Web-Based Learning Environment Based on Students’ Needs

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Abstract. Traditional learning needs to be improved since it does not involve active learning among students. Therefore, in the twenty-first century, the development of internet technology in the learning environment has become the main needs of each student. One of the learning environments to meet the needs of the teaching and learning process is a web-based learning environment. This study aims to identify the characteristics of a web-based learning environment that supports students’ learning needs. The study involved 542 students from fifteen faculties in a public higher education institution in Malaysia. A quantitative method was used to collect the data via a questionnaire survey by randomly. The findings indicate that the characteristics of a web-based learning environment that support students’ needs in the process of learning are online discussion forum, lecture notes, assignments, portfolio, and chat. In conclusion, the students overwhelmingly agreed that online discussion forum is the highest requirement because the tool can provide a space for students and teachers to share knowledge and experiences related to teaching and learning.

1. Introduction

In education, the technology of the internet is very important for economic development in the future because a high standard of education can facilitate the development of a country. However, communities have believed that the internet technology provides more harm than benefit to teenagers. Therefore, teachers should try to demonstrate that the internet technology is useful in education. To adopt this technology, teachers can utilise web-based learning approaches as effective methods of learning for students. According to Lever-Duffy and McDonald (2008), the internet undoubtedly has great potential in the process of teaching and learning (T&L).

In education, various learning strategies can be used to enhance the learning process. However, because educators have a responsibility to assist countries in achieving a high level of education, they should use methods that not only convey knowledge but also encourage students to think at higher levels. The learning strategies that can be used for T&L purposes include active learning, collaborative learning, cooperative, problem-based learning, and inquiry. All these methods are capable of providing a positive impact on students’ thinking skills.

Therefore, to enhance students’ thinking skills at a higher level, a suitable approach and an effective learning should be introduced so that it is beneficial to all parties. Teachers should be thinking creatively about appropriate teaching strategies to convey knowledge to students. In order to encourage students in higher-order thinking skills (HOTS), teachers should use a web-based learning environment to support the learning process.
2. Web-Based Learning Environment

The implementation of conventional learning has faced many problems, especially in terms of implementation, the static learning environment, and limited learning resources. Learning via the web is said to help in reducing the constraints and is able to provide a more flexible and efficient collaborative learning environment. A web-based learning environment is one of the distance learning strategies in which the internet technology becomes the primary medium for delivering the teaching and learning (T&L) courses quickly (Za`ıane, 2001).

A web-based learning environment is not only suitable for distance education but able to support the twenty-first-century learning because it can improve the skills needed by students especially in higher education. Therefore, a web-based learning is very suitable to emphasise student-centeredness because it does not depend merely on the instructor. According to Baharuddin (2001), learning through the website should have the following characteristics:

i. Ability to produce genuine learning context and involve solving real problems
ii. Students are responsible and have initiative to learn independently in a skill
iii. Teachers act as facilitators and guides, not as a source of information
iv. Active discussion between students and teachers
v. The learning in a group-collaborative and cooperative learning
vi. Authentic learning assessment strategies to evaluate the actual skill.

According to Siti Fatimah Petra, Jainatul Halida Jaidin and Perera (2016), a web-based learning offers the potential to support the development of the struggle in the twenty-first century skills, which contributes to autonomous learning. These skills include communication skills, numeracy, ICT skills, critical thinking skills, and problem-solving.

3. Higher Order Thinking Skills

Higher-order thinking skills must be applied especially in higher education because it helps students to improve learning skills for future requirements. According to Barak and Shakhman (2008), to build the capacity of students’ “thinking” is an important goal in education. Therefore, educators should endeavor to encourage these skills be instilled in students, particularly by using specific teaching strategies. For example, to encourage higher-order thinking skills among students, educators must have deep knowledge in specialised fields, such as mathematics, physics, or biology, and pedagogical knowledge on how to develop high level of thinking among students both in the context of education and skills (Barak & Shakhman, 2008). Prior to absorbing these higher order thinking skills among students, educators must understand what is being said about these skills. According to the bloom taxonomy, there are six levels of thinking skills, namely knowledge, comprehension, application, analysis, synthesis, and evaluation.

The lowest level in the bloom taxonomy is knowledge level where students only make memorisation of a fact without understanding it. The second stage is understanding where students understand, predict, explain, and interpret a fact according to their own understanding. The third stage is application where students use, perform, develop, and build a knowledge for themselves. The fourth level is the level of analysis at which students are able to separate, identify, isolate, categorise, and detect anything through them. The fifth level is synthesis, at which the students are able to consolidate, simplify, organise, classify, summarise, and change something specific knowledge. The highest level in the bloom taxonomy is the assessment process at which students are able to evaluate, propose, criticise, support, protest, challenge, and define certain information.

Then, to improve students’ higher-order thinking skills through the use of web-based learning therefore the characteristics of web-based learning environment that supports the learning needs of students should be identified. The higher level in higher-order thinking skills are analysis, synthesis and evaluation. According Pilten (2010), the ability to create a synthesis, analyse, interpret, and assess the depth of a text for the purpose of education is the highest level in reading, where students are said to be able to think on a higher level. Many higher learning institutions have emphasised...
that this higher-order thinking skills should be applied because it is crucial that students are able to think creatively and critically.

