A Proposed Model for the University Students' E-Portfolio

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Abstract

Previous efforts have been made to develop a model for a university students' e-portfolio and determine university students' attitudes toward that model; however, to date, few studies have been conducted. This study employed a descriptive and experimental design: interviews with 20 specialists in educational science were conducted to develop and gain consensus on the proposed model for a university students' e-portfolio; and, following verification of its validity and reliability, a 17-item questionnaire was distributed among an experimental group of 90 students (43 male, 47 female) at Al-Shoubak University College to assess their attitudes toward the proposed e-portfolio model. The interviews resulted in a proposed model of a university students' e-portfolio comprising 10 components: student biography, course plan, reports and research, homework, projects and experiments, activities, summaries and conclusions, scientific material, audio and video clips, and samples of student performance. In addition, the results of the questionnaire revealed that the students' attitudes toward the proposed model were generally positive. Consequently, it is recommended that faculty members introduce the university students' e-portfolio into teaching practice.

Contents

Contribution of this paper to the literature
This study contributes a model for a university students' e-portfolio for faculty members and students to use as part of the teaching–learning process. It includes the components of the e-portfolio and emphasizes its importance as an evaluation tool for student learning.

1. Introduction

Following technological developments, particularly in communications, in the education field, it became necessary to integrate these innovations into the teaching process (Suskie, 2009). One of the most important was the e-portfolio, which has increased in significance (Smith and Tillema, 2007; Douglas *et al.*, 2019) owing to its objectivity and effectiveness in evaluating learners' performance (Mahasneh and Farajat, 2015; Volmer and Sarv, 2018).

A theoretical literature review revealed that the term e-portfolio has become important in the teaching process. Several reasons were identified: increased use of computer technology; access to the Internet for educational purposes; and the development of a range of evaluation tools, from a simple appraisal of comprehension to an all-inclusive assessment of knowledge, skills and emotional aspects, of which the e-portfolio is an example (Al Tawarah *et al.*, 2017).

The e-portfolio is one technological innovation that has attracted the attention of educators. It enables the owner to electronically document their work and accomplishments over a number of years (Choi *et al.*, 2005; Van Wyk, 2017). As such, an e-portfolio can contain the work of both the student and teacher in a particular subject over a specified period and be viewed in an electronic environment (Lopez-Fernandez and Rodriguez-Illera, 2009). Earlier definitions explained the e-portfolio as: a compilation of the best work produced by a student at each stage of their study (Lamont, 2004); and a repository of all information related to teachers' practice and the course (i.e., study plans, tests and assessment methods, models for student work, classroom pictures, philosophy and objectives, letters of recommendation, certificates, and favorite teachers) (Lambert *et al.*, 2007). Furthermore, the American Association of Higher Education (AAHE) believes that the e-portfolio can be used to improve teaching in colleges of education and universities, becoming a requirement for obtaining a teaching license (Lamont, 2004).

Mahasneh and Murad (2014) conducted a study on whether e-portfolios should be part of school and university curricula, and the current study aimed to develop a model for a university students' e-portfolio.

1.1. Theoretical Background

The first use of the portfolio was by artists to collect their best work for later presentation and proof of their achievements and expertise. Bird (1990) stated that they maintained their portfolios for many years in their search for other work; however, the portfolio always included their best work, from which the concept of the achievement portfolio emerged in many fields. The portfolio first appeared in the education field in the late 1980s at colleges (Bird, 1990). Whereas that study focused on the need for quality, this concentrates on evaluation.

Stiggins (1994) defined the portfolio as a collection of a student's work that demonstrates their accomplishments for the purposes of assessment. In addition, Fenwick and Parsons (1999) explained that the information was selected by the student and took the various forms, including audio or video recordings.

There were many shortcomings with the traditional portfolio, which led to a   difficult-to-use view despite the benefits. With the escalation of information technology and the potential to facilitate the educational process and data management, it was soon exploited to promote the use of the achievement portfolio; hence, the e-portfolio emerged (Gülbahar and Tinmaz, 2006; Meyer *et al.*, 2010).

Ahn (2004) described the e-portfolio is the organization of a range of evidence selected from a complete inventory of what was learned at any given time. This chronological inventory is continually collected and maintained to present for comparison with others; this portfolio of all achievements can be web-based or burned to a CD for later occasional review and updating with new achievements for specific purposes (Evans, 1995).

E-portfolio are used by teachers and learners in pre-university education and faculty members and students at universities. It offers many benefits including: comprehensive performance assessment, exploiting technological developments, professional development, performance improvement, and stimulating creativity and innovation.

