolios?; (ii) Who decided what should be included in the portfolio?; (iii) How is evidence in a portfolio managed?; (iv) What are the types of artifact that can be stored in the e-portfolio?; (v) Can the teacher add information to the e-portfolio during the teaching and learning process?; (vi) How should the e-portfolio be evaluated?; and (vii) What should happen to the e-portfolio after it is completed?

Various concepts of ICT-integrated teaching and learning have been introduced in recent times such as e-learning, multimedia-aided training and blended learning. The e-portfolio is an educational product that uses ICT-based e-learning. It

can store all kinds of information in digital form, is flexible, can be accessed at any time and anywhere (Dimarco, 2006; Montgomery & Wiley, 2008; Stefani, Mason, & Pegler, 2007).

The use of e-portfolios in the teaching and learning process has become very popular at all academic levels. Using the latest technology, the e-portfolio has outperformed the traditional portfolio of paper format and provides a better way to store information (Bhattacharya & Hartnett, 2007; Hallam, Creagh, Harper, & Hauville, 2010; Halstead & Sutherland, 2006; Mcallister & Hauville 2010; Montgomery & Wiley, 2008; Siti Fatimah, 2007; Smyth, Horton, Studdert, Griffin, & Symonds, 2011). Information that can be included in e-portfolios is in the form of personal artifacts, lesson plans, assignments, video clips, notes, evaluation and results of work already done (Powers, Thomson, & Buckner, 2001).

In the Malaysian Skills Certification system, the portfolio is used as a document to assess the level of knowledge and student achievement, whereas the traditional paper-based portfolio is limited merely to storage of artifacts. The use of printed portfolios is not relevant to the present application. This is because the printed portfolio is static, limited to sharing information with others, difficult to manage, evaluate and update and cannot improve students' professional skills (Mcallister & Hauville, 2010; Smyth et al., 2011; Stefani et al., 2007). In contrast, the e-portfolio has many advantages: It can store and organise material more easily, share

information, enhance professional skills to improve employability skills of graduates and facilitate searches for information (Bhattacharya & Hartnett, 2007; Halstead & Sutherland, 2006; Mcallister & Hauville, 2010; Smyth et al., 2011). Thus, the e-portfolio has great potential in improving the Malaysian Skills Certification system.

However, the development of e-portfolios requires an appropriate framework to meet the needs of the education system (Young & Morriss, 2007). Before implementing the e-portfolio system in Malaysian skills education, a detailed study needs to be done first to identify the corresponding elements in the production of the e-portfolio are easy to use, user-friendly, appealing to teachers and students and in line with the standard of the Malaysian Skills Certification.

METHODOLOGY

This study used the Modified Delphi approach. The Modified Delphi approach is a procedure to find consensus among experts on the matter at hand and it uses the questionnaire as instrument (Wiersma & Jurs, 2009). The first stage of the interview was not required as the researchers had sufficiently defined the issue in the first stage of the Delphi method, so the Modified Delphi process for this study began with the second stage of questionnaire exploration of the subject.

In the first stage, the researchers conducted a literature review of models of e-portfolios and analyses of documents

related to skills education in Malaysia. This step was undertaken to create a benchmark and find variables for the study.

Next, an instrument in the form of the questionnaire was produced. Experts in the field were selected based on their qualifications to evaluate and provide feedback in connection with the criteria required for each item selected. The experts chosen were experienced and involved in setting up the Malaysian Skills Certification (MSC) system.

In the second stage, the panel of experts selected was given the questionnaire for assessment and they were asked to indicate their level of agreement and comment on the statements relating to the construction of the e-portfolio intended for use in the MSC system. The completed questionnaires were collected and analysed.

In the third stage, each expert was given a questionnaire based on feedback on material collected from the second stage. This questionnaire asked for approval of each item and the reasons given for any discrepancy in views. The results obtained were analysed and the researchers concluded the findings on the approval of elements selected for inclusion in the e-portfolio.

