



PEDAGOGICAL FACTORS INFLUENCING ONLINE ASSESSMENTS USE: A CASE STUDY WITH BUSINESS RESEARCH METHOD SUBJECT AT A MALAYSIAN PRIVATE UNIVERSITY

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ABSTRACT

The main aim of this action research is to determine relationships between usefulness of feedback, learning flexibility, attitude towards online assessments and intention to use online assessments. Another aim of the study is to establish relationships between the independent variables, actual use of online assessments and students' achievements. The respondents are 160 students registered in Business Research Method during semester September 2013. Results of the study show that there are significant relationships between the three selected variables and intention to use online assessments. Significant relationships are also found between the selected variables and actual use of online assessments. Attitude towards online assessments is found to be the most significant predictor variable affecting both intention and actual use. No significant relationship is found between any of the selected predictor variable and students' achievements in the subject.

Keywords: online assessments, online learning, usefulness of feedback, learning flexibility

1.0 INTRODUCTION

In online learning, in whatever form it takes, whether via the use of laptop computers, computer tablets or smartphones, learners are no longer passive recipients of knowledge. For effective use of online learning technologies, students and educators actively learn and construct knowledge together. Teaching and learning become fun, interactive and collaborative, with the educators providing guided instructions, encouraging reflection about thinking, giving feedback and encouraging transfer (Berge, 2000; Zakaria, 2008). Assessments are essential for effective learning, no matter what the modes of instructions are. They provide students and educators with feedback on how well they are doing and what improvements are to be made. In online learning environment where students construct and make meaning of their learning experiences, the use of effective online assessments are fundamental to learning.

Many previous studies, for examples Yuen and Ma (2008), Park, Lee and Cheong (2007) and Masrom (2007) have focused on online technology adoption from the perspectives of users attitudes towards the technology. These studies employed Technology Acceptance Model (TAM) or Theory of Planned (TPB) as the theoretical framework. With TAM, perceived usefulness and perceived ease of use are two important attitudinal variables influencing people's propensity to accept and use new technology. Perceived usefulness is defined as the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context. Perceived ease of use refers to the degree to which the prospective user expects the target system to be free of effort (Davis, Bagozzi & Warshaw, 1989). With TPB, intention is predicted by three factors. The factors are attitude towards the behaviour (A), subjective norms (SN) and perceived behaviour control (PBC). Attitude refers to likes or dislikes towards the behaviour while subjective norms refer to "the person's perception that most people who are important to him think he should or should not perform the behaviour in questions". Perceived behaviour control reflects perceptions of internal and external constraints behaviour, that is, the perception whether they are able or unable to perform the tasks (Fishbein & Azjen, 1975; Taylor & Todd, 1995)

Zakaria (2008) conducted a study on online learning technology use among engineering educators in a Malaysian private university, from the pedagogical perspectives. Results from the study, show that self-directed learning beliefs and readiness in using technology significantly influenced the use of online technology among engineering educators. The intention of this study is to provide other pedagogical dimensions to online learning technology adoption, with emphasis on online assessments, among students. Thus the first objective of this study is to determine the relationships, if any, between the predictor variables (usefulness of feedback, learning flexibility and attitudes towards online assessments) and intention to use online assessments. The second objective of the study is to determine the relationships, if any, between usefulness of feedback, learning flexibility, attitude towards online assessments and actual use of online assessments. The third objective of the study is to determine whether the use of online assessments significantly influenced students' achievements in the subjects. The justifications for including the variables are discussed in the following sections.

2.0 LITERATURE REVIEW

2.1 Online Assessments

Assessments can be categorized into summative and formative assessments. Summative assessments are usually conducted at the end of the course. Formative assessments are continuous assessments intended to improve students' learning, how the course is taught and the required improvement in the syllabus. Formative assessments provide feedback to both students and lecturers. Provisions to assess students online are usually available with most online Course

Management System (CMS) or Learning Management System (LMS). According to Robles and Braathen (2002), online assessment techniques provide students with various advantages which are 1) students are able to interact not only with the educator but with the other students, online, 2) different assessment techniques provide educators with different ways of gauging students understanding of the subject matter just like traditional assessments and 3) the provision of instant feedback enable the students to know how well they are doing in the course.

