Graduate Students' Attitudes Towards the Use of Electronic-Portfolios in the College of Educational Sciences at the University of Jordan

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Abstract

The purpose of this study was to probe graduate student' attitudes towards the use of e-portfolios. The study sample consisted of 90 students, and survey methodology was employed to collect data through a self-administered questionnaire. Content validity was achieved by submitting the questionnaire for review by experts in the field of educational studies and instructional technology in Arab Countries before the final version was sent out to the participants. Reliability was ensured by computing the Cronbach's alpha coefficient of the internal consistency. The students expressed positive attitudes toward the use of e-portfolio in all areas (awareness, works and activities, and advantages and disadvantages). There were no significant differences in attitudes across gender and academic specialization in the BA, but there were significant differences in attitudes across academic degree (in favor of PhD students) and computer skills (in favor of students with high level of computer skills).

Keywords: E-portfolio, graduate students, faculty of education.

1.0 Introduction

E-portfolios are a new study formula now widely used in many developed countries. They can be used in educational institutions or in the economic or technical fields, and they have affected many features of the educational process (Ismail, 2005). The recent spread of these new formulas into many educational institutions around the world has resulted in fundamental changes to the roles of the teacher and the learner.

E-portfolios are a technological innovation which relies on the idea that experience passes one by and may be lost unless it is recorded for further exploitation. Utilizing e-portfolios can help in maintaining the continuity of expertise and taking advantage of experience. In addition, students are enabled to develop self-learning skills, which has become one of the main objectives of new types of curriculum (Abdel-Moneim, 1997). The employment of e-portfolios in the educational process can also lead to an authentic, effective, and reliable method of assessment and works as an evaluation tool of teacher performance according to international and local standards, rather than arbitrary methods of self-assessment and evaluation (Ismail, 2005).

1.1 Definition of E-portfolios

E-portfolios are also known as digital portfolios, web-folios, multi-media portfolios or e-folios. They also include, in principle, the same artifacts as do traditional paper-based portfolios; but the fundamental difference is that the contents are shown in digital format (Kilbane & Milman, 2003). The term 'e-portfolio' has been translated in the Arabic literature into several labels including: documentary file, student electronic file, learning file, delivery file, performance file, and assessment and evaluation file.

According to Abdul-Aziz (2008), the so-called e-portfolio is a "systematic collection of the student's work related to content based topics developed by the learner and under the supervision of the teacher" (p. 106). Additionally, Ismail (2005) defines the e-portfolio as a "record of the student's best works within a course or groups of courses, and it employs multimedia elements and one can navigate by using hyper-links, and can be published on the Internet or on CDs " (p. 36). Furthermore, Bakkar and Al-Bassam (2001) add that the e-portfolio is a "record that keeps the performance of the learner in order to highlight his work and achievements which indicate the extent of his growth, naturally, socially, psychologically, academically, skillfully, creatively, and culturally" (p. 147).

More generally, Barrett (2001) defines a portfolio as a "purposeful collection of a student's work that exhibits the student's efforts, progress, and achievements in one or more areas" (p. 8). Al-Ahmed and Osman (2006) more specifically refer to the e-portfolio as an "evaluation tool developed by the learner and not for learner, to help them learn how to assess and value their work during their learning" (p. 4). techniques of modern technology to meet the needs of a knowledge-based society and to bring its students to the next level of excellence and creativity makes it imperative that the university develops new plans for using student e-portfolio in order to equip candidates in teacher education programs to rise to the challenge. Therefore, understanding student attitudes toward this new initiative would facilitate its successful integration.

In addition, there is a lack of effective tools for evaluating and assessing students enrolled in teacher educational programs in order to help them collect together and document their experience in such a way that they could benefit from it in the future. Experience is easy to forget if not practiced in real situations and if not documented to show the progress, skills, and achievements of the student overtime. According to constructivist perspective, learners must be educated to build on what they have already learned. For example, offering students vocabulary exercises in science and social studies may not result in the appropriate representation of concepts.

