Key Successful Factors for Virtual University Implementation: A Literature Study

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Abstract— **In enhancing the quality of teaching and learning process, university is using internet as media to leverage education system. The technology has shifted the learning paradigm from traditional to online learning. The technology used as tools to support learning activity are curriculum development, content creation, interaction between lecturer and student, and assessment. It is not easy to successfully implement the virtual university because it will spend huge investment for infrastructure. The purpose of this article was to find out key successful factors for virtual university implementation. It was a literature study by reviewing various journal related on virtual university topic. There were 133 papers retrieved by using keyword "virtual university" and/ or "virtual campus" and those papers were published after the year 2000. Retrieved papers were synthesized into 100 relevant titles, then selected into 32 papers to review. These selected papers were then reviewed to answer the research questions in virtual university area. The research's result finds 12 key successful factors for virtual university implementation.**

Index Terms— **Key successful factor; Virtual university; online learning; Literature review; Teaching learning process.**

I. INTRODUCTION

Technology in higher education institution extends the teaching and learning process. Learning environment is shifting from face to face traditional learning to online learning by using the internet. Some university are using internet as a part of blended learning and others are using the internet as online learning. This learning model gives some impacts to pedagogical process in university. Online learning has similar theme with distance learning. The pedagogical question is about the differences of physical places and virtual places [1][2].

The purposes of this research were to serve three goals. The first goal was to analyze some successful keys in virtual university implementation. Second, it would be useful to researchers who were interested in understanding the relation between Critical Success Factor (CSF) in virtual university. Third, the research would give contribution in the area of virtual university.

This research reviewed 133 papers published after the year of 2000. It was difficult to review all papers, and then a complete list of reference was provided for each theme and reviewed it. The theme was divided in three parts, those were

framework design, a case study on the university's implementation experience, and evaluation of virtual university implementation. The reviewed paper were analyzed and categorized into some themes.

II. METHODOLOGY

The processes of review articles were as follows. First, a searching process of papers using keywords to define research question in "key successful factors in virtual university". Each retrieved paper had to be published in a peer-reviewed and or/archival journal and it would be extracted focusing on the year of publication, that was between 2000 and Jan 15, 2016, as the cut-off date. The huge number of papers made authors focus on discussion about "virtual university" and/ or "virtual campus" for higher education institution, excluding training institution. Therefore, it was possible that there was more existing papers that were not surveyed in this study. The Second, candidate's paper then were selected according to relevant "virtual university" and/or "virtual campus" and/or "online learning" in title and abstract. Third, the selection review concentrated on key successful factor of implementation experience and evaluation/post implementation. Duplicate papers of the same study were also excluded.This literature review was to answer the question of what is key successful factors of Virtual University implementation?

III. EXTRACTION RESULT

Searching process is using google scholar which is a searching engine to find paper with intended subject. The keywords to define research question were "(framework or model) and (virtual and (university or campus))". The searching process resulted in 133 papers. Those papers were then selected to get the candidate papers. After reading the papers' titles, relevant title determined as a "candidate studies". The selection process from retrieved paper to "candidate studies" was resulted 100 papers to be reviewed. Then, those papers were selected again by reading the abstract to answer the research question. There was only 32 papers (24%) out of 133 papers surveyed were written primarily on virtual university and/or virtual campus and/or online learning

on higher education institution was selected (in detail see Table 1.

The complete list of 32 selected papers along with the number of papers appeared in each found in Table 2 for journal and Table 3 for the conferences.