There are many different types of online assessment techniques available with these LMS. Just like in traditional assessments, different assessment techniques are used to assess different levels of thinking skills. Typical online assessments' techniques which are able to assess different levels of thinking, from remembering, understanding and applying are multiple choice questions (MCQs), true and false questions (TF) and matching questions. Depending on how lecturers design the assessments, multiple choice questions (MCQs) format can be extended to assess higher order thinking skills such as analysing and evaluating. Lecturers typically design real scenarios which the students are required to analyse. This type of MCQs is referred to as extended multiple choice questions (EMQs). In order to assess higher order thinking, lecturers are also able to assess students by designing questions using restricted extended response (short essays) and extended response (long essays) formats. Lecturers are also able to gauge students' understanding of specific topics via the use of online bulletin boards and forums (Wade, 1999; Robles and Braathen, 2002)

The provision for students to work collaboratively with others is available with Web 2.0 technology. Typical examples are Wikis, blogs and Facebook which are increasingly used in higher education (Alexander, 2006). In most cases these tools are used as formative assessments. Students are able to discuss various problems posed by their lecturers, with other students, online. Students are also able to submit their portfolios and projects online. With certain web-sites such as i-rubrics, rubistar and r-campus, lecturers are able to grade students' assignments online. Thus feedback is available almost instantly for the students to view.

2.2 Usefulness of Feedback

Feedback helps students to learn. The ultimate aim in providing feedback should be to equip students with the ability to self-monitor the quality of their own work while construction is under way (Sadler, 2010). Effective learning requires feedback to be given almost immediately and in positive and encouraging manner. There are seven principles of good feedback practice (Nicol & Macfarlane, 2006). These are to help clarify what good performance is, facilitate the development of self-assessment (reflection) in learning, delivers high quality information to students about their learning, encourages teacher and peer dialogue around learning, encourage positive motivational beliefs and self-esteem, provide opportunities to close the gap between current and desired performance and provide information to teachers that can be used to help shape the teaching.

In 2004, Iahad, Dafoulos and Kalaitzakis conducted a study on the role of feedback in online assessments. Findings from the study show that instant feedback received by the students in online assessments was very useful for their learning. Furthermore the study indicates that students showed preference mostly to the provision of the correct answers to each question. The next finding on the role of feedback is, the students agreed with the usefulness of the links to the explanation for each correct answer and thirdly with individual suggestions provided based on marks obtained.

2.3 Learning Flexibility

Online assessments offer students the flexibility of reviewing their learning experience, anywhere, anytime and anyhow, provided they have access to online network (Robles & Baarthen, 2002). The flexibility of online assessments enables students to be self-directed learners. There are eight competencies required for self-directed learning. These are the ability to assess own learning needs, formulating learning strategies, identifying resources and to be critically reflective to the development of convergent and divergent thinking (Knowles, 1975). Assessments in online learning environment enable students to experience assessments as learning method, rather than "live" or "die" situations.

In online learning environment, online learners are autonomous, independent, self-motivated managers of their own time, able to use knowledge rather than the work of the textbook author or instructor, able to acquire learning strategies both individually and collaboratively rather than learning to "pass test" and access to resources is expanded (Berge, 2000). Drennan and Kennedy (2005) studied the factors affecting students' attributes towards flexible online learning in management education. Results from the study indicate that there were two important students' attributes contributing to students attitude towards flexible learning. The first was positive perceptions of technology in terms of ease of use and use of online flexible learning materials. The second attribute was autonomous and innovative learning styles. In summarizing, learning flexibility provides by online assessments include different learning strategies, from learning on their own without assistance from lecturers or peers to working collaboratively with their peers, either using face to face discussion or the use of their mobile applications.