Although the educational benefits of e-portfolio are promising, only a few relevant studies have been conducted in Arab universities in general and in Jordanian universities in particular. Sheed and Stone (2006) advocated further studies that attempt to understand the students' experiences and attitudes in using e-portfolios. This study therefore seeks to answer the following research questions:

1. What are the attitudes of graduate students towards the use of e-portfolio?
2. Are there any significant differences in attitudes among graduate students towards the use of e-portfolios with regard to their gender?
3. Are there any significant differences in attitudes among graduate students towards the use of e-portfolios with regard to their academic specialization at first degree level (Scientific, Humanistic)?
4. Are there any significant differences in attitudes among graduate students towards the use of e-portfolios with regard to the level of their academic degree?
5. Are there any significant differences in attitudes among graduate students towards the use of e-portfolios with regard to their level of computer skills?

2. 1 Importance of the study

This study reflects the desire and urgent need felt by many Arab educators to identify new global developments in teaching and evaluation methods in higher education. The study may contribute to paving the way for faculty members and graduate students in Jordanian universities to explore this technological innovation as a means of learning, teaching, and evaluation. Therefore, educators need to gain better understanding of student's attitudes prior to the integration of e-portfolios into the curriculum. Furthermore, the study adds to the literature a contribution to the body of knowledge about the role of new technological innovations in enhancing learning and potentially transforming society.

3. 0 Literature Review

The existing literature reveals that only a limited number of published studies have been conducted in Arab countries about the use of e-portfolios by students. Studies conducted in Saudi Arabia (Bakkar & Al-Bassam, 2001; Bakkar et al, 2003), Qatar (Ismail, 2005), Turkey (Kokoglu, 2008), and various universities in the United States (Czech, & Amber, 2002; Salzman et al, 2002; Wright, et al, 2002; Sherry & Bartlett, 2005; Wetzel & Strudler, 2006 ; Zellers & Mudrey, 2007; Ntuli, Keengwe, & Kyei-Blankson, 2009) have shown that students have benefited from using the e-portfolios in their learning in various ways.

Ntuli, Keengwe, and Kyei-Blankson (2009) reported that students considered the e-portfolio a useful learning and teaching tool, and an effective means when applying for a job. In addition, they emphasized the urgent need for more training for students and faculty members to help the e-portfolio to be integrated into their courses.

Kokoglu (2008) investigated perceptions about the e-portfolio as a learning tool among student teachers of English as a Second Language at the University of Yeditepe in Turkey who benefited from becoming accustomed to the latest innovations in digital technology, which helped them show their talents and skills.

Zellers and Mudrey (2007) pointed out that faculty staff in the College of Lorain, in Ohio benefited from using e-portfolios in developing students' metacognitive skills and increasing their academic achievement. Students could be guided through reflective thinking, and effective feedback could be provided on different technological and educational topics.

Wetzel and Strudler (2006) investigated the benefits and costs of using e-portfolios in preservice teacher education by probing the perceptions of students in six academic programs. They found that understanding student perceptions of their experiences can lead to improved practices and polices. Ismail (2005) found positive attitudes towards the use of the e-portfolios among students in the College of Education at Qatar University. More positive attitudes were also found towards their course and its objectives. It was concluded that e-portfolios may serve as an alternative method of evaluation especially in technological courses, and particularly benefit students in exhibiting their best work.

Sherry and Bartlett (2005) conducted a questionnaire study of the perceptions of graduate and undergraduate students majoring in education about the use of e-portfolios. They found that despite differences in information technology skills between the two groups, they had positive perspectives.

Bakkar et al. (2003) reported that female students in the College of Education, at King Saud University, Saudi Arabia, accomplished three purposes with the use of e-portfolios: documentation of experience, choosing their best works, and growth and progress in their performance. In addition, students were able to describe their own weaknesses in the application of knowledge, skills, and teaching. The results also showed that academic specialization had no significant effect on the use of e-portfolios.

