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Web 2.0 in Higher Education: The Instructors' Acceptance in Higher Educational Institutes in Kingdom of Bahrain

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***Abstract*—**Since the beginning of distance education with the rapid evolution of technology, the social network plays a vital role in the educational process to enforce the interaction been the learners and teachers. There are many Web 2.0 technologies, services and tools designed for educational purposes. This research aims to investigate instructors' acceptance towards web-based learning systems in higher educational institutes in Kingdom of Bahrain. Questionnaire is used to investigate the instructors' usage of Web 2.0 and the factors affecting their acceptance. The results confirm that instructors had high accessibility to such technologies. However, patterns of use were complex. Whilst most expressed interest in using online technologies to support learning activities, learners seemed cautious about other values associated with web-based system, such as the shared construction of knowledge in a public format. The research concludes that there are main factors that affect instructors' adoption which are security, performance expectation, perceived benefits, subjective norm, and perceived usefulness.

***Keywords*—**Web 2.0, Higher education, Acceptance, Students' perception.

I. Introduction

CURRENT generation grew up surrounded by technology. Computers, multimedia, Internet and cell phones were and continue to be an essential and intuitive part of their life. Students stay connected and their experiences are interactive and real time; as a result, they have little tolerance for delays, non-interactive environment or lack of current technology. They also prefer any time any place learning instead of traditional classrooms. These factors have resulted in a student group that responds to interactive learning environments in which they receive real time feedback and can control the speed and depth of their learning. Instructors must always adapt to students' learning preferences and styles to effectively engage them in the learning process. Therefore, it is important to consider student learning preferences and then, introduce new ways to meet those preferences.

E-learning systems can handle all aspect of a course, and it can help in interaction with the faculty and students. If e-learning meets instructors' needs, then it considers being successful. However, if the users fail to use the system and did not accept it then its benefits will not be fully utilized. Therefore, this research is to investigate the factors that affect the instructors' Acceptance Towards using Web 2.0 in terms of Social, Organizational and Individual factors in higher educational institutes.

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II. Literature Review

A. Adoption of Technology in Education

Universities have encouraged accepting and using e-learning systems due to the high competition between high educational institutions for the purpose of meeting the educational needs [19]. The use of Internet supports individual learning or organizational performance goals in the process of educating in an easy way through Web-based learning tools without being under the limitations of distance and time. In distance education that is the basis of different learning forms as e-learning, web based learning, online learning and virtual learning, providing interaction has always been an important issue. Reference [20] stressed that "Technology plays a key role especially for promoting interaction, delivering education and providing communication between individuals". Interaction is important and necessary within different forms (student-teacher, student-student, student-content) and it has been appeared by different technologies to leverage the quality of learning, the learning's outcomes, and satisfaction of students as well as eliminating isolation feeling.

Reference [20] explained that technology in learning systems used to separate learners from the teachers and learning group while maintaining the education process integrated and trying to "replace the interpersonal communication and the inter subjectivity which is the essence of education transaction between teachers and taught by a personal form of communication mediated by technology" [20]. Students may become isolated with low interaction; so it is necessary to represent clearly and enhance the connectivity between the teacher and the students. Emerging technologies and changing pedagogies bring out the necessity for more effective two way communication, promoting interaction and collaborative working, sharing and flexible participation.

Radio, TV, one way video conferences, e-mail, discussion forums, are the first technologies used to provide communication between users, but, they were lack of helpful interaction and collaboration. Researches for the ways of using blogs effectively, wikis, podcasts and social network in education has been started to cover the limitations of Web 1.0 and to provide more effective interaction and collaboration.

Now, Web 2.0 is users' active participation in the content of creation process according to [20].

Active participation between instructors and learners can enhance the quality of learning, so collaborative learning is recommended as it involves two way communications. Thus, it is important that collaborative technology used leads students toward achieving desired learning outcomes. [20] pointed out that "Web 2.0 tools are a new trend of internet technologies which have many characteristics that support teaching and learning and there have been many studies about technology usage in education though, majority of them are limited to delivery of content and teaching course subject."

