Study on the Factors Influencing the Virtual Learning Environment in the Sri Lankan Universities

Rajaratnam Charanya

Department of Physical Science, Vavuniya Campus of the University of Jaffna, Sri Lanka

Abstract- A project is commonly acknowledged as a successful project when the aim of the project is achieved positively. A system called Virtual Learning Environment (VLE) was designed among the students and university academic staff to encourage a positive approach in knowledge achievement and to support active learning within the university. This study was carried out to analyze the factors influencing the VLE system and to explore the relationship between the students and university academic staff on the system. The factors influencing VLE were identified through the literature review and the interviews which were conducted among the university academic staff and the industry experts. A paper-based questionnaire survey was carried out among the students and university academic staff in order to measure the severity of the factors influencing the VLE system. The respondents chosen for this study were the undergraduate students and university academic staff from Vavuniya Campus of the University of Jaffna, who used the above created VLE system. There were 120 nos. of responses from the students and 30 nos. of responses from the university academic staff. The students and university academic staff were requested to indicate their level of contribution on various factors in the survey questionnaire with a 5-point Likert scale and the Relative Importance Index (RII) was calculated for each factor. The severity of each factor was identified based on its RII value. The factors were ranked based on their severity and Spearman's rank correlation coefficient was calculated. It was found that there was 26.9% of positive degree of agreement between the students and university academic staff on the factors influencing VLE. This paper also explores some recommendations to improve the usage of VLE system.

Index Terms- Learning Management Systems, Learning Tools, Sri Lankan Universities, Virtual Learning Environment

I. INTRODUCTION

One of the most important problems that may arise in the university is the interface between the student and the university academic staff member is not much fair. In order to maintain a good relationship in teaching and learning activities among students and university academic staff, a system called VLE (Virtual Learning Environment) can be used.

VLE is defined as an alternative of the classical learning environment. It can be used as a virtual source for learning activities. A user can log on the system through the supporting applet interface. If the user uses the system for the first time, he/she should register by filling a registration form in the provided login interface. After the registration takes place, the profile of corresponding student or university academic staff is updated to the database. Then the users are enabled to access their personalized learning course materials from anywhere. VLE enables the structure of user login, admin panel, post students problem, course materials, quizzes, chatting tools, calendar view, reminder notifications, comments and short message service for important posts.

Within a span of a decade, an LMS has moved from a support tool to the learning process. All learning management systems are not alike; they can be used in numerous ways. However, a common idea behind the virtual learning is that e-learning is organized and managed within an integrated system. Different tools are integrated in a single system which offers all necessary tools to run and manage e-learning activities. All learning activities and materials are managed and organized within the system.

II. LITERATURE REVIEW

Frasen, J.W., (2007) studied on the critical success factors to enhance the quality of web supported learning opportunities in a blended learning environment in higher education. The factors were organized into six categories and determined how these factors are affecting the performances. In order to evaluate the effectiveness of LMS, one needs to compare student engagement, motivation and performance in their learning environment. The review of factors and related researches indicate that these two aspects are an essential part of student web supported learning.

Sanders and Morrison-Shetlar, (2002) found that student attitudes toward the internet and web based courses can influence the future use of the web based instructional materials and how educationally beneficial web based resources are there for students. Instructor attitude toward web based instruction also affect student's experiences with web based courses. The National Education Association (2000) administered a survey in which 75% of the instructors surveyed indicated that they were positive about web based education.

In addition to web based courses consisting of an instructor-created web-site, many instructors are now using proprietary LMS as course delivery platforms. Kendall (2001) reported on a study in which courses taught through traditional means were converted into units using WebCT software as the primary means of delivery. Results indicated overall satisfaction with the WebCT software and the organization and content of the units. Wernet, Olliges, and Delicath, (2000) reported on a survey examining the satisfaction 32 levels and perceptions of 39 social work students regarding the use of WebCT in social work education course. All students responded that they found the course materials on the course website helpful.

Mafuna and Wadesango, (2012) carried out the study through the questionnaire survey and it was found that students were ignorant about the new technology in their university. It was found that the availability of resources is very important in the acceptance of LMS and it should be prioritized and utilized effectively.

Swan, Shea, Fredericksen, Pickett and Maher, (2000) focused the factors affecting the success of online learning through an investigation of relationships between student perceptions and course design factors in one of the largest learning networks in the city. It was found that three factors such as consistency in course design, interaction with course instructors and active discussion have been consistently shown to significantly influence the success of online courses. It was suggested that the reason for these findings relates to the importance of building community in online learning.