According to Britten, Mullen, & Stuve (2003), 50% of graduate students in 400 U.S academic department used e-portfolio. In a review published by The Society for Information Technology and Teacher Education (SITE), Strudler and Wetzel (2005) found over one hundred papers in 2003-2004 related to the use of e-portfolios in education.

Wright et al. (2002) qualitative research method explored the use of e-portfolios in developing the skills of student teachers. The majority believed that using e-portfolios had contributed to the development of their reflective thinking and practical and organizational skills.

A questionnaire study by Salzman et al. (2002) identified the use of e-portfolios. The results showed that most used e-portfolios as a means of assessment. More generally, recent advances in educational technology are leading many educational institutions to shift from paper to electronic files (Bartlett, 2002).

Czech and Amber (2002) found that the benefits to students of using portfolios lay in providing them with good feedback through reflective thinking, developing their technological skills, and allowing them to exhibit their projects in an orderly and accurate manner.

Bakkar and Al-Bassam (2001) developed a conceptual framework for the definition of the e-portfolio and its benefits. They concluded that more empirical studies should be conducted with learners at various levels ranging from kindergarten to graduate students on how to design, develop, and evaluate e-portfolios. They also highlighted the need to hold training sessions for teachers to integrate e-portfolios into the curriculum.

In summary, the literature clearly shows that the use of e-portfolios is gaining momentum especially within higher education institutions. Most qualitative and quantitative studies considering factors such as academic achievement, specialization, attitudes, the perceptions of learners, learning processes, teaching skills, reflective thinking skills, evaluation and assessment conclude that the use of the e-portfolio is an effective method in teaching and learning..

However, there is a marked paucity of Arab studies regarding this topic. In examining the attitudes of graduate students in the College of Educational Sciences at the University of Jordan toward the use of e-portfolios, the present study is the first of its kind to be conducted in the Hashemite Kingdom of Jordan. In this country, some universities already provide the infrastructure required for offering access to e-portfolios while others are considering it, but some have yet to discover their possibilities.

4. 0 Methodology

To ascertain the attitudes of graduate students, a survey research method was deemed an effective way of gathering the data necessary to examine the attitudes of graduate students toward the use of e-portfolios. Overall, survey research utilizes the responses to questions from the sampled population to formulate inferences about the attitudes. Survey research obtains responses about attitudes that are otherwise difficult to measure using observational techniques (McIntyre, 1999). A written questionnaire consisting of four sections with 38 items was used.

4. 1 Variables of the Study

Independent variables were: Gender (male, female), academic specialization at bachelor level (human, scientific), academic degree (Master, Doctorate), level of computer skills (low, moderate, high). Dependent variable was student's attitudes towards e-portfolio.

4. 2 Participants

The target population in this study consisted of graduate students in the College of Education at the University of Jordan for the academic year 2010/2011 totaling (607) comprising Masters (332) and doctoral students (275). Using stratified random sampling, the questionnaire was distributed to (150) students, and only (90) students responded with a return rate of 60.0% of responses subsequently used in the statistical analysis.

4. 3 Instrument of the Study

In exploring the attitudes of graduate students toward their use of e-portfolios, the questionnaire was developed by examining survey methods previously used in this area, such as in studies by Ismail (2005) and Bakkar et al. (2003) and then constructing a self-administered questionnaire consisting initially of 45 items.

The content validity of the questionnaire was achieved by consulting experts in the field of educational studies and instructional technology in Jordan and other Arab Countries. The amended questionnaire consisted of 38 items distributed in the categories of awareness, work and activities, and advantages and disadvantages. A five-point Likert scale ranging from strongly disagrees to strongly agree was used to measure the attitudes of the students towards the use of e-portfolios.