2.4 Attitudes towards Online Assessments

The most common definition of attitude is feeling of like or dislike towards any object, situation, people or everything that a person encounters in everyday life. Previous studies (Davis, 1989; Teo, 2009; Wong, Osman, Goh & Rahmat, 2013) have shown that attitude is a very strong predictor of behaviour intention and actual behaviour. Results from the study conducted by these authors show that perceived usefulness and attitude towards computer use were found to have a significant influence on student teachers' behaviour intention to use computer in teaching and learning. In another study with 235 students showed that attitude towards Moodle was found to be the strongest predictor of behaviour intention and actual use (Sumak, Hericko, Pusnick & Polance, 2011).

3.0 PROBLEM STATEMENT AND RESEARCH QUESTIONS

Previous studies (Davis, 1989; Teo, 2009; Wong, Osman, Goh & Rahmat, 2013; Sumak, Hericko, Pusnick & Polance, 2011) have shown intention and actual use of online learning including that of online assessments are predicted

significantly by usefulness of the technology, ease of use, attitude, knowledge and skills in using the technology and subjective norms. This study is intended to determine factors influencing intention, actual use and students' achievements from the pedagogical perspectives. The research questions guiding the study are:

1. What are the demographic variables of the respondents?
2. Which online assessments formats are used by the students?
3. What are the students' perception of online assessments in terms of usefulness of feedback, learning flexibility and attitude?
4. Are there significant relationships between independent variables (usefulness of feedback, learning flexibility and attitudes towards online assessments) and intention to use online assessments?
5. Are there significant relationships between independent variables (usefulness of feedback, learning flexibility and attitudes towards online assessments) and actual use of online assessments?
6. Are there any significant relationship between the use of online assessments and students' achievements in the subject?

4.0 METHODOLOGY

This study is an action research study, employing quantitative research design. The main purpose of action research is for improvement after certain change process is initiated (Sekaran & Bougie, 2013). One of the researcher used online learning and online learning assessments for her class, Business Research Method, during September 2013 semester which ended in January 2014. Several different online assessments techniques were used continuously throughout the semester. These online assessments techniques are part of Moodle, the open source Learning Management System (LMS) used by the university. A survey instrument comprising 3 parts is developed for the study. Part A consists of 4 questions on demographic variables, Part B is meant to gather information on respondents' use of online tools and their actual use of online assessments' tools.

There are 17 items designed for Part C, divided into 4 factors, usefulness of feedback, learning flexibility and attitude towards online assessment. A 5 point Likert scale is used. There are five items on usefulness of feedback adapted from Iahad, Dafoulos and Kalaitzakis (2004). There are 5 items designed to measure learning flexibility when using online assessments, 5 items to measure attitude and another 4 items to measure intention of using online assessments. Reliability coefficient for usefulness of feedback is 0.794, learning flexibility is 0.644, attitude towards online assessments is 0.875 and 0.710 for intention to use online assessments. The overall reliability coefficient is 0.899. Students' results were obtained from their course work (60%) and final examination (40%).

The survey questionnaires were distributed to 160 students registered for Business Research Method in September 2013. The students were asked to answer the survey questions during their last class, in January 2014. Out of the 160 survey questionnaires returned, 154 were analyzed using Statistical Package for Social Sciences (SPSS). Six questionnaires which were not fully completed were omitted from final analysis.

5.0 RESULTS AND DISCUSSION

5.1 The demographics variables and online assessments used by the respondents

Table 1 shows the respondents demographic variables, online assessments use and students' achievements in the subject. The average age of the respondents is 22.62 years. The maximum age is 27 while the minimum age is 20 years old. Thirty percent of the respondents are male while 70 percent of the respondents are female. Most of the respondents (59%) are in their fourth semester. Twenty-eight percent of the respondents are in their fifth semester and 10% are in their sixth semester. Use of online assessments is measured by the number of online assessments types they have had experience in using for the semester. The maximum number of assessment types they have used during the semester is 10 and the minimum is 0. Students' achievement in the subject (business research method) during the study period is good, with maximum marks of 83 and minimum of 48. To pass the subject students need to obtain at least 40 percent. No student failed the subject.