1.2. Previous Studies Related to a University Students' E-Portfolio

It appears no studies have been conducted on a possible model for a university students' e-portfolio or measuring their attitudes toward using them. Instead, studies have focused on defining the e-portfolio and its importance to the school-level teaching process, as well as investigating students' attitudes toward using an e-portfolio. Some of these studies are discussed in this subsection.

Abo (2018) investigated the effectiveness of e-portfolios for improving teaching proficiency among student teachers at the Faculty of Education of Al Aqsa University, Gaza. Statistically significant differences ($\alpha = 0.05$ were found between the scores in the sample population and the 75% cutoff value of the total available score on the e-portfolio evaluation card.

Meanwhile, Encalada *et al.* (2018) discovered that applying the lesson study model in combination with the e-portfolio significantly improves learning achievements. It was found that, enabling asynchronous interaction, the e-portfolio improves students' collaborative skills, and facilitates an understanding of functional elements at each stage of the model and their application in pre-professional practice.

In addition, Alsbai (2017) developed an e-portfolio for chemistry teaching and examined its effect on developing reflective thinking. Statistically significant differences ($\alpha = 0.01$) were indicated for reflective thinking in the experimental group: the e-portfolio proved very effective in improving reflective thinking.

Similarly, Alasale and Ayoup (2016), studying the effect of portfolios on fifth grade pupils' achievement trends in Arabic at government schools in Nablus, revealed a statistically significant mean difference between the experimental and control groups. In terms of dimensional achievement, this difference benefited the experimental group.

Fuglík (2013) compared the e-portfolio initiatives, detailing their interconnections as well as possible applications in education in the Czech Republic.

Finally, Hasan (2005) showed the positive attitudes toward the use of e-portfolios among students at the Faculty of Education of Qatar University.

However, this study differs in being the only one to propose a model for a university students' e-portfolio and examine attitudes toward their use in the teaching process.

2. Study Objectives

This study aims to:
i) Propose a model for a university students' e-portfolio.
ii) Determine university students' attitudes toward the proposed model.

3. Study Problem and Questions

Based on personal experience of the lack of interest in keeping each semester's documents and record of activities by either faculty members or students, despite the emergence of (e)-portfolios since the early 20th century, this study aimed to answer the following questions:

- **Question 1**: What model for a university students' e-portfolio can be developed?
- **Question 2**: What are university students' attitudes toward this model?
- **Question 3**: Is there a significant mean difference ($\alpha = 0.05$) between university students' attitudes toward the e-portfolio model and their gender?

4. Method

4.1. Study Design

The study adopted a descriptive and experimental design.

4.2. Measures

Table 4 in the Appendix shows the questionnaire designed to assess university students' attitudes toward the proposed e-portfolio model. Participants responded to each item using a 5-point scale, ranging from 1= completely disagree to 5 = completely agree.

4.3. Population and Sample

The proposed e-portfolio model was developed from a consensus among 20 specialists in educational sciences. Students' attitudes toward the proposed e-portfolio model was determined through its use by an experimental group of 90 students at Al-Shoubak University College.

4.4. Research Ethics

Approval for the study was first sought from the Dean of Al-Shoubak University College, and then implementation agreed. The measurement tools were constructed, and their validity and reliability verified, before being used with the sample of participants.

4.5. Measurement Tools

1. An interview was conducted to develop a model for a university students' e-portfolio.
2. A questionnaire was distributed to assess students' attitudes toward the proposed model.

4.6. Validity

First, experts reviewed the language, clarity, relevance, and comprehensiveness of the questionnaire and interview items, each of which were rated as either 4—Very relevant, 3—Quite relevant, 2—Somewhat relevant, or 1—Not relevant). The items were then divided into two groups: Group 1 comprised Categories 1 and 2, and Group 2, Categories 3 and 4. The content validity index (CVI) was calculated using the following formula:

CVI = Items rated as 4—Very relevant and 3—Quite relevant / Total number of items.

The CVI was 0.91 for the questionnaire and 0.92 for the interview, each falling within the accepted statistical range of 0.7–1), confirming the validity of both.

4.7. Reliability

4.7.1 Questionnaire Reliability

A pilot was undertaken with 10 people, who did not participate in the later study. These results were used to calculate Cronbach's alpha coefficient and determine reliability. As shown in Table 1, the coefficient fell within the accepted statistical range of 0.7–1), confirming the questionnaire to be reliable.