Cronbach's alpha coefficient was calculated to measure the internal consistency of the questionnaire as a whole (0.89), and for each of the three categories (0.67, 0.76, and 0.84 respectively) which suggested that the instrument was reliable. Furthermore, an item analysis was conducted to double check if items were highly correlated.

4. 4 Procedure

The self-administered questionnaire was sent to the sample graduate students via their university e-mail addresses, and descriptive statistics for all independent and dependent variables were computed for the data. An alpha level of 0.05 was placed prior to examine if data were statistically significant.

4. 5 Results and Discussion

The results in Table 1. show that the attitudes of the students toward the use of e-portfolios in learning were very positive with a mean of all responses of 3.97. The highest mean score of 4.05 was for awareness followed by advantages and disadvantages with a mean of 3.98, then works and activities 3.89. The results can be attributed to the fact that the e-portfolio represents a shift from traditional methods of learning and evaluation to new methods based on the contents of the e-portfolio such as records of work and projects which integrate multimedia applications that are attractive to students and motivate them to learn. In addition, the development of computer skills among students has contributed to the development of positive attitudes towards the use of electronic methods in learning and evaluation.

4. 5. 1 Awareness of the e-portfolio

Table 2. shows that the students' attitudes towards e-portfolios were very positive for all the items in the category of awareness apart from one. Means of responses ranged from 3.47 to 4.47 with the highest score for "I feel proud after the creation of my e-portfolio", and "Completion of e-portfolio requires a clear ability to organize". The lowest scores were for "I am comfortable with electronic portfolios more than paper portfolios" and "I am comfortable with assessing my performance through traditional ways such as pencil and paper exams".

4. 5. 2 Work and activities for the e-portfolio

Table 3. shows that the students' attitudes towards e-portfolio were very positive for almost all of the items in the area of work and activities, whereas only two items received moderate ratings. Means ranged from 4.47 to 2.50 with the highest scores for "I am comfortable with e-portfolio more than paper portfolio when collecting and presenting my distinctive works" and "Using e-portfolios helped in developing my personal and professional skills". The lowest mean scores were for "Some aspects of learning such as listening or speaking can not be easily exhibited in e-portfolio" and "I have placed artifacts for my works to show my progress".

4. 5. 3 Advantages and disadvantages

Table 4. shows that the students' attitudes toward e-portfolios were positive for all of the items in the category of advantages and disadvantages, with only two items rated as moderate. Means for the students' responses ranged from 2.97 to 4.52 with the highest score for "Creating e-portfolio helped me reviewing my projects in order to present them in the best manner" and "Creating e-portfolio helped in developing my technological skills in teaching". The lowest scores were for "Creating e-portfolio is time consuming" and " I feel that creating e-portfolio increases my academic load".

In order to answer the second research question, means and standard deviations of scores were calculated according to the gender of the respondents, and an independent t-test was performed to test the significance of any difference between the means. Table 5. shows that there were no statistically significant differences (at $p < 0.05$) between male and female students in their overall attitudes towards the use of e-portfolios, either in the scale as a whole or for the sub-categories. The absence of differences between male and female students in attitudes towards the use of e-portfolios may be attributed to the fact that all students enjoy the same privileges at university level due to the existence in Jordan of a coeducational system where there is no such discrimination in terms of courses or educational facilities.

To answer the third research question, means and standard deviations for student attitudes toward the use of e-portfolio were calculated for the scale as a whole and for each sub-category with regard to each student's academic specialization at first degree level. An independent t-test was performed to test the significance of differences in the attitudes of students in science and humanities specializations.

Table 6. shows that there were no statistically significant differences (at $p < 0.05$) between the students with different academic specialization in their attitudes toward the use of e-portfolios. This finding corresponds with those of Bakkar et al., (2003) which also found no effect of academic specialization on the attitudes of student teachers in pre-service programs towards the use of e-portfolio. This may attributed to the existence of compulsory and elective courses in computer skills to bridge the gap between humanities and sciences disciplines. In addition, the rise of computer culture in the community at large, and the focus in secondary education on enhancing basic computer skills and e-learning applications before students enroll in higher education as found in both private and public, helped in bridging the digital divide between students in human and scientific disciplines.