Eleven experts were selected as the sample for this study who: Had the relevant experience related to the issues discussed; Were able to contribute insights, and; Were able to assess and make decisions in order to achieve consensus on the matter at hand (Pill, 1971). The data were analysed using the Statistical Package for the Social

Sciences (SPSS), one of the more popular tools in contemporary statistical analysis due to its easy-to-use graphical user interface and wide range of capabilities ranging from add-on modules to add-on packages. The analysis results were presented in the form of descriptive statistics with score percentages, mean and median scores for the approval of a panel of experts representing those involved. To reflect the consensus of the expert panel on the items of the questionnaire, interquartile range scoring was used (see Table 1).

Table 1
Level of consensus among the experts on the questionnaire items

Interquartile Range Score	Level of Consensus
0 - 1	High consensus
1.01 – 1.99	Medium consensus
≥ 2	No consensus

Source: Peck and Devor (2012)

RESULTS

The data analysis of indicators for an e-portfolio to be used in the Malaysian Skills Certification system for a virtual learning environment was divided into two: (i) review of the literature (first stage of the Modified Delphi Technique) (ii) data analysis (second and third stages of the Modified Delphi Technique).

The First Stage of the Modified Delphi Technique: Literature Review

In the first stage of the Modified Delphi Technique, a literature review of previous research material and documents related to the e-portfolio was done to establish the questionnaire items that would be used in a second survey. The literature review yielded four elements and 32 indicators essential for a virtual learning environment (Nunez, Sheremetov, Martínez, Guzmán, & Albornoz, 1998; Punie, 2007; Pereira, Harris, Davidson, & Niven, 2000). Table 2 reflects the findings classified according to concept.

Table 2
E-Portfolio indicators for a virtual learning environment classified by concept

Element	Indicator			
Assessment	-	Formative test	-	Tests in the form of multiple-choice answers
	-	Summative tests	-	Test in the form of short essay
	-	Comment by teacher	-	Comments by members of the same group
	-	Assessment verification	-	Comments by members of different groups
	-	Online discussion activities	-	Overall score testing
	-	Tests in the form of right or wrong answers		
Personal space	-	Space to send messages	-	Space for communication among students of one class
	-	Space for reflection	-	Space for communication between teachers and students
	-	Space for socialising	-	Space for communication between teachers and families of students
	-	Space for sharing ideas	-	Space for communication between students and students from other classes.
	-	Space for working together		
Exhibition	-	Storing personal information	-	Collecting learning material
	-	Presenting information in various ways	-	Presenting learning material
	-	Editing information		
Learning management	-	Posting practical work	-	Guiding students
	-	Teacher's control	-	Online monitoring
	-	Posting homework	-	Detection of the learning process

The Second and Third Stages of the Modified Delphi Technique

Table 3 shows the detailed data analysis of a virtual learning indicators for the second and third stages. In the second stage, the analysis revealed 10 virtual learning indicators needed to be dropped from the list (2, 5, 6, 13, 16, 19, 23, 24, 31 and 32). All the experts agreed strongly on keeping the remaining 22 indicators, with consensus receiving a score of IQR=1 and a mean value between 3.50 and 5.00 (high). For

Indicators 3, 18 and 30, the IQR value was 2, which indicated no consensus among the panel members. However, since the three indicators received an acceptable mean score, they were retained.

In the third stage, all 22 indicators for an e-portfolio received strong consensus from the panel of experts. The IQR value was between 0 and 1 and the mean value was between 3.50 and 5.00 (high). This clearly showed that all 22 indicators received high approval from the panel of experts.

