The Using of the Moodle e-Learning Management System at Suan Dusit University to Develop Digital Citizenship and Learning Achievement in Information Technology

Titiya Netwong

Suan Dusit University, Thailand

Abstract

The objectives of this research were: 1) to develop digital citizenship of Urban Environment and Industry program students utilizing by utilizing Moodle, an online learning management system, 2) to improve learning achievement by using Moodle, and 3) to determine the correlation between digital citizenship and learning achievement of students enrolled in the Urban Environment and Industry program. The sample consisted of 49 undergraduate students enrolled in the Urban Environment and Industry program who were registered in the Information Technology course during the 2012 academic year. The research instruments were the questionnaire for digital citizenship and a learning achievement test through e-Learning developed by Suan Dusit Rajabhat University. Data were analyzed by using frequency, percentage, mean, standard deviation, t-test dependent and Pearson's product moment correlation coefficient. The results of the study were as follows: 1) digital citizenship increased by 15.l85% following use of e-Learning through Moodle, 2) learning achievement increased by 23.37% following use of e-Learning through Moodle, and 3) the correlation between digital citizenship and learning achievement was of a rather high level ($r = 0.79$).

Keywords: e-Learning, learning management system: moodle, digital citizenship, learning achievement

* Corresponding Author
e-mail: titiya_net@dusit.ac.th

Introduction

Currently, there are increasing levels of knowledge. Yet, there are still things highly important things that remain to be taught. Our goal is to be able to invest in education and achieve high returns. Increasing the productivity and efficiency of learning is necessary. Modern learning takes less time, learning occurs faster, allows learners to have the opportunity to share resources and ideas. The advancement of information technology has allowed for development of teaching. e-Learning is a form of learning that uses electronic media, online tutorials and activities through a network. Online learning allows the use of computers as tools to assist learners to reach their goals more easily and quickly (Online Learning, 2010). e-Learning is a hallmark of learning, the learner can access content anywhere, any time, create content, and perform various operations. The e-Learning system allows the evaluation of test knowledge. Online learning is one way of developing people. The students can learn anything, anywhere at any time. e-Learning allows the students to enjoy learning with an independent and flexible that decreases the time to learn by more than 50 percent, and costs 30 to 60 percent less than traditional education and training (Netwong, 2013).

When it comes to education reform, a paradigm consisting of a well-designed process of learning between teachers and learners is necessary. The paradigm proposes that the learning process is more important than knowledge, particularly the teacher's personal knowledge, and learners must learn together. Students in the new century can obtain knowledge from a variety of sources, both in the conventional classroom environment and on the internet. To meet this unprecedented availability of knowledge, there must be a shift towards lifelong learning. To be effective, everyone must learn throughout life in order to continuously develop themselves (Virtual Environment, 2010). .

"Digital Citizenship" is one of the educational technology standards proposed by the International Society for Technology Education (ISTE) to allow students to demonstrate their understanding of social issues, culture and humanity related to information technology, and their ability to conduct themselves in an ethical and legal manner to safely and responsibility access information. These are important skills in learning in the 21st century learning skills, thinking and knowledge of ICT [4], [5].

Suan Dusit Rajabhat University has been used to study a wide variety of information technology, especially e-Learning and the Learning Management System (LMS) Moodle for managing education courses online. The technology already exists to enhance teaching and learning. e-Learning is an easily accessible learning platform that can be accessed from various devices, including laptops, and can deliver a variety of educational resources such as e-books (International Society for Technology in Education, 2005). Assessment can be conducted online using e-Learning; seeking additional documents is another feature of

e-Learning. It said that the introduction of e-Learning into the curriculum in order to develop the digital citizenship of learners can make human resources with skills in information technology critical to the development and progress towards the country.

Research Objectives

1. To develop digital citizenship of students in Suan Dusit Rajabhat University's Urban Environment by utilizing e-Learning with the Moodle learning management system.

2. To improve learning achievement of students in Suan Dusit Rajabhat University's Urban Environment by utilizing e-Learning with the Moodle learning management system

3. To determine the correlation between digital citizenship and learning achievement of students in the Urban Environment and Industry program.

Methodology

1. The population was students of Suan Dusit Rajabhat University who registered in Information Technology, during the 2012 academic year.