To answer the fourth research question, means and standard deviations for student attitudes toward the use of e-portfolios were calculated for the scale as a whole and for each sub-category with regard to each student's academic degree. The independent t-test was performed to test for significant differences between the attitudes of PhD students and MA students.

Table 7. shows that the attitudes towards the use of e-portfolio among PhD students were in general more positive than those of Masters students. In addition, the attitudes of doctoral students were significantly more positive in the categories of awareness and work and activities. Moreover, no significant difference was found with regard to the category of advantages and disadvantages.

These findings contradict those of Bakkar et al. (2003) who found in their study at King Saud University in Saudi Arabia that academic qualification did not significantly affect the awareness of student teachers in pre-service programs toward the use of e-portfolios. This may be attributed to the fact that the nature of PhD programs requires students to use computer applications such as internet, databases, and e-mail software, all of which may contribute to honing the skills needed for multi-applications when working on e-portfolios. Such students are then more capable of handling e-portfolios, and may thus have more positive attitudes towards them.

To answer the fifth research question, means and standard deviations for the students' attitudes towards the use of e-portfolio were calculated for the scale as a whole and for each sub-area of the scale with regard to level of computer skills. In addition, a one-way analysis of variance (ANOVA) was conducted to find any statistically significant differences in mean scores between the students' attitudes with regard to their level of computer skills, which were measured via using a three-point scale of low, moderate, and high.

The results in Table 8. show that there are statistically significant differences in the mean scores of the students' attitudes with regard to their level of computer skills. A one-way analysis of variance (ANOVA) was conducted to identify any statistically significant differences in the mean scores.

Table 9. shows that there are significant differences for the scale as a whole and for each sub-category of the scale. The Scheffee test for comparisons was then used to determine where the differences in means lie in terms of level of computer skills.

Table 10. shows that the students with moderate and high levels of computer skills had more positive attitudes than those with low levels of skills for the scale as a whole and for the awareness and advantages and disadvantages sub-categories.

These differences may be attributed to the fact that students with high levels of computer skills can work on portfolios in the electronic rather than paper version by more readily employing some of the information technology applications required, such as using, organizing, storing, designing, and editing multimedia files. In addition, their skills help them in constructing websites and taking into account the principles of electronic design while working to certain technological standards, which will be reflected in their positive attitudes towards e-portfolios.

5. 0 Recommendations

In the light of the findings of this study, the following recommendations can be made:

1. Further exploration of the use of e-portfolios as an alternative method of assessment is needed, since this method is now widely used in American higher education and has proved its effectiveness and usefulness.
2. Training courses should be held for graduate students and faculty members on how to integrate e-portfolios into teaching and learning.

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Table 1: Students overall attitudes towards the use of e-portfolio.

No.	Area	Mean	Standard Deviation	Degree
1	Awareness	4.05	36.0	high
2	Works and activities	3.89	42.0	high
3	Advantages and disadvantages	3.98	48.0	high
	Total Degree	3.97	37.0	high

Table 2: Students' awareness towards the use of e-portfolio arranged in descending order