Table 3
Data Aanalysis of virtual learning indicators for the second and third stages of the Modified Delphi technique

No	Indicator	Second Stage			Third Stage		
		Mean	IQR	Cons.	Mean	IQR	Cons.
Assessment							
1	Online discussion activities	4.6	1	H	4.5	1	H
2	Tests in the form of right or wrong answers	3.1	0	H	Remove		
3	Tests in the form of multiple-choice answers	4.0	2	No Cons.	4.1	1	H
4	Tests in the form of short essay	4.4	1	H	4.2	1	H
5	Comments by members of the same group	3.2	1	H	Remove		
6	Comments by members of different groups	3.2	1	H	Remove		
7	Overall score testing	4.5	1	H	4.4	1	H
8	Formative test	4.4	1	H	4.3	1	H
9	Summative tests	4.4	1	H	4.4	1	H
10	Comment by teachers	4.5	1	H	4.5	1	H
11	Assessment verification	4.5	1	H	4.2	1	H
Personal space							
12	Space for sharing ideas	4.6	1	H	4.3	1	H
13	Space for working together	2.7	1	H	Remove		
14	Space for sending messages	4.4	1	H	4.6	1	H
15	Space for reflection	4.2	1	H	4.6	1	H
16	Space for socialising	2.8	1	H	Remove		
17	Space for communication among the students in one class	4.2	1	H	4.3	1	H
18	Space for communication between teachers and students	4.1	2	No Cons	4.0	0	H
19	Space for communication between teachers and families of students	2.9	1	H	Remove		
20	Space for communication between students and students from other classes	4.4	1	H	4.3	1	H
Exhibition							
21	Editing information	4.6	1	H	4.6	1	H
22	Collecting learning material	4.6	1	H	4.5	1	H
23	Presenting learning material	2.8	1	H	Remove		
24	Storing personal information	2.7	1	H	Remove		
25	Presenting information in various ways	4.6	1	H	4.6	1	H
Learning management							
26	Posting homework	4.5	1	H	4.5	1	H
27	Guiding students	4.2	1	H	4.5	1	H
28	Online monitoring	4.5	1	H	4.6	1	H

Table 3 (continue)

29	Detection of the learning process	4.4	1	H	4.3	1	H
30	Posting practical work	3.8	2	No Cons	3.8	1	H
31	Teacher's control (for learning activities at school)	2.9	1	H	Remove		
32	Teacher's control (for learning activities at home)	2.9	1	H	Remove		

DISCUSSION

The results indicated a degree of consensus and agreement among the panel members on online discussion activities, tests in the form of multiple-choice answers, tests in the form of short essay, overall score testing, formative test, summative tests, comments by teacher and assessment verification. However, three indicators were rejected by the experts i.e. tests in the form of right or wrong answers, comments by members of the same group and comments by members of different groups. Assessment of students' knowledge and skills in formal or non-formal education is easier conducted online. Therefore, the e-portfolio is an effective platform for assessment, and for this reason is used in various fields of expertise (DiMarco, 2006; Mcallister & Hauville, 2010; Montgomery & Wiley, 2008).

Next, six indicators for the element of personal space received high consent among the experts. The indicators were space for sharing ideas, sending messages, reflection, communication among students in one class, communication between teachers and students and communication between students and students from other classes. However, three indicators were eliminated i.e. space for working together,

space for socialising and communication between teachers and families of students. Personal space refers to an environment that allows users to interact with each other and resources and for reflection and socialising (Pereira et al., 2000; Punie, 2007; Nunez et al., 1998; Ku & Chang, 2011). Personal space is important in web-based learning because it allows students to organise and develop a learning environment on their own that matches their learning style (Attwell, 2007; Wilson et al., 2007).

On exhibition elements, eight indicators received consensus of the experts to retain them. The indicators included editing information, collecting learning material and presenting information in various ways. Two indicators, presenting learning material and storing personal information, were removed. In this study, exhibition space is defined as a repository of personal information and learning material that is accessible at any time (Ku & Chang, 2011; Nunez et al., 1998). Specifically, the concept refers to the three indicators mentioned above that were retained as these indicators are ideal for storing in a virtual learning system, which provides a more structured, quick and easy way to facilitate storage of information or articles.

On management of learning, the indicators for posting homework, guiding students, online monitoring, detecting learning process and posting practical work received consensus of the experts. However, two indicators were eliminated i.e. teacher's control (for learning activities at school) and teacher's control (for learning activities at home). The five indicators that the experts agreed on were important for allowing students to submit assignments easily. Teachers would be able to monitor the students' learning process and to guide them online.