2. The sample group to this study consisted of 49 undergraduate students enrolled in the Urban Environment and Industry who were registered in the Information Technology course during the 2012 academic year. Students were obtained by simple random sampling from the 17 sections of the Information Technology course.

3. Research Design and Data Collection

3.1 One group pretest-posttest design was the research design in this study

T_1	X	T_2

X : Experiment or Treatment

T_1 : Pretest

T_2 : Posttest

3.2 The experimental group learned by using e-Learning for 6 weeks; the steps were as follows:

3.2.1 **Providing learning and orientation:** Students took the pretest of the questionnaire for digital citizenship and a learning achievement test for Information Technology. The instructor suggested rules and roles for e-Learning.

3.2.2 **Set learners and breaking the ice online** (e-Profile, web board and forum): The instructor demonstrated the use of e-Learning by using familiar lesson and class members. The students' provided information about how to participate in e-Learning activities such as personal profile (e-Profile), online content, resource learning, website and online forum.

3.2.3 **Offer knowledge and processing the learning activity** (online content, resource learning and website): The instructor taught basic knowledge continuously, by example and a case study. The students' discussed through the online forum and offered guidance on issues of the social culture.

3.2.4 **Review knowledge (blog, online text or chat):** The students reviewed present concept information and ideas through blogs and asked and answered questions via online text.

3.2.5 **Knowledge application (blog):** Activities focused on the application of knowledge in other situations and sharing ideas. The blog demonstrated the value of cooperative learning.

3.2.6 **Evaluate:** The students discussed the summary results of the evaluation activities.

3.3 When they finished learning by using e-Learning, the students completed the assessment of digital citizenship questionnaire and learning achievement test immediately.

3.4 The test achievement was scored using 0-1 (Zero-One Method) – one point was awarded for any response and 0 for failure to respond.

4. Instrument

4.1 Digital Citizenship Questionnaire

4.1.1 The questionnaire for digital citizenship was composed of 2 parts: 1) a check list and 2) a rating scale. Two episodes were as follows: the first part, the check list, inquired about the basics of learning the gender and grade. The second part focused on digital citizenship and provided questions in five elements: 1) Understanding of social issues - 5 items. 2) Understanding of cultural issues - 6 items. 3) Understanding of the human issues - 5 items. 4) Ethical and legal channel - 5 items, and 5) the use of appropriate technology and lifelong learning - 8 items.

4.1.2 Creation and determination of the efficiency of the questionnaire for digital citizenship by study covered the measurement of digital citizenship within the framework of the International Society of Technology in Education (ISTE). These guidelines assisted in preparation of the questionnaire for digital citizenship. Creation of queries on the issue: understanding of social issues, understanding of cultural issues, understanding of the

human issues, ethical and legal channel, and use of appropriate technology and lifelong learning. The questionnaire was then presented to three experts to determine the validity of the content, the consistency of the question by IOC (Item Objective Congruence) and then adjusted accordingly. The finalized questionnaire was then given to a trial group of 30 students to determine the reliability. The reliability of the questionnaire was determined to be 0.906 using Cronbach's alpha coefficient. The finalized version was used for data collection.

4.2 Learning Achievement Test for Information Technology

4.2.1 The learning achievement test for Information Technology was 20 items. The achievement test was a multiple-choice quiz for Urban Environment and Industry program students at Suan Dusit Rajabhat University.

4.2.2 Creation and determination of the efficiency of the learning achievement test for Information Technology. Preliminary data from the study of the theory and related documents guided the creation of the learning achievement test for Information Technology. Behavioral objectives were defined and a table was created to analyze the test (Test Blueprint). The content and coverage of the course was checked. A multiple-choice test of 20 questions was created and reviewed by three experts to check the content validity and the appropriate language (Wording) by assessing the consistency of the questionnaire with the purpose or IOC (Item Objective Congruence). The improved learning achievement test, based on recommendations, was piloted with students who had already studied the Information Technology subject already. The analysis of difficulty (p) and discrimination (r) screening test demonstrated a difficulty of 0.20-0.80 and discrimination of 0.20. It was decided that the test should cover the purpose and content of each episode; the reliability of the test (KR-20) had a confidence 0.827.

5. Data Analysis

5.1 The statistical package for analysis digital citizenship was used for mean, standard deviation, and dependent t-test.