Reference [20] stressed that it is important to investigate student and faculty awareness and use of Web 2.0 technologies because there have been limited studies about it. Many different dimensions such as student, teacher, media, technology access, cost, efficacy of users, resources, social dimension etc., must be taken into consideration while investigating the spread of Web 2.0 technologies in education. As a result, "examining adoption of Web 2.0 in distance education with only one diffusion, adoption or acceptance theory and model can be inadequate".

B. Web 0.2 Tools in Education

A study on using podcast in learning shows that after student evaluation forms, two major themes were found from the data collected. The first major theme is "students' perception that the course content was being delivered more consistently than other courses when it was delivered via a podcast". The second major theme is "the convenience of learning via a podcasted lecture as opposed to a traditional lecture course" students were able to learn when and where they want to; they can listen to podcasted lectures while walking between classes, driving to school, or during other activities [14].

The instructor thought was by using podcasting, inconsistent learning experiences of the students in a large lecture class will not be a problem as students will all listen to the same lecture. The instructor mentioned that "the convenience factor of podcasting appealed to the majority of students enrolled in the course". The instructor reported that many students were satisfied with the new format of the course.

The data gathered from teaching assistants indicate that students were pleased with the ease of learning via podcasted lectures. Teaching assistants reported that student will not have to attend the lecture to learn, they can review and discuss the lecture content whenever they want. They also confirmed that students want visual aids to follow the lecture content and see what they were learning.

Lots of students drew comparisons to other large-enrollment courses. The most spread subject was the convenience of podcasted lectures as opposed to sitting in traditional lecture. Many of the students reported that they learned best when they were able to find out when and where they required as opposite to being required to learn at a particular time and location. The students' opinion was that learning when and where they needed to was essential to promoting their knowledge. A number of the students reported that they enjoyed the convenience, but felt that they did not have a deep understanding of the material as they were famous to request for clearing up or to promote their knowledge in the traditional lecture.

These students reported that they were able to do well on the examinations, but did not learn beyond the material that was provided via the lecture podcast" [14].

The instructor of the course points out that the podcasted shape of the lecture course was very various from other courses as students would always have a copy of the lecture material and can review it whenever they wanted to. In lot of other traditional learning (without podcast) students would review notes and lecture handouts, but able not get a contract of the lecture. The instructor pointed out that the students asked more detailed questions and the coach said that the clarification questions were more common in the traditional cycle. So, the instructor's opinion was that the more detailed questions were a pointer of deeper learning of the course content. The instructor concluded that the podcasted lectures were the cause for the deeper learning as students can listen to particular parts of the lecture that the student absent or did not understand multiple times. This side of the instructor opinion inconsistent with the opinion of the students and some of the students that they did not learn the content accurately due to the lack of face-to-face interaction with the subject instructor. Opinion was about students and teaching assistant's perception that students participated more actively through the podcasted of the traditional lecture.

C. Research Model and Hypotheses

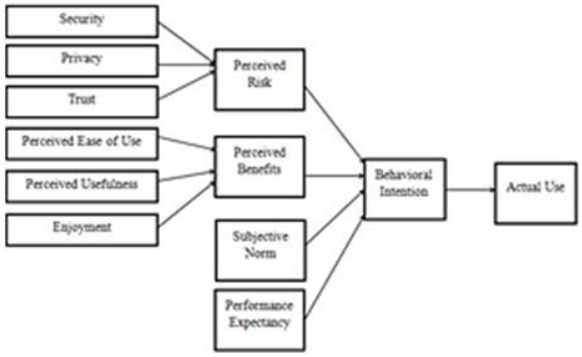

Fig. 1 Research model

One of the most important models related to technology acceptance is the Technology Acceptance Model (TAM) which discusses perceived usefulness and usage intentions considering social impact and cognitive instrumental processes [17] that is followed by this research. This model is introduced by [5]. According to [5], the model helps toward the understanding of whether users will actually use the given system or not. Fig. 1 illustrates research model along with the different factors that can affect the usage of technology such as: Perceived Risk, Perceived Benefits, Subjective Norms and Performance Expectancy.

