A Service Science Approach for eLearning

Mohamed Nazul Ismail[1] ,Yazrina Yahya[2] , Muriati Mukhtar[3], Ali Ahmad Zahrawi[4]
Department of System Science & Management
Faculty of Information Science and Technology, UKM
Bangi, Malaysia
[1]nazulmaster@yahoo.com
[2]yaz@ftsm.ukm.my
[3]mm@ftsm.ukm.my
[4]ali@ftsm.ukm.my

Mohamad Shanudin Zakaria
Graduate School of Business
Universiti Kebangsaan Malaysia
Bangi, Malaysia
msz@ukm.my

Abstract— **This study focused on the process of creating framework to support a web-based e-learning system which uses service science approach. Co-creation value by stakeholder is a main task along the process of new framework for Learning Management System (LMS). Hopefully it does escalate learners' motivation in using Learning Management System (LMS) and make use of LMS effectively. Ultimately, we hoped to achieve a better service for LMS. It is part of attraction to improve value-in-use of LMS and to be able to achieve better education levels.**

Keywords - Learning Management System; Service-dominant logic; value co-creation; e-learning

I. INTRODUCTION

Due to the advent of technology made available currently, the concept of learning and teaching has been transformed tremendously compared to ten years ago. Teaching and learning are now conducted online via the internet, hence realizing the potential of internet in promoting learning anytime, anywhere. Most Higher Learning Institutions are currently using the Learning Management System (LMS) to enhance the learning and teaching process [1]. LMS allows learners and instructors to communicate via web application where learning materials are shared, and assignments are electronically handed in to the instructors through the system [2]. The use of LMS has increased tremendously in the past two years where currently over 90% of universities and colleges and 95% of the learning institutions in the US are using LMS for the benefit of their students and faculty members [2][3].

LMS is a software application for the administration, documentation, tracking, and reporting of training programs, classroom and online events, e-learning programs, and training content [4]. LMSs range from systems for managing training and educational records, to software for distributing courses over the Internet with features for online collaboration. As such, it is the heart for e-Learning attainment. Some examples of LMS can be found at www.wbtsystem.com, www.karta.com, www.moodle.org (Open Source) and www.blackboard.com (proprietary software). Both these systems are examples of commercialized large scale systems that are fully operational [5], [6]. Most of LMS have delivery mechanism features such as chat, group discussion forum, learning object repositories, audio and video player, and so forth. Using all of these features, learners will able to communicate with each other and their instructor within the same domain and more comfortably.

However despite its advantages in promoting e-Learning or online learning, statistics shows that the number of LMS users is far less than those currently using the social network applications, such as Twitter or Facebook. By the end of 2007, there were 3.9 million students using LMS in the US [7], while by September 2007, Facebook had 18 million users, who are between 20-34 years of age. Coincidently, this is the age range of learners in Higher Learning Institutions. This further confirms that users or learners are more interested in using the social network application compared to LMS. As such, further research is required to understand the phenomena and provide solutions to the situation.

The discussion that follows elaborates the LMS predicament methodology, further work and conclusion.

II. LMS PREDICAMENTS

Due to the huge gap in the number of users, it is imperative to study the phenomena and find the reasons why the number of LMS users is far less than those of the social network applications. This is pivotal as thousands if not millions are

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spent by organizations to purchase hardware and LMS applications to establish reliable network services to the learners or users of the LMS [8][9]. In addition, huge efforts and investment are disbursed in designing good learning materials tailored to the specific needs of different types of learners [10]. Due to the huge amount of fund spent in establishing LMS, the number of users and its usage should be proportional to the amount spent. If the numbers are not proportional, reasons are required.

Besides the uneven ratio in terms of users and money spent for establishing LMS, the most perturbing fact is that most LMS has the same features as the social network application. LMS is able to manage users' roles and courses, provide storage for learning materials, allow learners messaging, display learner's scores and transcripts, manage learners' grouping and provide the learning path. Facebook, on the other hand, also manages its users, provides storage allocation for video, notes and photos, allows groups and network establishment, and provide chatting facilities and other available features. With similar features, but with different aspiration (as LMS should be more useful as it is used for learning), LMS is still far from popular among users. Therefore, there rises a need to look at the entire design of the LMS application.

Many institutions conducted their own survey on LMS and it is useful to identify some studies and comparison from findings. A small scale study at The University of Queensland shows that many students feel that their university teachers (instructors) are not using the LMS to its full potential [11]. A longitudinal study (2001 – 2005) at Swinburne University on students' experience in the Blackboard LMS reveals that students are dissatisfied with:

- The level of use by instructor
- The level of interaction with lecturer and tutor
- Lack of use of LMS tool that are available to instructor.

As a result, students are frustrated as they realise that the quality and usage of the forums depends on the instructors using them. In the same proceeding, at Monash University, a survey of the WebCT system shows that poorly designed sites were commented in terms of lack of interaction and feedback from staff, outdated information or links and the quality of teaching. More recently, at University of Denver, the major drawbacks of the system are similar to previous research cited above. It is safe to imply from the above findings that users have failed to take advantage of invaluable communication potential through LMS.