Table-1. Questionnaire reliability.

Reliability statistics	
Cronbach's alpha	**Items (N)**
0.822	17

4.7.2. Interview Reliability

Four respondents were reinterviewed at a two-week interval, and 100% reliability was found between the first and final interviews.

4.8. Data Analysis

SPSS Version 16.0 was used for the descriptive analysis. The mean and standard deviation were calculated to identify the respondents' attitudes toward the proposed e-portfolio model, and the t-test to determine the mean difference between their attitudes and their gender.

Having used a 5-point Likert scale, on which 5 indicated the highest and 1 the lowest scores, the mean range was calculated using the formula:

$$\text{Mean Range} = (5 - 1) / 3 = 4 / 3 = 1.33$$

4.9. Data Interpretation

University students' attitudes toward the proposed e-portfolio model were classified as follows: Positive for a mean range of 5-3.67) 5, Moderate for 3.66-2.33, and Negative for (2.32-0).

4.10. Post-Study Design

The study used a quasi-experimental one-group post-study design—E: X O.

5. Results

5.1. Question 1

To answer the question "What model for a university students' e-portfolio can be developed?" a literature review of previous educational studies and interviews with 20 specialists in educational sciences were conducted.
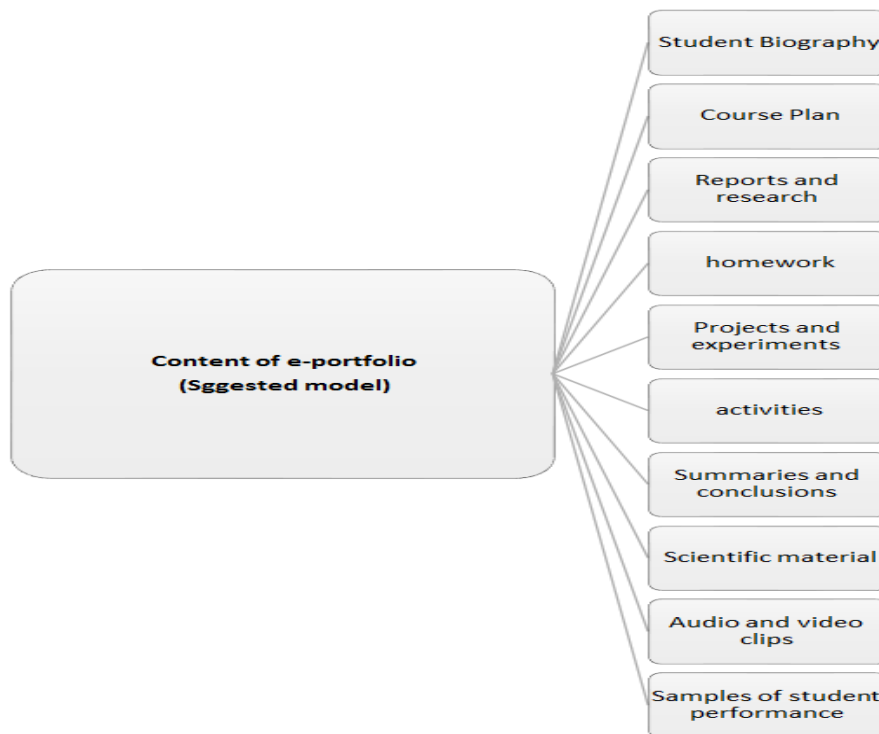

Figure-1. Proposed e-portfolio model.

Figure 1 shows the resulting model, which proposed a 10-component e-portfolio, as designed on Google Sites.

5.2. Question 2

To answer the question "What are university students' attitudes toward this model?" the mean and standard deviation were calculated.

Table-2. Mean and standard deviation for university students' attitudes.

Rank	N	Statement	Mean	Std. Dev.	Attitude level
13	1	Save my work and record it for future reference	4.40	0.684	Positive
17	2	Demonstrate my creativity and organizational skills	4.32	0.747	Positive
3	3	Undertake self-assessment	4.78	0.667	Positive
4	4	Exploit a range of thinking skills to accomplish specific tasks	4.73	0.445	Positive
10	5	Improve my computer skills	4.53	0.502	Positive
16	6	Record my work in audio and video formats	4.32	0.668	Positive
15	7	Conduct an objective evaluation by a faculty member	4.38	0.990	Positive
6	8	Facilitate deletions, additions, and modifications	4.66	0.876	Positive
7	9	Increase interest in the course	4.60	0.493	Positive
12	10	Identify the strengths and weaknesses of the course	4.47	0.502	Positive
9	11	Share my experiences with others	4.53	0.674	Positive
2	12	Publish my experiences on web pages for others' benefit	4.96	0.207	Positive
1	13	Increase my self-confidence	4.97	0.181	Positive
5	14	Take advantage of services offered by websites	4.71	0.456	Positive
14	15	Enhance my acquisition of course competencies	4.39	1.148	Positive
11	16	Increase my knowledge and comprehension of course	4.50	0.851	Positive
8	17	Exploit leisure time for design and research	4.60	0.667	Positive
Overall attitude			4.58		**Positive**