Below are the descriptions for each factor and the model's

hypotheses:

- **Security:** one of factors that hinder the adoption of a technology is security and most of organizations limited the use of web 2.0 tools because of it [2].

H1. The security of web 2.0 has a significant effect on perceived risk of web 2.0.

- **Privacy:** is defined by [7] as "Potential loss of control over personal information". Also [7] considered privacy as a risk that negatively affects the intention to use a system.

H2. H2: The privacy of web 2.0 has a significant effect on perceived risk of web 2.0.

- **Trust:** [17] defined trust as "The willingness to take risk" and the specified that the readiness of a person to take a risk is based on the level of trust. According to [18], perceived risks is impacted by trust because people are unable to determine the risk.

H3. The Trust of web 2.0 has a significant effect on perceived risk of web 2.0.

- **Perceived usefulness and perceived ease of use:** is defined by [5] as "the degree to which a person believes that using a particular system would enhance his or her job performance". And he defined perceived ease of use as "the degree to which a person believes that using a particular system would be free of effort". According to [3], people will intend to use the technology when they anticipate that it will raise their effectiveness to do their job. And he said that perceived usefulness affected by the ease of use of the technology. And he thought that the expected interests from technology become greater when using the technology is easy. From his research, he extracts that perceived usefulness and ease of use of technology positively affect the behavioral intention to use the technology. Reference [15] also said that perceived usefulness influences the intention to use the system.

H4. Perceived ease of use of web 2.0 has a significant effect on perceived benefits of web 2.0.

H5. Perceived usefulness of web 2.0 has a significant effect on perceived benefits of web 2.0.

- **Enjoyment:** According to [12], enjoyment is defined as "The sensation and perception of using the computer as enjoyable, apart from any probable and predictable performance consequences". Also, enjoyment refers to the happiness that a person feels when using any medium [13]. A major educational outcome can be gained when a person perceives the enjoyment of the medium [9]. Also, [13] consider that the enjoyment will be as a motivation to perform the activity.

H6. The enjoyment of web 2.0 has a significant effect on perceived benefits of web 2.0.

- Perceived Risk: Reference [7] defined perceived risk as "an uncertainty regarding possible negative consequences of using a product or service". According to [16], predication of losses when using a system can be identified as perceived risk.

H7. Perceived risk of web 2.0 has a significant effect on behavioral intension to use web 2.0.

- Perceived Benefits: According to [11], there are two types of perceived benefits, direct and indirect advantages. He defined direct advantages as "immediate and tangible benefits" and indirect advantages as " those benefits that are less tangible and difficult to measure". Perceived benefit has a strong effect on the acceptance of web 2.0 [22].

H8. Perceived benefit of web 2.0 has a significant effect on behavioral intension to use web 2.0.

- Subjective Norm: is defined as "the person's perception that most people who are important to him think he should or should not perform the behavior in question" [8]. According to [1], people will intend to perform a behavior when subjective norm is favorable.

H9. Subjective Norm of web 2.0 has a significant effect on behavioral intension to use web 2.0.

- Performance expectancy: is defined by [6] as "the degree to which an individual or group of people expect to be proficient in their work or education when they are using technology." According to [4], performance expectancy is the degree to which a person thinks that using a system will improve his performance. Reference [21] realizes that performance expectancy has an influence on a person intension to use a new technology.

H10. Performance expectancy of web 2.0 has a significant effect on behavioral intension to use web 2.0.

H11. Behavioral Intension of web 2.0 has a significant effect on Actual use of web 2.0.

III. Research Methodology

This research followed the quantitative approach as it will be explained in the following sections of the used instrument and sampling.