No.	Item	Means	Standard deviation	Degree
9	I feel proud after the creation of my e-portfolio.	4.47	0.57	high
1	Completion of e-portfolio requires a clear ability to organize.	4.43	0.50	high
2	I think that the appearance of e-portfolio (including the design and the cover) is very important.	4.37	0.55	high
4	I think that the content of e-portfolio (with its details and Regulation) is very important.	4.30	0.65	high
5	The preparation of e-portfolio requires computer skills and artistic talent.	4.10	0.80	high
8	I still do not understand why we must complete the student's e-portfolio.*	4.07	0.82	high
6	I was comfortable to compile my projects under a student e-portfolio.	4.00	0.90	high
10	I would be comfortable with an e-portfolio used as a learning tool in all courses.	3.97	0.80	high
7	I think viewing previous samples of student's e-portfolios helped me in forming a better picture about e-portfolios.	3.93	0.97	high
3	I have a clear concept of how to compile and complete e-portfolios.	3.77	0.81	high
12	I am comfortable with assessing my performance through traditional ways such as (pencil and paper exams).*	3.70	1.20	high
11	I am comfortable with electronic portfolios more than paper portfolios.	3.47	1.19	moderate

* Negative items were re-arranged on the scale to become positive items.

Table 3: Students' work and activities toward the use of e-portfolio arranged in a descending order of means

No.	Item	Means	Standard deviation	Degree
24	I am comfortable with e-portfolio more than paper portfolio when collecting and presenting my distinctive works.	4.47	0.62	high
17	Using e-portfolios helped in developing my personal and professional skills.	4.30	0.70	high
19	I feel comfortable to compile my projects within e-portfolio.	4.27	0.82	high
20	I know how to design e-portfolio in the future.	4.27	0.69	high
21	E-portfolio has increased my desire to learn effectively	4.10	0.75	high
14	Goals that I tried to achieve through e-portfolio were difficult and not achievable.*	3.97	0.88	high
22	Using e-portfolio helped me in working within specific standards.	3.90	0.84	high
16	I feel nervous when I work on my e-portfolio.*	3.80	1.02	high
23	E-portfolio helped me in working and learning through a constructivist perspective.	3.80	0.84	high
13	I achieved most of my educational goals through my e-portfolio.	3.73	0.82	high
15	I have placed artifacts for my works to show my progress.	3.53	0.77	moderate
18	Some aspects of learning such as listening or speaking can not be easily exhibited in e-portfolio. *	2.50	0.89	moderate

* Negative items were re-arranged on the scale to become positive items.

Table 4: Advantages and disadvantages toward the use of e-portfolio arranged in descending order of means score

No.	Item	Means	Standard deviations	Degree
38	Creating e-portfolio helped me reviewing my projects in order to present them in the best manner.	4.52	0.63	high
29	Creating e-portfolio helped in developing my technological skills in teaching.	4.38	0.72	high
34	Creating e-portfolio made me realize that it is possible to learn at any time.	4.31	0.60	high
36	I feel that e-portfolio is not helping to learn.*	4.21	1.10	high
35	Creating e-portfolio helped in showing me efforts to learn outside the classroom.	4.14	0.74	high
31	Creating e-portfolio is a valuable self-learning tool for the future.	4.10	0.89	high
28	Creating e-portfolio helped in planning my own learning style.	4.07	0.59	high
30	Creating e-portfolio helped in knowing my strengths and weaknesses.	4.03	0.90	high
32	Creating e-portfolio helped in showing my best abilities and capabilities.	4.03	0.72	high
37	Creating e-portfolio helped in developing my reflective thinking.	4.00	0.84	high
27	Creating e-portfolio helped in choosing what to read and to listen according to my personal need.	3.86	0.74	high
33	I feel that e-portfolio represents the outcomes of my learning.	3.83	0.96	high
26	I feel that creating e-portfolio increases my academic load.*	3.31	1.16	moderate
25	Creating e-portfolio is time consuming.*	2.97	1.11	moderate

Table 5: Results of t-test for student's attitudes with regard to gender (male and female).

Area	Gender	Number	Means	Df	t	Df	Sig.
Awareness	male	15	4.00	0.42	0.549-	88	0.585
	female	75	4.06	0.35			
Works and activities	male	15	3.73	0.23	1.558-	88	0.123
	female	75	3.92	0.44			
Advantages and disadvantages	male	12	3.93	0.11	0.416-	85	0.678
	female	75	3.99	0.52			
Total degree	male	15	3.86	0.24	1.196-	88	0.235
	female	75	3.99	0.39			

Table 6: Results of t-test for student's attitudes toward the use of e-portfolio with regard to their academic specialization at the first degree level.