Table 1: Demographic Variables and Online Assessments Use

Variables	Frequency (n=154)	Percentage	Mean	Standard Deviation
Age			22.62	1.036
Minimum Age =22				
Maximum Age = 27				
Gender				
Male	46	29.9		
Female	108	70.1		
BRM Marks Obtained			69.82	6.960
Minimum Marks =48				
Maximum Age = 27				
Semester				
Second Semester	1	0.6		
Third Semester	2	1.3		
Fourth Semester	91	59.1		
Fifth Semester	43	27.9		
Sixth Semester	16	10.4		
Seventh Semester	1	0.6		
Online Assessments Use				
Multiple choice questions (MCQs)	147	95.5		
Short answer questions	139	90.3		
Formative assessment activities	66	42.9		
Simulation (business games, virtual labs etc.)	62	40.3		
Discussion/bulletin board	89	57.8		
Online collaboration	73	47.4		
E-mail submission /e-learn submission	133	86.4		
True-false questions	131	85.1		
Reflection Journals	57	37.0		
Projects/E-Portfolio	59	38.3		

Online assessments techniques which the students used in descending order are multiple choice questions (96%), short-answer questions (90%), e-mail and e-learn submission of assignments (86%), true-false questions (85%), online discussion forums (58%), online collaboration (47%), formative assessment activities (43%), simulation such as business games (40%), reflection journals (38%) and E-portfolio (38%). The results of this study are consistent with Booth, Clayton, Hartcher, Hungar, Hyde and Wilson (2003) which shows that assessment methods most used by the respondents in their study in descending order were e-mail submission of essay and portfolios, multiple choice questions, true-false questions, short-answer questions and chat-room. Similar to this study, the least used were bulletin board or threaded discussion, self-assessment and simulation.

5.2 Students' perception of usefulness of feedback, learning flexibility and attitude towards online assessments

The results on the respondents' level of agreements with the predictor variables statements are shown in Table 2. The highest level of agreement amongst the respondents on items on usefulness of feedback is on "The links to the explanation of the correct answers tell me what I do not know and help me improve my understanding" (M=4.0). This is followed by "The correct answers provided for the questions I answered wrong in the online tests are essential in learning online" (M=3.90), "I read the lecturer's feedback for the short answer questions" (M=3.82), "The suggestion provided from the online tests based on the marks I obtained is very useful in my learning process" (M=3.75) and "Overall, the online tests provided me with useful feedback" (M=3.68). Results from this study are consistent with findings from Iahad et al. (2004) which show that instant feedback received by students in online assessments was very useful for their learning. Furthermore the study indicates that students showed preference mostly to the provision of the correct answers to each question. The next finding on the role of feedback is, the students agreed with the usefulness of the links to the explanation for each correct answer and thirdly with individual suggestions provided based on marks obtained. Similar conclusion was also reported by Honey and Marshal (2003) who found that students valued the timeliness of feedback provided with online assessment using multiple choice questions.

With regards to learning flexibility with online assessments, the highest level of agreement is indicated by "I refer to the text book or other materials to do the online tests questions" (M=4.03). This are followed by "Overall, the online tests improve my ability to learn" (M=3.84), "Online tests allow for self-paced multiple attempts" (M=3.64), "Online tests are convenient and flexible" (M=3.55) and "I do the online tests on my won without discussing it with my friends" (M=3.35). The results in this study are consistent with Drennan and Kennedy (2005) which shows that online learning enhanced students' ability to learn because of the flexibility of learning materials.