III. OBJECTIVES

The following objectives are developed to achieve the aim of the research.
- To identify the significant factors influencing the VLE system
- To measure the severity of the factors influencing the VLE system
- To determine the degree of agreement between the students and university academic staff on VLE system

IV. METHODOLOGY

The VLE system was designed as a web version according to the requirements of the students and the university academic staff of Vavuniya Campus of the University of Jaffna. Knowledge areas needed for designing this project were Software Engineering, Web Engineering, UI/UX Engineering, and Database Management System. PHP, AJAX, JavaScript, CSS and HTML were the languages used to design VLE system. Laravel 5.2.4, JQuery and Bootstrap were the frameworks used for the development of the system. MYSQL was used for the data vendors. The database and the application both were installed on a server. Passwords were saved on the database by encrypting Bcrypt method. Each and every activity can be backed up on a separate cloud outside the server.

After the completion of VLE system, the interviews and discussions were conducted among the university academic staff and the industry experts to check the performance of the system. The suggested modifications were made in the system and it was given to the university to implement for the academic usage.

There were 25 significant factors influencing VLE were identified as follows.

- System quality
- Appropriate use of technology
- Reliability
- Availability of usage
- Problem solving
- Assignment strategies
- Learning resources
- Self-directed learning
- Frequent feedback
- Academic background
- User friendliness
- SMS alert notification
- Reminder
- Discussion
- Download demands
- Flexible Learning
- Sustainability
- Time saving
- Collaborative learning
- Use of media
- Evaluation of teaching competence
- Infrastructure
- Motivation of learning activities
- Ease of assignment submission
- Learning practice

A questionnaire was designed to measure the severity of the factors influencing VLE. The questionnaires were distributed to the students and the university academic staff members who used the above created VLE system. The students and university academic staff were requested to indicate their level of contributing on the above various factors in the survey questionnaire with a 5-point Likert type scale as a measurement from 1 to 5 (very low effect to very high effect).

There were 120 nos. of responses received from the students and 30 nos. of responses received from the university academic staff members. The collected data was analyzed using MS Excel. This data analysis was used to determine the relative importance of the various factors influencing VLE. The following steps were followed in the analysis of data.

- Relative Importance Index (RII) was calculated.

$$RII = \frac{\sum W_i X_i}{\sum X_i}$$

Where:

i - Response category index

w_i - Weight assigned to i^{th} response =1, 2, 3, 4, 5 respectively

x_i - Frequency of the ith response given as percentage of the total responses for each factor

- The factors were ranked in each category based on their Relative Importance Index (RII)

According to M.Kesavan, N.N.Gobidan and P.B.G.Dissanayake (2015), Spearman's rank correlation is a non-parametric test. Correlation is a relationship measure among different parties or factors. This correlation is computed by the following formula.

$$r_s I = 1 - \frac{6\sum d^2}{n(n^2 - 1)}$$

Where:

r_s^I - Spearman rank correlation coefficient between two parties

d - Difference between ranks assigned to variables for each cause

n - Number of pairs of rank

This correlation coefficient is used to show the degree of agreement between the different parties. It varies between +1 and -1, where +1 implies a perfect positive relationship (agreement), while -1 results from a perfect negative relationship (disagreement). The value near to zero indicates little or no correlation. In this study, this correlation coefficient was determined to find out the degree of agreement between the students and university academic staff.

V. RESULTS

The data analysis was done using Microsoft Excel. All the factors influencing VLE system were ranked based on the Relative Importance Index (RII). Ranking of factors influencing VLE system based on the responses from the students is shown in Table 1.

Table 1: Ranking of factors influencing VLE system based on the responses from the students

Factors	RII	Rank
Infrastructure	4.60	1
Time saving	4.56	2
Collaborative learning	4.50	3
Learning practice	4.45	4
Use of media	4.37	5
SMS alert notification	4.35	6
Reminder	4.26	7
Motivation of study	4.25	8
Reliability	4.24	9
User friendliness	4.23	10
Frequent feedback	4.20	11
Availability of usage	4.10	12
Problem solving	4.07	13
Ease of assignment submission	4.06	14
Academic background	3.98	15
System quality	3.89	16
Appropriate use of technology	3.77	17
Self-directed learning	3.57	18
Download demands	3.21	19
Sustainability	3.20	20
Evaluation of teaching capability	3.11	21
Flexible learning	3.09	22
Learning resources	3.07	23
Discussions	3.02	24
Assignment strategies	2.76	25

Ranking of factors influencing VLE system based on the responses from the university academic staff is shown in Table 2.

Table 2: Ranking of factors influencing VLE system based on the responses from the university academic staff

Factors	RII	Rank
Collaborative learning	3.43	1
Learning practice	3.35	2
Evaluation of teaching capability	3.26	3
Flexible learning	3.25	4
Frequent feedback	3.24	5
Availability of usage	3.22	6
Reminder	3.20	7
User friendliness	3.15	8
Infrastructure	3.12	9
Motivation of study	3.08	10
System quality	3.05	11
Use of media	3.04	12
Self-directed learning	3.03	13
Download demands	3.02	14
Academic background	3.02	15
Ease of assignment submission	3.01	16
Reliability	2.96	17
Discussions	2.91	18
Appropriate use of technology	2.80	19
Sustainability	2.78	20
Problem solving	2.66	21
Learning resources	2.48	22
Time saving	2.44	23
Assignment strategies	2.03	24
SMS alert notification	2.02	25

The Spearman's rank correlation coefficient is applied to measure the degree of agreement or disagreement associated with the importance rankings. The following table shows the ranking of factors and the Spearman's rank correlation coefficient was derived.