A. Research Instrument

Questionnaire was employed as an instrument for collecting data about adoption of Web 2.0 in high educational institutes in Kingdom of Bahrain. The questionnaire is used to collect the needed data, according to the model mention previously; there are questions equivalent to each item in the model, therefore, the questionnaire is divided into twelve sections. Mainly, there are 5-point Likert scale questions (strongly disagree to strongly agree). The survey consisted of 2 different parts of questions. The first part of survey is about general personal information (Gender, Age, felid of teaching, status), four questions about usage of web 2.0 and one question about the used tools. The second part of survey is about the research model variables. The following table presents the questionnaire items.

TABLE I
QUESTIONNAIRE ITEMS

Factor	Items
Security	In general, I believe using web 2.0 tools is risky
	Web 2.0 tools provides clear disclosure about the possible risks of sharing personal information.
Privacy	The security systems built into web 2.0 tools I used are not strong enough to protect my private information
	The decision of whether to use a web 2.0 tool is risky
Trust	I trust in the ability of web2.0 tools I used to protect my privacy
	I am not worried about the security of web 2.0 tools I used
Perceived Ease of Use	The usage of web2.0 tools was frustrating.
	The usage of web2.0 tools was controllable.
	The web2.0 tool was ease of teaching and learning.
	The usage of web2.0 tools was heavy.
	The usage of web2.0 tools was rigid and inflexible.
	The web2.0 tools were understandable.
Perceived Usefulness	Using web2.0 tools saves my time.
	Using web2.0 tools lead to work more quickly.
	Using web2.0 tools lead to accomplish my job without difficulty.
	Using web2.0 tools makes job easier.
	Using web2.0 tools lead to effectiveness.
	Using web2.0 tools increase productivity.
Enjoyment	I enjoy doing things on a web 2.0 tool.
	Working with web 2.0 tools makes the job more interesting.
	Using web 2.0 tools does not make me feel nervous.
Perceived Risk	Web 2.0 servers may not perform well because of slow download speeds.
	I worried about inability to do my job when an error occurs to the system.
	I worried about my personal information when incurs fraud or the hacker invades.
Perceived Benefit	I think that using web 2.0 can save time in searching for information.
	I think that using web 2.0 can offer me a wider range of information.
	I think web 2.0 tools enable me to communicate other with free charge.
Subjective Norm	The management of university thinks that I should use web2.0 tools.
	Other Instructors think I should participate in web2.0 tools.
	I would do what my university thinks I should do.
Performance Expectancy	I would find the system useful in my job
	Using the system enables me to accomplish tasks more quickly.
	Using the system increases my productivity.
	If I use the system, I will increase my chances of getting a raise.
	The use of Web 2.0 technology in education will help improve performance.
Behavioral intention	I intend to use the web 2.0 to do different things. From uploading lecture notes and participating in chat rooms to encourage students to engage in learning environment
	I predict I would use web 2.0 in the next semester
	I plan to use web 2.0 frequently for my course work and other activities next semester
Actual Usage	On average, how frequently do you use web 2.0.
	On the average working day, how much time do you spend on web2.0.

B. Research Sample

In this research, probability sampling is used and our sampling is selected based on simple random sampling which is also called "straight random sampling" [10] which is defined as: "every member has an equal chance of being selected from the population" [10]. A simple random sample is selected by using a random number table to show the members of the sample after assigning a number to each member in the population list. Each member of the population is "selected one at a time, independent of one another and without replacement; once a unit is selected, it has no further chance to be selected" [10]. Our survey distributed through email among private universities instructors from different fields. More than 200 surveys distributed to instructors in private universities, after one month we received 134 respond only.