In the Malaysian education system, the use of a virtual learning space in teaching and learning is rare (Liaw & Muzafar, 2011; Sukri et al., 2010). Virtual learning is an easy and fun learning process that allows students to learn anywhere and at any time (Punie, 2007; Pereira et al., 2000; Nunez et al., 1998). It allows students to manage their time more effectively and allows them to explore information that has been downloaded from websites. Hence, the development of virtual learning indicators as discussed in this study can produce an efficient e-portfolio system for learning. The outcome of the e-portfolio is important for providing a learning space for students in general and exposure for vocational students to applying Information and Communication Technology (ICT) in the learning process.

The indicators that were established can be used to create an e-portfolio to support learning activities. In this study, exhibition space, evaluation and management of personal learning were concepts developed

to meet virtual learning needs as outlined by Punie (2007), who highlighted the necessary elements as being a space for socialising, digital personal space, space for educational activities and legalisation space. The concept of virtual learning space that is applied in the system of e-portfolios is in line with the theory of the virtual learning, as pointed out by Pereira et al. (2000), who stated that the structure of the virtual learning environment must allow students to interact, reflect and socialise.

CONCLUSION

Overall, it can be concluded that the concept of virtual learning space discussed in this paper has the potential to provide many benefits to vocational education in Malaysia i.e.: (i) there is no gap in time and distance to prevent learning from taking place; (ii) sources of information can be easily and quickly obtained; and (iii) more students will be motivated to master Information and Communication Technology (ICT) skills. Also, e-portfolios provide a dynamic facility for personal interaction and reflection, support information exchange and are convenient for online discussion. The indicators discussed here allow for a more compact e-portfolio compared to those currently available. The e-portfolio proposed here focussed only on fulfilling the expectations of the Malaysian Skills Certification only. This will provide motivation and interest to users to use the system more frequently for the purpose of teaching and learning.

ACKNOWLEDGEMENT

This research was supported by a Short Term Grant (STG) from the Office for Research, Innovation, Commercialisation and Consultancy Management (ORICC), UTHM awarded to Dr. Mohd Bekri Rahim. The data presented, the statements made and the view expressed are solely the responsibility of the author.

REFERENCES

- Attwell, G. (2007). Personal learning environments – The future of elearning? *Elearning Papers* 2(1), 1–8.
- Bhattacharya, M., & Hartnett, M. (2007, October). E-portfolio assessment in higher education. In *Frontiers In Education Conference-Global Engineering: Knowledge Without Borders, Opportunities Without Passports, 2007. FIE'07. 37th Annual* (pp. T1G-19). IEEE.
- Bullock, A. A., & Hawk, P. P. (2005). *Developing a teaching portfolio* (2nd ed). United States: Pearson.
- Dimarco, J. (2006). *Web portfolio design and application*. United States: Idea Group.
- Hallam, G., Creagh, T., Harper, W., & Hauville, K. (2010). The development of strategies to drive government and academic policy to underpin the e-portfolio. In N. Buzzetto-More (Ed.), *The e-portfolio paradigm: Informing, education, assessing and managing with e-portfolios* (pp. 289–320). California: Informing Science Press.
- Halstead, A., & Sutherland, S. (2006). Eportfolio: A means of enhancing employability and the professional development of engineers. *International Conference on Innovation, Good Practice and Research in Engineering Education* (pp. 201–205). Liverpool, England.
- Handa, J., Arame, M., Goda, Y., Naganuma, S., & Gondo, T. (2011). Using e-portfolios: The impact of online group work. *International Journal*, 5(1), 75–85.
- Kilbane, C. R., & Milman, N. B. (2005). *The digital teaching portfolio workbook: Understanding the digital teaching portfolio process*. United States: Pearson.
- Ku, D. T., & Wen-Chih, C. (2011, June). uFolio: A conceptual design framework for a learning platform and assessment system. In *Networked Computing and Advanced Information Management (NCM), 2011 7th International Conference on* (pp. 358-363). IEEE.
- Liaw, Y. H., & Muzafar, M. Y. (2011). Internet usage in the process of teaching and learning at community college. *Proceedings of the National Conference on Research and Innovation in Education and Technical and Vocational Training* (pp. 158–161). Malaysia.
- Mcallister, L., & Hauville, K. (2010). The eportfolio approach: Supporting authentic assessment for student learning. In A. Miller, B. Oliver, & L. Lilly et al. (Eds.), *Eportfolios Australia conference 2011: Making a difference showing the difference, book of abstracts and papers*. (pp. 56–64). Perth: eLearning Services Queensland University of Technology.
- Montgomery, K. K., & Wiley, D. A. (2008). *Building e-portfolios using PowerPoint – A guide for educators* (2nd ed.). United States: Sage Publication Ltd.
- Nunez, G., Sheremetov, L., Martínez, J., Guzmán, A., & Albornoz, A. (1998). The Eva teleteaching project – The concept and the first experience in the development of virtual learning spaces. *15th IFP World Computer Congress: The Global Information Society on the Way to the Next Millennium* (pp. 769–778). Vienna, Austria.