In Malaysia, it was found that for LMS to be successful and well-accepted by the learners, matters such as interaction between instructor-learner, attitude towards electronic learning, motivation through forums, technical support, technology availability and language used in the LMS play very important role in ensuring that users are engrossed and engaged when using LMS [12]. Reference [9] emphasizes the importance of communication between both parties - learners and instructor - to establish a LMS framework consisting of interaction mechanism needed in the LMS. Nevertheless realizing the importance of communication, most LMS has already embedded the chatting and forum component in the system but survey conducted by [12][13] shows that the forum facility provided are not fully utilized by the learners unless requested by the instructors. Reference [12] has brought to light the fact that students in Higher Learning Institution are merely using LMS for downloading learning materials and to view the announcements made by the instructors. As such learners are only using LMS at certain time only. Therefore, it can be concluded that learners have not taken full advantage of LMS and its features, as compared to the social networking applications. In other words, it can be inferred that LMS had few value-in-use merit to the learners as compared to the social networking application.

Other reasons why forum facility is not being fully capitalized by the learners, among others are the instructors delay replying to the post published, resistance to the online facility, ignoring online activity participation, technical problems relating to the net services and several others [13]. This further shows that LMS is currently having a shallow value-in-use merit, as confirmed by interviews conducted with LMS learners of a Higher Learning Institution in Malaysia in July this year. The learners confirmed that they seldom used LMS as there were always technical problems associated to the usage of LMS especially while accessing the system; in addition, the learning material design is not up-to-date or some topics are difficult to design in digital format and to fulfil the online interaction quota set by the instructor. Further interview conducted also confirmed that due to limited time available, forum facility was not fully utilised by the learners and furthermore, technical issues hindered them from using the application.

Reference [14] establishes that LMS usage is heavily depending on factors such as well established content or learning materials, instructors' role, learning environment and the e-learning process involved when using the LMS. As such instructors are required to be actively involved in the forum in order to escalate learners' motivation [16]. This is supported by [15],[16] which stated that "deep and meaningful formal learning is supported as long as one of the three forms of interaction (student–teacher; student-student; student-content) is at a high level."

This provides the platform indicating that the forum facility can be fully capitalized if learners find the values are embedded in the site. Therefore, further research is also required in determining the factors that will provide the value-in-use which will extend the number of LMS users.

According to [17], due to the advent of Web 2.0, new types of communication such as blogs, podcasting, twitter, mobile

learning and educational games online have allowed learning to occur indirectly. However, further analysis revealed that the obstacles in using the e-Learning system were not due to the technology or the limitation in infrastructure but due to local culture and individual practices or attitudes [18]. Local culture does not support discussion online in which discussion are more encouraged in a face to face environment, as such this dampers the need to discuss online and fully utilizing the e-Learning system. However, further analysis also showed that the younger generation are more tech-savvy as they are online more often and finds that being online provides some form of value and enhance their relationship with the system. This change in attitude provides a research platform to look into the current e-Learning system in which the concept "value-in-use" needs to be embedded into the system using the value co-creation method. The trend that leads to the e-Learning system predicaments is described in Fig.1.