IV. RESULTS

A. Validity and Reliability

The factor loading analysis for each item shows a value above 0.5 which is acceptable [23]. All factors have values greater than (0.5), expect for four items which are EOU1 that have the value of (.327), EOU4 that have the value of (.122), EOU5 that have the value of (.208) and E3 that have the value of (.479). So, these items are excluded from the hypothesis analysis. On the other hand, internal consistency reliability is a measure of reliability used to evaluate the degree to which different test items that look for the same construct produce similar results and it is recommended to be above 0.7. The results of alpha coefficient for each factor is calculated. Values ranged from 0.535 to 0.838. Some factors like privacy have 0.535 Cronbach's Alpha. It has two questions and its risky to remove one question, other factors with 0.6 Cronbach's Alpha can be considered because its near to 0.7.

B. Usage of Web 2.0 Tools for Teaching Purposes

Female respondents are equal to male respondents and the majority of them were older than 40 years (46%). While the least respondents were between ages of 25 -30 to represent 12%.

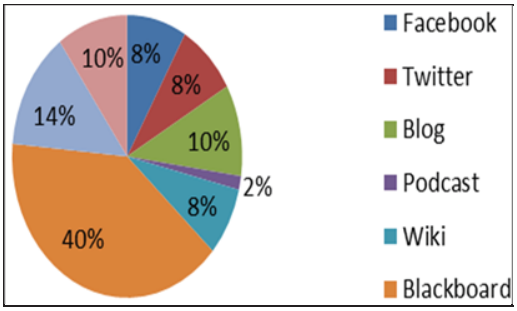

Fig. 2 Research model

Results illustrated that 59% of instructors had used web 2.0 tools in teaching. However, 41% of instructors did not use it before in teaching. These results indicate that most instructors are aware about web 2.0 tools and how it can serve them in teaching and this may encourage them to utilize and benefit from web 2.0 services in their courses. On the other hand, instructors who did not have any experience with web 2.0 tools indicate that their universities should expand their effort in making them aware about web 2.0 services and encourage them to adopt it in order to increase the quality of teaching and learning. Fig 2 shows that the majority of instructors use Blackboard system. Podcast were not used the least.

C. Hypothesis Testing

Linear regression analysis is used to test the hypotheses

separately. Linear regression is a technique in parametric statistics that is commonly used for analyzing mean response of a variable which changes according to the magnitude of an intervention another variable. The coefficient of determination (R^2) measures the proportion of the variance of the dependent variable about its mean that is explained by the independent or predictor variables.

The result shows that security has significant effect in predicting of perceived risk. The R square value for the dependent variable perceived risk (PR) is 0.111, meaning that 11.1% of the variance in the perceived risk is explained by the regression model.

The first regression results support the first hypotheses: The security of web 2.0 has a significant effect on perceived risk of web 2.0. (β=0.352, P<0.05). However, the regression results do not support the second and third hypotheses:

H2. The privacy of web 2.0 has no significant effect on perceived risk of web 2.0(β= -0.066, P>0.05).

H3. The Trust of web 2.0 has no significant effect on perceived risk of web 2.0(β= -0.086, P>0.05).

The second regression analysis was run for H4, H5, and H6. PB is the dependent variable while EOU, PU, and E are the independent variables. The results show that perceived usefulness (PU) has significant effect in predicting of perceived benefit (PB). The R square value for the dependent variable perceived benefit (PB) is 0.351, meaning that 35.1% of the variance in the perceived benefit is explained by the regression model.

The second regression results support the fifth hypotheses: Perceived usefulness of web 2.0 has significant effect on perceived benefits of web 2.0 (β= 0.413, P<0.05). However, the regression results do not support the following hypotheses:

H4. Perceived ease of use of web 2.0 has no significant effect on perceived benefits of web 2.0 (β= 0.229, P>0.05).

H6. The enjoyment of web 2.0 has no significant effect on perceived benefits of web 2.0 (β= 0.020, P>0.05).

The third regression analysis was run for H7, H8, H9 and H11. BI is the dependent variable while PR, PB, SN and PE are the independent variables. The results show that perceived benefit (PB), subjective norm (SN) and performance expectancy (PE) has significant effect in predicting of behavioral intention (BI). R square value for the dependent variable behavioral intention (BI) is 0.501, meaning that 50.1% of the variance in the behavioral intention is explained by the regression model.