4. Methodology
The study applied a quantitative research design via a questionnaire survey. The population of this study comprised all final-year undergraduate students in UTM, Johor. There are fifteen faculties in UTM, Johor, as shown in Table 1.

| No | Faculty                                      | Categories                |
|----|----------------------------------------------|---------------------------|
| 1. | Faculty of Built Environment                 | Engineering               |
| 2. | Faculty of Civil Engineering                 |                           |
| 3. | Faculty of Electrical Engineering            |                           |
| 4. | Faculty of Mechanical Engineering            |                           |
| 5. | Faculty of Chemical and Natural Resources Engineering |                     |
| 6. | Faculty of Biomedical Engineering and Health Sciences |                         |
| 7. | Faculty of Petroleum and Renewable Energy Engineering |                     |
| 8. | Faculty of Chemical Engineering              |                           |
| 9. | Faculty of Engineering and Geoformation Science |                        |
| 10. | Faculty of Science                          | Science                   |
| 11. | Faculty of Biosciences and Bioengineering    |                           |
| 12. | Faculty of Computer Science and Information Systems | Science and technology  |
| 13. | Faculty of Management and Human Resource Development |                         |
| 14. | Faculty of Education                         | Social Science            |
| 15. | Faculty of Islamic Civilization             |                           |

The population of this study was 8000 students involved and the sample was 542 students where they exceed the sample as determined by Krijie and Morgan (1970) table, namely 367 students. A randomly survey was conducted involving 542 students from several faculties at Universiti Teknologi Malaysia (UTM), Johor, to discover the features of a web-based learning environment that support their learning needs. A simple random sampling was adopted.

The questionnaire was developed from the questionnaire by Tin (2007), Su (2006), and Tasir et al. (2011). The items were modified according to the related research questions. Subsequently, the questionnaire was tested for reliability and validity from a pilot study, which was conducted to ensure that recurring items placed meaningless and misleading to reduce the likelihood of respondents. Validity of the instrument was verified by three experts in the field of web-based learning environment that have been teaching experiences between 14 years to 10 years.

Researchers have been using Cronbach Alpha analysis to test the reliability of the questionnaire and the Cronbach Alpha for this questionnaire is 0.875. A pilot study is a study conducted at a small scale prior to actual study, the purpose being to look at the reliability and feasibility of the study (Chua, 2006a). In the pilot study, the reliability analysis Cronbach alpha obtained was 0.89, a value in a range considered by Chua (2006b) to indicate high reliability (≥ 0.70).

5. Results and Discussion
In this study, the 542 students were randomly selected from three categories (engineering, science, and social science). The three faculties were Faculty of Electrical Engineering, Faculty of Science,
and Faculty of Education (see Table 2).

| No. | Faculty                             | Total Number of Students |
|-----|------------------------------------|--------------------------|
| 1.  | Faculty of Electrical Engineering  | 206                      |
| 2.  | Faculty of Science                 | 196                      |
| 3.  | Faculty of Education               | 141                      |
| **Total** |                                  | **542**                  |

The results of data analysis for the characteristics of a web-based learning environment that supports the students’ learning needs are divided into two constructs: demographic and characteristics of web-based learning environment. Table 3 shows the mean value and standard deviation of the characteristics of a web-based learning environment that support the students’ learning needs (see Table 3).

| Item | Statement                                                                 | Mean | Standard Deviation |
|------|---------------------------------------------------------------------------|------|--------------------|
| 1.   | I like to use notes in web-based learning (e.g., e-learning) either be placed in a public or private. | 3.94 | 0.94               |
| 2.   | Online discussion forums in a web-based learning can be used to discuss the tasks assigned by the lecturer. | 4.00 | 0.60               |
| 3.   | Assignments in a web-based learning environment can help my learning process. | 3.79 | 0.74               |
| 4.   | The use of messaging applications in a web-based learning makes the personal space with my friends and me. | 3.68 | 0.95               |
| 5.   | I can change a user profile in a web-based learning easily and quickly. | 3.56 | 1.00               |
| 6.   | I like to use a chat room web-based learning to communicate with friends at the same time. | 3.27 | 1.12               |
| 7.   | I like to download notes via web-based learning as primary source materials for learning purposes. | 3.82 | 0.77               |
| 8.   | Evaluation using the quizzes and tests in a web-based learning makes it easy for me to answer all questions within the prescribed time. | 3.68 | 0.91               |
| 9.   | The use of web-based learning can help me find out the announcement made by the lecturers quickly. | 3.77 | 0.94               |
| 10.  | Uploading and downloading files (notes, assignment, etc.) application in a web-based learning can make the process of teaching and learning easy. | 3.90 | 0.85               |
| 11.  | Sharing link (teaching and learning resource) in a web-based learning by lecturers has made it easy for me to find the material or additional resources. | 3.84 | 0.86               |
12. A web-based learning environment makes it easy for me to discuss the tasks assigned by lecturer.  3.68  0.95
13. Online evaluation using quizzes, tests, and assignment through a web-based learning makes me accessing easier.  3.62  0.92
14. I felt the private message in a web-based learning is very useful to discuss assignments with my classmates.  3.46  1.01

| Total of mean and standard deviation |
|------------------------------------|

The highest characteristic of a web-based learning is item one (an online discussion forum in a web-based learning can be used to discuss the tasks assigned by the lecturer) (mean 4.00). The lowest characteristic of a web-based learning is item 6, which denotes that the students like to use a chat room web-based learning to communicate with friends at the same time (mean 3.27). From this result, the use of online discussion was mostly chosen by the students in their learning process, which would help them to talk about their assignment quickly and easily via online. According to Kui et al. (2013), online discussion forum is the most widely used method in web-based learning. It is a way to help students interact (Patel & Aghayere, 2006) and thus should be used as quickly as possible in order to facilitate the learning process online. Therefore, the characteristics of web-based learning have been identified will be used for the development in online learning.

6. Conclusion
In conclusion, the selected features of the web-based learning environment shows that students are more likely to choose an online discussion forum where they can interact with their friends and educator online. This proves that in a web-based learning, educators need to ensure that an online discussion forum is used because the method would bring positive impact on students. It is expected that this study will provide insights for other researchers to make online discussion forum as the main platform to facilitate online teaching and learning.

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7. References

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