With regards to attitude of respondents towards online assessments, the respondents' level of agreement with the items in descending order are "I enjoy sitting for online tests" (M=3.76), "The use of online tests motivates me to learn the subject better" (M=3.62), "Online tests help me with time management skills" (M= 3.56), "Overall, online tests improve my learning of the subject matter" (M=3.56) and "Online tests are non-threatening, thus build my confidence" (M=3.47). The findings from this study provide proofs that online assessments provide students with useful immediate

feedback, learning flexibility, motivate students to learn, and improve students' ability to learn. The students in this study also enjoyed sitting for the online tests. The results are consistent with findings from a study by Honey and Marshal (2003) where the respondents from the study cited four top benefits from online assessments were convenience and flexibility, immediate feedback, allow for self-paced multiple attempts and motivate the learners.

With items representing intention to use online assessments, respondents' levels of agreement in descending order are "I would recommend my friends to use online assessments" (M=3.50), "I would do online assessments even if it is not compulsory" (M=3.45), and "I would like my lecturers to use online assessments in the future" (M=3.44). Statement which the respondents least agreed on is "I do not like to use online tests and quizzes or other online assessments formats at all" (M= 2.82).

Table 2: Respondents' Level of Agreement with Usefulness of Feedback, Learning Flexibility, Attitude towards Online Assessments and Intention to Use Online Assessments

Items	Mean	Std. Deviation
Feedback		
1. The suggestion provided from the online test based on the marks I obtained is very useful in my learning process".	3.75	0.924
2. The correct answers provided for the questions I answered wrong in the online test are essential in learning online	3.90	0.956
3. The links to the explanation of the correct answers tell me what I do not know and help me improve my understanding".	4.00	0.900
4. I read the lecturer's feedback for the short answer questions	3.82	0.867
5. Overall, the online test provided me with useful feedback".	3.68	0.921
Learning Flexibility		
1. I do the online tests on my own without discussing with my friends	3.35	1.141
2. I refer to the text book or other materials to answer the online tests questions.	4.03	0.977
3. Online tests are convenience and flexible	3.55	1.004
4. Online tests allow for self-paced multiple attempts	3.64	0.920
5. Overall, the online tests improve my ability to learn	3.84	0.932
Attitude towards online assessments		
1. The use of online tests motivate me to learn the subject better	3.62	0.943
2. Online tests are non-threatening, thus build my confidence	3.56	0.970
3. Online tests help me with time management skills	3.47	1.127
4. I enjoy sitting for online tests	3.76	0.970
5. Overall, online tests improve my learning of the subject matter	3.56	0.970
Intention to use online assessments		
1. I would like my lecturers to use online tests/quizzes/ in the future	3.44	1.035
2. I would recommend my friends to use online tests/quizzes	3.50	1.068
3. I would do online tests/quizzes or other online assessments even if it is not compulsory	3.45	0.987
4. I do not like to use online tests/ quizzes or other online assessment tools at all.	2.82	1.178

5.3 Relationships between the Independent Variables and the Dependent Variables

A Pearson correlation analysis is performed to determine whether there are significant relationships between usefulness of feedback, flexibility of learning, attitude towards online assessments and intention to use online assessments. Results shown in Table 2 below indicate that there are significant relationships between usefulness of feedback and intention to use online assessments ($r=0.476$, $p=0.000$), between flexibility of learning and intention to use online assessments ($r=0.596$, $p=0.000$) and between attitude towards online assessments and intention to use online assessments ($r=0.756$, $p=0.000$). The second Pearson correlation analysis is performed to determine whether there are any significant relationships between usefulness of feedback, flexibility of learning, attitude towards online assessments and actual use of online assessments. There are significant relationships between the three selected independent variables and actual use of online assessments. The highest correlation is found between attitude towards online assessments and actual use ($r=.252$, $p=0.002$), followed by flexibility of learning ($r=.240$, $p=.003$) and usefulness of feedback ($r=.170$, $p=.036$). However, no significant relationship is found between the three selected independent variables and students' achievements in the subject as shown in Table 3.