- Peck, R., & Devor, J. L. (2012). *Statistics: The exploration and analysis of data* (7th ed.). United States: Richard Stratton.
- Pereira, M., Harris, R., Davidson, D., & Niven, J. (2000). *Building a virtual learning space for C&IT staff development, selected papers in education series*. University of Sheffield. Retrieved from <http://www.leeds.ac.uk/educol/documents/00001651.htm>
- Pill, J. (1971). The Delphi method: Substance, context, a critique and an annotated bibliography. *Socio-Economic Planning Sciences*, 5(1) 57–71.
- Powers, D., Thomson, S., & Buckner, K. 2001. *Electronic portfolios. Developing a teaching portfolio: A guide for preservice and practicing teachers*. Columbus, Ohio: Merrill Prentice Hall.
- Punie, Y. (2007). Learning spaces: An ICT-enabled model of future learning in the knowledge-based society. *European Journal of Education*, 42(2), 185–199.
- Siti Fatimah, M. Y. (2007). W-Portfolio teaching and learning of information technology for nursing. In A. Siti Rahayah & N. M. Nordin (Eds.). *Pedagogy and development e-learning in higher education institutions* (pp. 53–64). Bangi: UKM.
- Smyth, R., Horton, G., Studdert, C., Griffin, B., & Symonds, I. (2011). Adopting an e-portfolio as an assessment tool: Investigating options, issues and future possibilities. *Eportfolios Australia Conference 2011*. (pp. 112–124). Curtin University, Perth, Australia.
- Stefani, I., Mason, R., & Pegler, C. (2007). *The educational potential of e-portfolios supporting personal development and reflective learning*. New York: Routledge.
- Sukri, S., Muhammad, R. R., Sarimah, I., Mohd, S. N., Asnul, D. M., Kamalularifin, S. ... Mahyuddin, A. (2010). ICT application in vocational and technical education and training (VTET) institutions in Malaysia. Retrieved from <http://ojs.voitech.org/index.php/seavern/article/view/64> .
- Wiersma, W., & Jurs, S. T. (2009). *Research methods in education*. United States: Pearson.
- Wilson, S., Liber, O., Johnson, M. W., Beauvoir, P., Sharples, P., & Milligan, C. D. (2007). Personal learning environments: Challenging the dominant design of educational systems. *Journal of e-Learning and Knowledge Society*, 3(2), 27–38.
- Young, E. H., & Morriss, M. (2007). *Digital portfolios: Powerful tools for promoting professional growth and reflection* (2nd ed.). United States: Corwin Press.
- Zeichner, K., & Wray, S. (2001). The teaching portfolio in us teacher education programs: What we know and what we need to know. *Teaching and Teacher Education*, 17(5), 613–621.