Table 3: Summary of ranking factors influencing VLE

Factors	Students	Academic Staff	d^2
	Rank	Rank	
System quality	16	11	25
Appropriate use of technology	17	19	4
Reliability	9	17	64
Availability of usage	12	6	36
Problem solving	13	21	64
Assignment strategies	25	24	1
Learning resources	23	22	1
Self-directed learning	18	13	25
Frequent feedback	11	5	36

Academic background	15	15	0
User friendliness	10	8	4
SMS alert notification	6	25	361
Reminder	7	7	0
Discussions	24	18	36
Download demands	19	14	25
Flexible learning	22	4	324
Sustainability	20	20	0
Time saving	2	23	441
Collaborative learning	3	1	4
Use of media	5	12	49
Evaluation of teaching capability	21	3	324
Infrastructure	1	9	64
Motivation of study	8	10	4
Ease of assignment submission	14	16	4
Learning practice	4	2	4
$\sum d^2$			1900

Using the Spearman's rank correlation coefficient, the degree of agreement or disagreement between the students and university academic staff was determined.

Here, $\sum d^2 = 1900$ and n = 25
$r_s I = 1 - [6 \times 1900] / [25\,(25^2-1)] = 0.269$

It was found that there was a positive relationship between the students and university academic staff on the VLE system. The results present that 26.9% of degree of agreement is there between them.

VI.   CONCLUSION

The students stated that infrastructure, time saving, collaborative learning, learning practice and use of media are the most significant factors influencing the VLE system. In the students' point of view assignment strategies, discussions, learning resources and flexible learning were the less influencing factors. Collaborative learning, learning practice, evaluation of teaching capability, flexible learning and frequent feedback were identified as the most critical factors influencing the Virtual Learning Environment system for the university academic staff. SMS alert notification, assignment strategies, time saving, learning resources, problem solving, sustainability and appropriate use of technology were found as very less importance for the university academic staff. It was observed that there was a positive relationship between university academic staffs and students. It was 26.9% of positive degree of agreement found between them.

VII.   RECOMENDATION

This paper explores some recommendations to improve the usage of VLE system in order to improve the VLE system.

So, the system has to be developed in order to attract the students to put more involvement in assignments, discussions and learning resources. The system can be modified to send a sticker, when the students undergo assignments and discussions. Then the students will do the assignments and the discussions as a competition by collecting the high number of stickers. This will lead the students to involve in assignments and discussions with high attention level. It is suggested to add a game facility which has a limited time with a set of levels and each level should be unlocked, when the students undergo assignment and discussion activities. This system can be linked with the library facilities to add more learning resources.

In addition, it is highly recommended to arrange any training facilities or workshops for the students and the university academic staff separately, by considering their academic activities within the university. It is important to give the basic training to use this type of VLE systems effectively.

ACKNOWLEDGMENT

REFERENCES

[1]   Farman Ali Khan, Sabine Graf, Edgar R. Weippl, and A Min Tjoa, 2009. 'An Approach for Identifying Affective States through Behavioral Patterns in Web-based Learning Management Systems', Proceedings of the 11th International Conference on Information Integration and Web-based Applications & Services, iiWAS'09, pages 431–435.

[2]   Wernet SP, Olliges RH and Delicath TA, 2000. 'Postcourse evaluations of WebCT (Web Course Tools) classes by social work students', Research on Social Work Practice, 2000;10(4):487–504.

[3]   M.Mafuna   and   N.Wadesango,   2012. 'Students' Acceptance and Experiences of the New Learning Management System (LMS) – Wiseup', Anthropologist, 14(4): 311-318.

[4]   Karen Swan, Peter Shea, Eric Fredericksen, Alexandra Pickett, William Pelz and Greg Maher, 2000. 'Building Knowledge Building Communities: Consistency, Contact and Communication in the Virtual Classroom', Journal of Educational Computing Research, Volume: 23 issue: 4, pages: 359-383.

[5]   Diana W. Sanders and Alison I. Morrison-Shetlar, 2001. 'Student Attitudes toward Web-Enhanced Instruction in an Introductory Biology Course', Journal of Research on Computing in Education, 33:3, 251-262

[6]   Manoharan Kesavan, Navanesan Gobidan and Pujitha Dissanayake, 2015. 'Analysis of Factors Contributing Civil Engineering Construction Project Delays in Sri Lankan Building Construction Industries', Journal of Industrial Engineering Research, 1(7) Special 2015, Pages: 5-11.

[7]   Steel C., 2009, "Reconciling university teacher beliefs to create learning designs for LMS environments", Australasian Journal of Educational Technology, Vol. 25, pp. 399-420.