The third regression results support the following hypotheses:

H8: Perceived benefit of web 2.0 has significant effect on behavioral intention of web 2.0 (β= 0.346, P<0.05).

H9: The subjective norm has no significant effect on behavioral intention of web 2.0 (β= 0.194, P<0.05).

H10: The performance expectancy of web 2.0 has no significant effect on behavioral intention of web 2.0 (β= 0.320, P<0.05).

However, the regression results do not support the following hypothesis:

H7. Perceived risk of web 2.0 has no significant effect on behavioral intention of web 2.0 (β= .006, P>0.05).

The fourth regression analysis was run for H11. AU is the dependent variable while BI is the independent variable. The results show that behavioral intention has significant effect in predicting of actual use (AU). The R square value for the dependent variable actual use (AU) is 0.393, meaning that 39.3% of the variance in the actual use is explained by the regression model.

The fourth regression results support the last hypothesis that perceived benefit of web 2.0 has significant effect on behavioral intention of web 2.0 (β= 0.393, P<0.05).

Table II summarizes the hypotheses testing's results

TABLE II
HYPOTHESES RESULTS

Hypotheses	Rejection / Acceptance
H1: The security of web 2.0 has an effect on perceived risk of web 2.0.	Accepted
H2: The privacy of web 2.0 has an effect on perceived risk of web 2.0.	Rejected
H3: The Trust of web 2.0 has an effect on perceived risk of web 2.0.	Rejected
H4: Perceived ease of use of web 2.0 has an effect on perceived benefits of web 2.0.	Rejected
H5: Perceived usefulness of web 2.0 has an effect on perceived benefits of web 2.0.	Accepted
H6: The enjoyment of web 2.0 has an effect on perceived benefits of web 2.0.	Rejected
H7: Perceived risk of web 2.0 has an effect on behavioral intension to use web 2.0.	Rejected
H8: Perceived benefit of web 2.0 has an effect on behavioral intension to use web 2.0.	Accepted
H9: Subjective Norm of web 2.0 has an effect on behavioral intension to use web 2.0.	Accepted
H10: Performance expectancy of web 2.0 has an effect on behavioral intension to use web 2.0.	Accepted
H11: Behavioral Intension of web 2.0 has an effect on Actual use of web 2.0.	Accepted

V. CONCLUSION

Main objective of this research is to investigate the factors that affect instructors' acceptance of web 2.0 in higher institutes in Kingdom of Bahrain building on existing technology acceptance model introduced by [5].

The factors that may affect the actual use of web 2.0 are: security, perceived usefulness, perceived benefit, subjective norm, performance expectancy and behavioral intention.

In our result, the factors that support the behavioral intention were perceived benefit, subjective norm and performance expectancy; which have a positive effect on instructors' intention to use web 2.0 tools. These supported factors are significant on the instructors' acceptance of web 2.0. On the other hand, the only factor that does not support the behavioral intention was perceived risk. It was rejected by the tested hypothesis which it has no significant effect on behavioral intention. Also, we found that the vast majority of instructors would like to communicate with their students by use web2.0. An interesting finding has been found that many instructors using Blackboard and Moodle in their classes. However, they have worries about security, privacy and building trust. However, they found that using Web 2.0 is interesting and useful in education.

This research was limited because many risks and challenges faced, such as difficulty to communicating with instructors and the small sample size, which hinder the generalization of the results.

The findings from this study has important implications in higher education authority in Kingdom of Bahrain to emphasize on the factors supported by the results and to follow an actual implementation plan to fulfill them or a better adoption of Web 2.0 in higher education in the Kingdom of Bahrain.

Regarding future work, the research project needs to be expanded to increase the sample size including more private and public universities and measuring the other factors that affect Web 2.0 adoption in education.

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