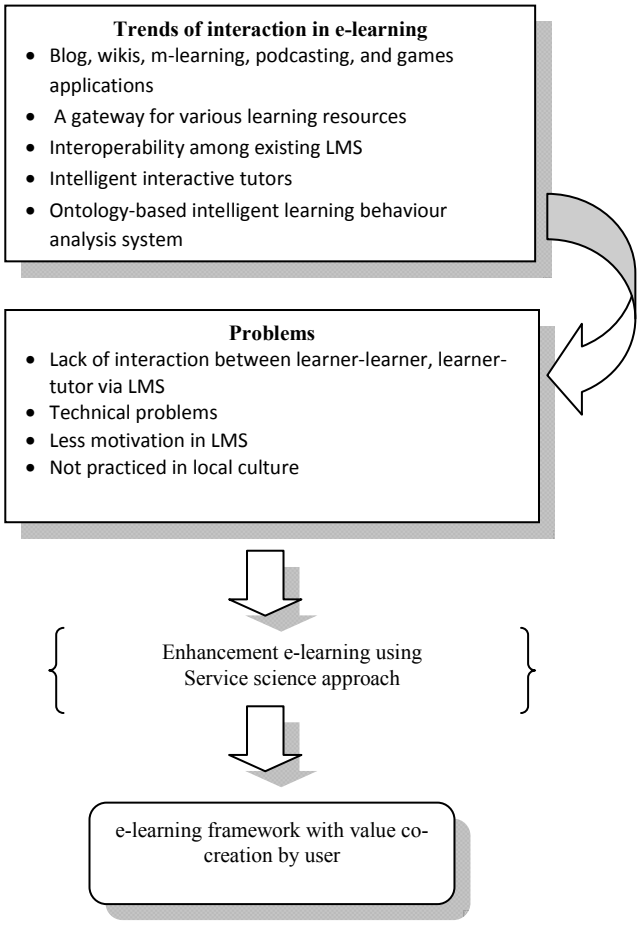

Figure 1: Trends, problems & suggested solutions

III. METHODOLOGY

The concept of "value-in-use" and the method "value co-creation" is widely discussed in the marketing and service science theoretical grounds [19]. These concepts are adopted as they applied the science method, acceptance perception and experiences as an input to a service. The service-dominant logic examined by Vargo & Lusch is the basis of this research [19]. A service-dominant logic implies that value is defined by and co-created with users rather than being embedded in products.

In term of value co-creation, noted value is ultimately derived with the participation of, and determined by, the beneficiary (often, the customer) through use (often called ''consumption'') in the process of acquisition, usage, and disposal [20]. It is based on interaction between designer and stakeholder in two-way information.

As e-Learning system can be considered as a type of service given to the public e.g. learners, the concept is adaptable to be used in this matter. To extract the "values" per say from the users, a methodology is adopted from [21][22] where methods, such as participatory approach and observation are used to obtain the latent needs or the values that are important to the users. These values are then translated into tangible form such as the functions (service) or interfaces of the system. The adopted methodology is shown in Fig.2.

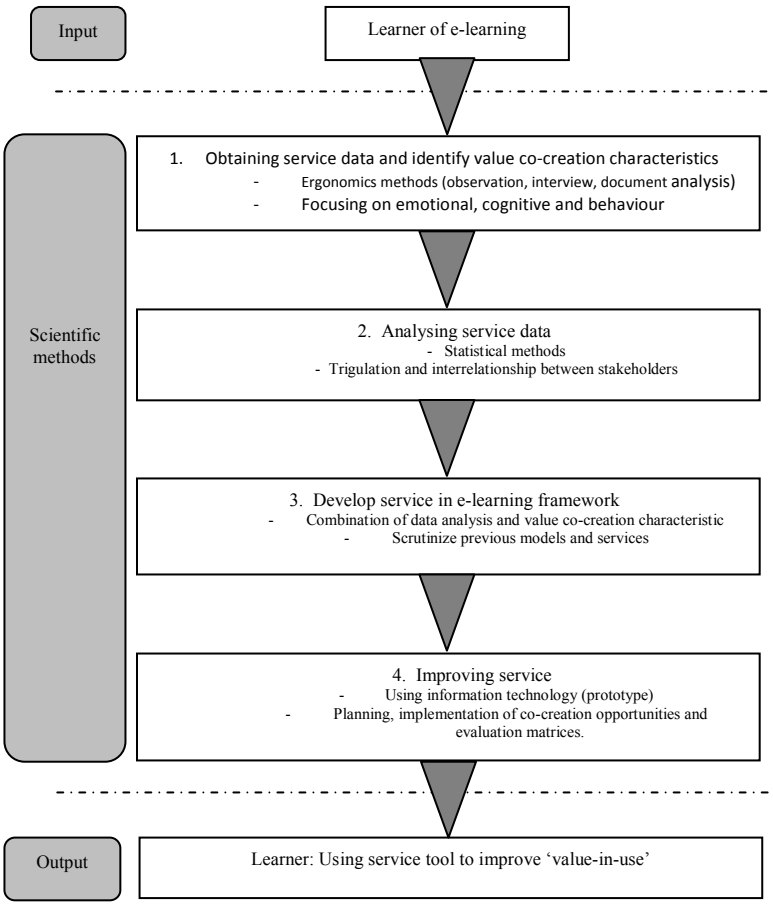

Figure 2: Adaptation Research Design from Payne & Matsunami [21][22]

IV. FURTHER WORK

Qualitative survey will be used for further work. The purpose of qualitative survey to understands users' new viewpoints such as service or experience. We propose a set of semi-structured interview questions in order to collect and categorised various themes for a value co-creation of each respondent. From that, we would be able to define single or various standards or scheme that can be part of framework for e-learning based on service science approach. Respondents for the survey will be selected from various stakeholders and prominent member of the institution including students, administrators and instructors of e-learning system.

V. CONCLUSION

LMS is one of the important components in e-learning practice. Use of LMS to its full potential is critical with new generations of students who are using technologies in evermore creative and connected ways. It is possible for LMS to be the key factor for the particular institutions to promote and attract learners to fully utilize the LMS developed by the institution. One of the major factors of decreasing rate of interest in using LMS is the lack of functionality available in social networking. Most of social networking offer enjoyable situation, satisfaction of communication, on line social gathering and warm relationship, which are absent in LMS. From this issue, it is crucial to develop a new framework to promote the attractive values LMS by offering an e-learning environment based on users needs from co-creation value perspective.

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