Table 3: Results for Pearson Correlation Analysis

Variables	r	Sig.
Usefulness of Feedback and Intention to use online assessments	.476**	.000
Learning Flexibility and Intention to use online assessments	.596**	.000
Attitudes towards online assessments and Intention to use online assessment	.756**	.000
Usefulness of Feedback and Actual use of online assessments	.170*	.036
Flexibility of Learning and Actual use of online assessments	.240**	.003
Attitude towards online assessments and Actual Use of online assessments	.252**	.002
Usefulness of Feedback and Students Achievements	-.059	.464
Flexibility of Learning and Students Achievements	.023	.384
Attitude toward Online Assessments and Students Achievements	-.071	.776

**Correlation is significant at 0.01 level (2-tailed)

*Correlation is significant at 0.05 level (2-tailed)

Regression analysis is used to determine the variance explained by the independent variables selected for the study. The results are shown in Table 3. Two separate models are used in this analysis. In the first model, learning flexibility and usefulness of feedback are used as the predictor variables. Intention in using online assessment is used as the dependent variable. The results show that the regression model fit the data where 37.6 percent of the variance in intention to use online assessment is explained by the usefulness of feedback and flexibility of learning. The overall model is significant ($F=45.329$, $p=0.000$). In this model both variables are found to be significant predictors with learning flexibility being more significant ($B=0.476$, $t=6.019$, $p=0.000$) compared to usefulness of feedback ($B=0.166$, $t=2.228$, $p=0.027$). Thus this study adds another dimension to factors relating to intention to use and actual use of online assessments as well as online learning. The new factors are usefulness of feedback and learning flexibility offered by online assessments.

The predictor variables in the second model are usefulness of feedback, flexibility of learning and attitude towards online assessments. The overall model is found to be significant ($F=67.525$, $p=0.000$) and the predictor variables explained 57.5 percent of the variance in intention to use online assessments. Attitude towards the use of online assessments is found to be the most significant ($B=2.045$, $t=8.363$, $p=0.000$). The other two predictor variables usefulness of feedback and flexibility of learning are not significant in this model.

Thus, it can be concluded that attitude towards online assessment reduce the effects of usefulness of feedback and learning flexibility. Results from this study are also consistent with studies conducted by Teo (2009), Wong et al. (2013) and Sumak et al. (2011), that attitude is a significant predictor of behaviour intention. In this study, attitude is found to have the highest correlation with both intention to use ($r=.756$, $p=0.000$) and actual use of online assessments ($r=.252$, $p=0.002$). Thus results from regression analysis in this study reinforced the importance of attitude in predicting behaviour intention and actual use of online assessments.

The findings from this study support the theoretical framework used in terms of the significance of usefulness of feedback, learning flexibility and attitude as the predictors to intention to use and actual use of online assessments. However, no significant relationship is found between usefulness of feedback, flexibility of learning and students' achievements in the subject. The results support findings from Russell's (2001) compilation of 355 studies on technology based learning where no significant difference results are reported when comparing students' achievements in technology based learning and traditional method. Similar findings are reported by Peat and Franklin (2003), Charman (2002) and Jenkins (2004) where the use of formative online assessments in their studies did not raise outcomes and evidence was inconclusive.