The range of values corresponded with the following five levels:

4.21 – 5.00 was the digital citizenship level 5

3.41 – 4.20 was the digital citizenship level 4

2.61 – 3.40 was the digital citizenship level 3

1.81 – 2.60 was the digital citizenship level 2

1.00 – 1.80 was the digital citizenship level 1

5.2 Analysis of the learning achievement by analysis of mean, standard deviation and dependent t-test.

5.3 Analysis of digital citizenship and learning achievement using Pearson's correlation coefficient with the following criteria.

> 0.81	high correlation
0.61 – 0.80	correlation is quite high
0.41 – 0.60	moderate relationship
0.21 – 0.40	relationships rather low
Relationships lower than 0.21	

Results

1. Digital Citizenship

Digital citizenship could be developed by using teaching with e-Learning. The students' digital citizenship before and after undertaking e-Learning are shown in Table 1.

Table 1 Digital citizenship of the experiment between the pre-test and post-test

Item	Pre-test			Post-test			p
	$\bar{\chi}$	S.D.	level	$\bar{\chi}$	S.D.	level	
Understanding social issues	**3.08**	**0.46**	**3**	**3.90**	**0.55**	**4**	**0.00***
1. You use rights and freedoms technology and respect the humanity of others.	3.12	0.56	3	4.04	0.61	4	0.00*
2. You use technology to communicate with students and demonstrate equivalence in communication with others.	3.12	0.66	3	4.02	0.75	4	0.00*
3. Your group activities exchange ideas, knowledge and technology for the benefit of the public.	2.92	0.64	3	3.73	0.73	4	0.00*
4. You understand that the use of technology for communication between people in society should be equitable and responsible.	3.06	0.59	3	3.84	0.74	4	0.00*
5. You have enthusiasm and interest in the news about people and countries from various news sources.	3.20	0.61	3	3.88	0.72	4	0.00*

Table 1 Digital citizenship of the experiment between the pre-test and post-test (cont.)

Item	Pre-test			Post-test			p
	$\bar{\chi}$	S.D.	level	$\bar{\chi}$	S.D.	level	
Understanding cultural issues	**3.09**	**0.46**	**3**	**3.88**	**0.60**	**4**	**0.00***
6. You have knowledge about the coherent and cultural diversity that exists in the world, and aspects of culture that are interwoven with technology.	3.08	0.67	3	3.84	0.77	4	0.00*
7. You use technology to feel appreciated, and see the value of art and culture of others.	3.06	0.59	3	3.86	0.79	4	0.00*
8. You use technology to learn cultures different from their own.	3.02	0.62	3	3.73	0.73	4	0.00*
9. Through the use of technology, you have an understanding of different cultures with a sense of understanding, and without bias.	3.06	0.62	3	3.86	0.81	4	0.00*
10. Through the use of technology, you have rejoiced in the multicultural world, and believe that all cultures are worthy to be shown to the satisfaction with the result.	3.16	0.62	3	4.02	0.72	4	0.00*
11. You believe that the use of information technology can improve the knowledge and capabilities between cultures.	3.20	0.53	3	3.98	0.72	4	0.00*
Understanding the human issues	**3.15**	**0.38**	**3**	**3.95**	**0.50**	**4**	**0.00***
12. You show a positive attitude towards using technology to promote collaborative learning and increase productivity.	3.22	0.58	3	4.00	0.79	4	0.00*
13. You show knowledge responsibility for lifelong learning, and show leadership as digital citizens.	3.02	0.62	3	3.71	0.76	4	0.00*
14. You have a better understanding of the impacts that will occur with the social, economic and political environment in the long term due to the use of technology.	3.10	0.51	3	4.04	0.57	4	0.00*

Table 1 Digital citizenship of the experiment between the pre-test and post-test (cont.)