According to the results shown in Table 2, university students' attitudes were generally positive (m = 4.58). This implies that the e-portfolio employs modern methods that students have not previously used during their studies.

5.3. Question 3

To answer the question "Is there a significant mean difference (α = 0.05) between university students' attitudes toward the e-portfolio model and their gender?" a t-test was performed.

Table-3. Results of t-test for effect of gender on university students' attitudes toward the e-portfolio model.

Independent Samples t-test

		Levene's test for equality of variances		t-test for equality of means							
		F-value	p-value	t-value	df	p-value (2-tailed)	Mean difference	Standard error of difference	95% confidence interval of difference		
									Lower	Upper	
Total	Equal variances assumed	21.409	0.000	5.714	88	0.000	6.09154	1.06608	8.21014	3.97293	
	Equal variances not assumed			5.515	50.991	0.000	6.09154	1.10462	8.30916	3.87392	

Group statistics

	Gender	N	Mean	Std. Dev.	Standard error of mean
Total	Male	43	74.6744	6.88242	1.04956
	Female	47	80.7660	2.36103	0.34439

Table 3 shows the results of the t-test, which revealed statistical significance (F = 21.41, p = 0.000). With a smaller significance than the standard (p = 0.05), a significant mean difference (α=0.05) between students' attitudes and their gender were confirmed this was particularly true with regard to women (mean = 80.76), which could be attributed to their interest in accomplishing their goals and recording their achievements for future reference.

6. Discussion

This study aimed to develop a university students' e-portfolio model and determine their attitudes toward the proposed e-portfolio. In accordance with the findings of Hasan (2005), students attitudes were generally positive, due to a group of influences of which the most important were:
1. The novelty of the study.
2. Students' first experience of preparing an e-portfolio for school or university.
3. The opportunity for students to demonstrate their achievements, creativity, and self-evaluation not usually offered by school or university teaching practices.

In addition, gender influenced university students' attitudes toward the e-portfolio model, particularly women, possibly due to their interest in accomplishing their goals and recording their achievements.

The findings of this study are consistent with those of others (Çimer, 2011; Abo, 2018). The e-portfolio is can indicate not only a student's academic level but also their aptitude and aspirations, as long as the tutor is adaptable and embraces creativity and diversity.

7. Limitations

To elicit accurate results, the study was conducted under normal conditions and, to avoid self-selection, efforts were made to ensure the sample population sufficiently represented all the classes at Al-Shoubak University College during the first semester of the 2019/2020 academic year. These results were verified by the validity and reliability of the tools used to collect the data. However, both this methodology and the way in which the results were interpreted may have placed limitations on the study.

8. Conclusions

In conclusion, the proposed model for a university students' e-portfolio consists of ten components: student biography, course plan, reports and research, homework, projects and experiments, activities, summaries and conclusions, scientific material, audio and video clips, and samples of student performance. Moreover, students' attitudes toward this model were positive.

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Appendix

Table-4. Results of questionnaire on students' attitudes toward e-portfolio model.

N	Statement	Scale				
	E-portfolio helps to:	Completely agree	Agree	Undecided	Disagree	Completely disagree
1	Save my work and record it for future reference					
2	Demonstrate my creativity and organizational skills					
3	Undertake self-assessment					
4	Exploit a range of thinking skills to accomplish specific tasks					
5	Improve my computer skills					
6	Record my work in audio and video formats					
7	Conduct an objective evaluation by a faculty member					
8	Facilitate deletions, additions, and modifications					
9	Increase interest in the course					
10	Identify the strengths and weaknesses of the course					
11	Share my experiences with others					
12	Publish my experiences on web pages for others' benefit					
13	Increase my self-confidence					
14	Take advantage of services offered by websites					
15	Enhance my acquisition of course competencies					
16	Increase my knowledge and comprehension of course					
17	Exploit leisure time for design and research					