Table 3: Multiple Regression Results

Variables	B	β	t	Sig
Model 1				
Constant	1.260			.332
Flexibility of Learning	.476	.487	6.019	.000
Usefulness of Feedback	.166	.180	2.228	.027
	R	R^2	F	Sig.
	.613	.376	45.329	.000
Model 2				
Constant	2.045		1.898	.060
Attitude	.536	.697	8.363	.000
Flexibility of Learning	.053	.054	.634	.527
Usefulness of Feedback	.034	.032	.466	.642
	R	R^2	F	P
	.758	.575	67.525	0.000

6.0 RECOMMENDATIONS AND CONCLUSIONS

Results from this study show that most of the respondents valued the feedback available instantly when they used online assessments. They valued the availability of the links to the correct answers which improved their understanding of the subject and according to the respondents, the correct answers provided were essential in learning online. The study also implies that the use of online assessments is another method of learning. This is proven when most of them reported high agreement with the statement of referring to textbook and other materials when they did the assessments. Results of the study also show that there are significant relationships between usefulness of feedback, flexibility of learning, attitude and intention to use online assessments. Significant relationships are also found between the three selected variables and actual use of online assessments. Attitude towards the use of online assessments is found to be the most significant predictor of behaviour intention and actual use of online assessments. These results support the theoretical basis for the study which is derived from theory of planned behaviour and technology acceptance model.

However, there is no significant relationship found between any of the three predictor variables, and students' achievements. This implies that the use of online assessments does not contribute to students' achievements. Thus, it can be concluded that using online assessments are quite similar to traditional based pen and paper tests. The technology need to be used wisely in order to be useful to students. There is a real need to look into designing online assessments which take into considerations different learning strategies and students' preference in learning. Since students have access to various learning materials, assessments online need to be designed to assess higher order thinking skills, rather than obtaining the answers straight from the textbook. These are scenario-based and problem based type of questions

which require the students to analyse and think critically. Lecturers need to design questions based on real work tasks or authentic assessments to ensure that assessments really do assist students to learn.

In order for technology based instructions to move away from the no significant difference results, we need to be able to develop course content which enables students to maximize the potential of online environment in whichever forms they may take. Twigg (2001) suggests the use of the following tasks built into the online learning module for more effective delivery: 1). An initial assessment of students' knowledge and skills and students learning styles, 2). An array of high quality, interactive learning materials and activities, 3). Individualized study plans, 4). Built-in, continuous assessment to provide instantaneous feedback, 5). Appropriate, varied kinds of human interaction when needed.

Online learning, via whatever medium, is definitely here to stay. Thus content development including assessments is a critical issue in ensuring the effectiveness of any online delivery. Good online course content enable students to learn on their own. We need to design course content including assessments, as if, the interface in front of them, which can be any online device, is the lecturer. They should be able to gauge their initial knowledge, determine appropriate study plan, able to perform practical tasks online via simulation software connected to real instruments available somewhere in remote laboratories, the opportunities to interact and work collaboratively with their peers and lecturers, check their understanding of the subject according to their personal ability rather than that of their group and able to sit for examinations online.