Item	Pre-test			Post-test			p
	$\overline{\chi}$	S.D.	level	$\overline{\chi}$	S.D.	level	
15. You disagree with the actions of individual people who use technology to cause damage to the social, economic and political environment.	3.31	0.65	3	4.14	0.76	4	0.00*
16. You often act in ways which demonstrate the resolve to use technology to improve the social, economic, and political environment.	3.12	0.56	3	3.90	0.71	4	0.00*
Ethical and legal channel	**3.08**	**0.38**	**3**	**3.82**	**0.47**	**4**	**0.00***
17. You have an understanding of intellectual property and The Ref. 2550 computer law to use the information that is published and the electronics.	3.00	0.64	3	3.61	0.78	4	0.00*
18. You classify information that can be accessed without charge.	3.16	0.62	3	3.71	0.76	4	0.00*
19. Pictures from the Internet are protected by copyright; therefore you must be careful using them.	3.24	0.56	3	3.90	0.71	4	0.00*
20. The student appropriately references the author responsible for information.	3.16	0.62	3	3.61	0.78	4	0.00*
21. You support safe, legal, and responsible training in information technology.	2.86	0.35	3	3.71	0.76	4	0.00*
The use of appropriate technology and lifelong learning.	**3.09**	**0.31**	**3**	**3.91**	**0.48**	**4**	**0.00***
22. You understand that the technology is appropriate. Technology can leverage the social, economic, political, social and other conditions.	3.14	0.50	3	3.88	0.63	4	0.00*

Table 1 Digital citizenship of the experiment between the pre-test and post-test (cont.)

Item	Pre-test			Post-test			p
	$\bar{\chi}$	S.D.	level	$\bar{\chi}$	S.D.	level	
23. You disagree with the use of technology used outside its culture, regardless of the appropriateness of the technology, society and its economy.	3.06	0.42	3	3.84	0.65	4	0.00*
24. You agree the appropriate technology use of technology may vary between societies.	3.08	0.57	3	3.82	0.72	4	0.00*
25. You often act to demonstrate your appreciation and pride in the technological development of local knowledge.	3.12	0.48	3	3.80	0.73	4	0.00*
26. You select and use applications effectively.	2.73	0.44	3	4.29	0.45	4	0.00*
27. You appreciate the knowledge, information and technology that is necessary and relevant to learning.	3.22	0.51	3	3.88	0.66	4	0.00*
28. You always use technology for self-directed learning outside of the classroom.	3.14	0.50	3	3.76	0.66	4	0.00*
29. You recognize that information technology has both positive and negative consequences in everyday use.	3.24	0.66	3	4.02	0.80	4	0.00*
30. You can bring skills and knowledge of information technology use in education, work and life. The transfer of knowledge and technology to others.	3.12	0.56	3	3.94	0.74	4	0.00*
Overview	**3.10**	**0.29**	**3**	**3.89**	**0.44**	**4**	**0.00***

*$p < 0.05$

Digital citizenship of the experiment between the pre-test and post-test was significantly different ($p<0.05$). The development of citizenship was at a high level, with the mean equal to 3.89; this demonstrates that 15.85 percent of students were found to have higher digital citizenship. A comparison of students' digital citizenship before and after undertaking the teaching is shown in Table 1. The digital citizenship of the experimental sample after undertaking teaching was 4 levels.

2. Learning Achievement

Details of the comparative analysis of achievement before and after learning are provided in Table 2.

Table 2 The learning achievement pre-test and post-test

Testing	$\overline{\chi}$	S.D.	t	df	Sig.
Pretest	6.57	2.57	17.34	48	0.00
Posttest	11.24	2.43			

*p< .05

A comparison of students' learning achievement before and after undertaking e-Learning is shown in Table 2. Their post-test scores on learning achievement were significantly higher than pre-test scores ($p<0.05$).

3. When students had completed e-Learning studies, the researchers evaluated the re-evaluated digital citizenship and academic achievement. The correlation of digital citizenship and achievement was determined by using Pearson's correlation coefficient. Table 3 provides the details.

Table 3 The correlation between digital citizenship and learning achievement

Digital Citizenship		Learning Achievement		Sig.	r
$\overline{\chi}$	S.D.	$\overline{\chi}$	S.D.		
3.89	0.45	11.24	2.43	0.037	0.799*

*p< 0.05

Table 3 shows that the relationship of digital citizenship and achievement by using Pearson's correlation coefficient. The correlation analysis found that overall, digital citizenship and academic achievement were related. The relationship between the two variables was positive and rather high (r = 0.799); the significance level was 0.05.