Area	Academic specialization	Number	Means	Df	t	Df	Sig.
Awareness	Scientific	12	4.167	0.435	1.225	88	0.224
	Human	78	4.029	0.351			
Works and activities	Scientific	12	4.000	0.404	1.011	88	0.315
	Human	78	3.869	0.421			
Advantages and disadvantages	Scientific	12	3.929	0.264	0.416-	85	0.678
	Human	75	3.991	0.511			
Total degree	Scientific	12	4.026	0.324	0.590	88	0.557
	Human	78	3.959	0.376			

Table 7: Students' attitudes toward the use of e-portfolio with regard to academic degree.

Area	Academic qualification	Number	Means	Standard deviation	t	Df	Sig.
Awareness	PhD	36	4.167	0.285	2.717	85	0.008
	MA	51	3.956	0.399			
Works and activities	PhD	36	4.104	0.263	4.310	85	0.000
	MA	51	3.740	0.455			
Advantages and disadvantages	PhD	36	4.089	0.291	1.990	82	0.050
	MA	48	3.879	0.580			
Total degree	PhD	36	4.118	0.219	3.459	85	0.001
	MA	51	3.853	0.421			

Table 8: Means and standard deviations for student's attitudes toward the use of e-portfolio with regard to their level of computer skills

Area	Level of computer skills	Number	Means	Standard deviation
Awareness	Low	15	3.767	0.347
	Moderate	48	4.125	0.384
	High	27	4.065	0.256
	Total degree	90	4.047	0.364
Works and activities	Low	15	3.667	0.440
	Moderate	48	3.865	0.382
	High	27	4.046	0.422
	Total degree	90	3.886	0.419
Advantages and disadvantages	Low	12	3.339	0.732
	Moderate	48	4.031	0.254
	High	27	4.183	0.440
	Total degree	87	3.983	0.483
Total degree	Low	15	3.596	0.458
	Moderate	48	4.008	0.265
	High	27	4.102	0.351
	Total degree	90	3.968	0.369

Table 9: One-Way ANOVA- results for student's attitudes toward e-portfolio with regard to their level of computer skills

Area	Variable Level of computer skills	Sum of Squares	Df	Mean Square	F	P
Awareness	Between groups	1.479	2	0.740	6.249	0.003
	Within groups	10.299	87	0.118		
	Total	11.778	89			
Works and activities	Variable Level of computer skills	Sum of Squares	Df	Mean Square	F	P
	Between groups	1.437	2	0.719	4.401	0.015
	Within groups	14.208	87	0.163		
	Total	15.645	89			
Advantages and disadvantages	Variable Level of computer skills	Sum of Squares	Df	Mean Square	F	P
	Between groups	6.159	2	3.080	18.554	0.000
	Within groups	13.942	84	0.166		
	Total	20.102	86			
Total degree	Variable Level of computer skills	Sum of Squares	Df	Mean Square	F	P
	Between groups	2.645	2	1.322	12.184	0.000
	Within groups	9.443	87	0.109		
	Total	12.088	89			

Table 10: Results for Scheffee test for comparisons between items with regard to student's level of computer skills

Area	Comparisons	Difference of Means	Standard Error	P
Awareness	Low * moderate	*0.36-	0.13	0.003
	Low * high	0.30-	0.14	0.031
	Moderate * high	0.06	0.10	0.768
Advantages and disadvantages	Low * moderate	*0.69-	0.16	0.000
	Low * high	*0.84-	0.17	0.000
	Moderate * high	0.15-	0.12	0.309
Total	Low * moderate	*0.41-	0.12	0.000
	Low * high	*0.51-	0.13	0.000
	Moderate * high	0.09-	0.10	0.497