References

- Alexander, B. (2006). Web 2.0: A new wave of innovation for teaching and learning. *Educause Review*, Vol. 41, issue 2 [Online]. Retrieved from: <http://www.educause.edu/apps/er/erm06/erm0621.asp>.
- Berge, Z. (2000). New roles for learners and teachers online higher education, [Online] Retrieved from: <http://www.globaled.com/articles/BergeZane2000.pdf>.
- Booth, R., Clayton, B., Hartcher, R., Hungar, S., Hyde, P. & Wilson, P. (2003). The development of quality online assessment in vocational education and training. Vol 1 [Online]. Retrieved from: <http://www.flexiblelearning.net.au/2003>.
- Charman, (2002). "Issues and impacts of using computer-based assessments (CBAs) for formative assessment, in S. Brown, P. Race & J. Bull (eds), *Computer-assisted assessment of students*, London: Kogan Page.
- Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, Vol. 13.
- Davis, F.D., Bagozzi, R.P., & Warshaw, P.R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, Vol. 35, issue 8, pp 982-1003
- Drennan J. & Kennedy, J. (2005). Factors affecting students' attitude towards online learning in management education. *Journal of Educational Research*, Vol. 98, issue 8.
- Fishbein, M. & Azjen, I. (1975). *Belief, Attitude, Intention and Behaviour*, Reading, Massachusetts: Addison Wesley Publishing.
- Honey, M. & Marshall, D. (2003). The impact of on-line multi-choice questions on undergraduate student nursing', in G Crisp, D. Thiele, I. Scholten, S. Barker & J. Baron (eds) *Interact, integrate, impact. Proceedings of the 20th annual conference of the Australian Society for Computers in Learning in Tertiary Education (ASCILITE)*, held at the University of Adelaide, Australia, 7 – 10 December .
- Iahad, N., Dafoulos, G.A., Kalaitzakis, E. (2004). Evaluation of online feedback: The role of feedback in learner-centred e-learning. *In Proc. of the 37th International Conference on System Sciences*.
- Jenkins, M. (2004). Unfulfilled promise: formative assessment using computer-aided assessment. *Learning and Teaching in Higher Education, Issue 1*.
- Knowles, M.S. (1975). *Self-directed learning*, New York: Association Press.
- Masrom, M. (2007). Technology acceptance model and E-learning. Paper presented at the 12th International Conference on Education, University of Brunei Darulsalam, 21 – 24 May.
- Nicol, D. & Macfarlane, D. (2006). Formative assessment and self-regulated learning: A model and seven principles of good feedback practice. *Studies in Higher Education*, Vol.31, no.2 pp.199-218.
- Peat, M. & Franklin, S. (2003). Supporting student learning: the use of computer-based formative assessment modules. *British Journal of Educational Technology*, vol. 33, no.5, pp. 515 -523.
- Park, N., Lee, K.M. & Cheong, P. H. (2007). University instructors' acceptance of electronic courseware: An application of the technology acceptance model. *Journal of Computer-Mediated Communication*, Vol. 13, issue , article 9. [Online] Retrieved from: <http://jcmc.indiana.edu/vol12/issue1/park.html>.
- Robles, M. & Braathen, S. (2002). Online assessment techniques. *Delta Pi Epsilon Journal*, 44 (1). 39-49.
- Russell, T. (2001). *The No Significance Difference Phenomenon*, 5th Edition IDECC.
- Sadler, D.R. (2010). Beyond feedback: Developing student capability in complex appraisal. *Assessment & Evaluation in Higher Education*, Vol. 35, pp-535-538.
- Sekaran, U. & Bougie, R. (2013). *Research methods for business: A skill building approach*. Wiley & sons: West Sussex, United Kingdom. 6th Edition.
- Sumak, B., Hericko, H., Pusnik, M. & Polance, G. (2011). Factors affecting acceptance and use of Moodle: An empirical study of TAM. *Informatica*, Vol 35, pp 91-100.
- Taylor, S. & Todd, P.A. (1995). Understanding information technology usage: A test of competing models'. *Information System Research*, Vol. 6, pp 144 – 176.
- Teo, T. (2009). Modelling technology acceptance in education: A study of pre-service teachers. *Computers & Education*, Vol. 52, pp. 302-312.
- Twigg, C. A. (2001). *Innovation in online learning: moving away from no significance difference*. The Pew Learning and Technology, Rensselaer Polytechnic Institute.
- Wade, W. (1999). What do students know and how do we know that they know it? *THEJournal*, 27(3), 94101.

- Wong, K.T., Osman, R., Goh, P.S.C., Rahmat, M. K. (2013). Understanding student teachers behaviour intention to use technology acceptance: Moodle (TAM) validation and testing. *International Journal of Instructions, Vol. 6, issue 1,*
- Yuen, H. K.. & Ma, W.W.K. (2008). Exploring teacher acceptance of E-learning technology. *Asia-pacific Journal of Teacher Education, Vol. 36, issue 3, pp-229-243.*
- Zakaria, A. (2008). *Self-directed learning beliefs, readiness and utilization of E-learning technologies among engineering educators in a Malaysian Public University.* Unpublished doctoral dissertation, Putra University of Malaysian, Serdang, Selangor.