Conclusion and Discussion

1. The development of digital citizenship by using e-Learning found that the digital citizenship of the samples was moderate prior to the study. At the conclusion of the study, the digital citizenship of the experimental group increased to a high level. The samples all had higher development of digital citizenship. The categories of digital citizen, in descending order, are: understanding the human issues, the use of appropriate technology and lifelong learning, understanding social issues, understanding cultural issues and to behave ethically and in accordance with legal oversight. It can be seen that the sample focused the most on the issue of understanding humanity. Concept development skills of the 21st century graduates of higher education should have the Leadership Council of National Leadership Council for Liberal Education and America's Promise (National Leadership Council for Liberal Education and America's Promise, 2007). Students must be prepared for the challenges of the 21st century, with the accumulated knowledge about human culture. These include education in science and mathematics, humanities, social sciences, history, language and art; the emphasis of studies should continue to focus on answers to key questions. The responsibility of society includes knowledge and participation of citizens, sharing local and global knowledge between cultures, and reasoning and moral action. Including basic skills for lifelong learning, it can be seen that the sample was dedicated to lifelong learning with the use of technology. Due to information technology, we can make use of the contemporary technology, innovate at the individual level, and change society. Technology has changed the world by providing a renewed passion for learning. Learning online has led to the formation of a partnership to produce resources together. The creation of an online community has enabled online learning by creative collaboration and sharing, for example, sharing pictures / videos, social networks, blogs, discussion forums online, Wikipedia and file sharing (Dede, 2009a).

2. The learning achievement after the experiment with an average of 11.24 is higher compared with pre-test in general have an average of 6.57, it found that most of the learning achievement higher scores of the sample group in the 10.00 to 45.00 percent. The average percentage score of the sample was 23.37; comparing achievement before and after the experiment by using statistical t-test (t-test) using a 95% achievement for samples before and after the experiment was different. The students had some behaviors of choosing a topic or lesson that they think is useful or can answer their questions and self-selection of learning

times. Over time the student feels comfortable or appropriate for their learning. The study is due to be willingness and eagerness to learn more. This is an opportunity for learners to access specialist fields, both on and off campus from domestic and foreign countries. The students can access information to learn from the experts directly. This is not possible with traditional teaching. It also saves time and costs. Compared to communication with experts in the same manner and similar to the concept, this learning style is a way of manpower development. With online instruction, students can choose to study anything, learning any time that they want, and learn to be satisfied with a free and flexible e-Learning system. Online learning reduces the learning time by more than 50 percent and costs 30-60 percent less than traditional teaching and training (Netwong, 2013).

3. The correlation between digital citizenship and learning achievement were at the high level. Digital citizenship is important for digital life. You want to get the best out of using the internet and keep yourself and others safe and healthy in an online world. Use of these materials allows one to learn what it takes to become a positive digital citizen. [8] Digital citizenship helps learner make great decisions so they can take advantage of the powerful technology that fills their lives. The learner wants to explore for digital life, enjoy, communicate, and create. So they are protected or they know how to protect themselves. If the learners are going to thrive with digital media or online digital, they must balance the negative with the positive, privacy with protection and know how to be safe and responsible before letting them loose. The learner need to see both the possibilities and the perils so they can act responsibly and seize all that is wondrous and have it enrich their lives as people and citizens (Digital Life: Our Kids' Connected Culture, 2009).

References

Dede, C. (2009a). *Determining, developing and assessing the capabilities of North Carolina's future-ready students.* Friday Institute White Paper Series. Raleigh: North Carolina State University.

Digital Citizenship. (2013). Retrived from : http://www.digitalcitizenship.nsw.edu.au/Prim_Splash/index.htm.

Digital Life: Our Kids' Connected Culture. (2009). Retrived from : http://www.commonsensemedia.org/advice-for-parents/digital-life-our-kids-connected-culture.

International Society for Technology in Education. National educational technology standards for students (2nd Ed.). Eugene, OR : (2007), Auther, 2007.

J. Bellanca, and R. Brandt. (2010) 21st Century Skills: Rethinking How Students Learn. Tree Press, 2010.

National Leadership Council for Liberal Education and America's Promise. (2007). College learning for the new global century. National Leadership Council for Liberal Education and America's Promise

Netwong, T. (2013). The using of e-Learning to develop digital citizenship and learning achievement in Information Technology. International Journal of e-Education, e-Business, e-Management and e-Learning. 3(2) pp. 135-137.

Online Learning. (2010). Retrived from : http://www.cpf.co.th/public/cpf/corporate/HR/cpftn/global.htm.

Virtual Environment. (2010). Retrived from : http://203.158.136.18/edtechpark/images/stories/Research/vleam.doc.

Author

Titiya Netwong
Suan Dusit University
295 Rachasima Road, Dusit, Bangkok 10300
Email: titiya_net@dusit.ac.th