Table 1
Sources of publication and citation number

Publisher	Reference	Year	Cites*)
Taylor Francis	[22]	2003	33
	[23]	2007	142
	[24]	2005	11
	[25]	2001	58
	[26]	2001	12
	[27]	2006	83
	[28]	2009	156
	[29]	2005	13
	[14]	2011	40
	[15]	2003	79
	[16]	2010	97
Science Direct	[1]	2000	514
	[17]	2001	167
	[18]	2000	26
	[19]	2001	30
	[20]	2011	20
	[10]	2009	6
	[11]	2002	14
	[4]	2001	17
ERIC	[5]	2009	10
	[6]	2010	69
	[30]	2012	41
Wiley	[31]	2001	12
	[32]	2009	24
Kungliga Tenkniska Hoegskolan/Royal Institute of Technology	[12]	2004	24
Proquest	[13]	2016	2
Australasian Journal of Educational Technology	[3]	2002	91
Sheffield University Press	[21]	2002	12
WSEAS	[33]	2008	11

*Cited Authors accessed from Google Scholar on 16/01/2016

Table 2
Number of papers in each journal (in *number* order)

Journal Name	Number of papers
Computers & Education	2
Internet and Higher Education	2
The Journal of Academic Librarianship	2
Assessment & Evaluation in Higher Education	1
Association for Learning Technology Journal	1
Australian Journal of Educational Technology	1
Applied Artificial Intelligence	1
British Journal of educational Technology	1
Electronic Journal of e-Learning	1
Electronic Journal of Information Technology in Construction	1
European Journal of Engineering Education	1
Innovations in Education and Teaching International	1
Interactive Learning Environments	1
International Journal of Educational Development	1
International Journal of Information and Education Technology	1
Journal of Computer Assisted Learning	1
Journal of Geography in Higher Education	1
New Directions for Higher Education	1
Procedia - Social and Behavioral Sciences	1
Teaching and Teacher Education	1
Teaching of Psychology	1

Table 3
Number of papers in each conference (in *year of conference* order)

Conference Name	Number of papers
World Conference on the WWW and Internet Proceeding, 2001	1
3rd International Conference: Networked Learning 2002	1
Proc. IEEE Int. Conf. Advanced Learning Technologies, 2002	1
IEEE Transaction on Education, 2002	1
International Conference on Computers in Education (ICCE'2002)	1
7th WSEAS International Conference. on Applied Computer and Applied Computational Science (ACACOS 2008)	1
IEEE Transaction on Knowledge and Data Engineering, 2009	1
3rd IEEE International Conference on Digital Ecosystems and Technologies, 2009	1

Most of "virtual university" relevant topic's author was from US, Australia, and Europe, whereas no single author from Asia (detail shown in Table 4)

Table 4
Number and country of authors

Country of Authors	Papers	%	Authors	%
USA	8	19%	14	18%
Australia	5	12%	10	13%
Germany	4	9%	8	10%
UK	4	9%	9	11%
Sweden	3	7%	4	5%
Canada	2	5%	5	6%
Finland	2	5%	4	5%
France	2	5%	3	4%
Greece	2	5%	5	6%
Portugal	2	5%	2	3%
Spain	2	5%	4	5%
Austria	1	2%	1	1%
Czech Republic	1	2%	3	4%
Italy	1	2%	1	1%
Norway	1	2%	1	1%
Slovak Republic	1	2%	2	3%
Slovania	1	2%	1	1%
Switzerland	1	2%	3	4%
Total	43	100%	80	100%

IV. RESULTS AND DISCUSSIONS

A comprehensive review for each paper was to determine the themes. This classification was based on the author's judgment and no particular sequence among the reference listed in the table. The major themes defined in this article were (1) framework, (2) implementation experience, and (3) evaluation/post implementation, (as shown in Table 5).

A. *Paper's Theme*
i. *Framework*

Framework was developed by synthesizing as a result from relevant theories through empirical studies or original experiences of implementing new practices [34]. From literature review there were 6 out of 32 papers (19%) discussed framework. These papers proposed a framework to identifying, evaluating, and promoting virtual university to

address best practices, sharing issues, learning environment, and learning quality.

ii. Implementation Experiences

Authors shared their experience in their university and give some insight about a key successful factor of virtual university implementation. There were 60% papers (19 out of 32 papers) discussed the implementation experience. The lesson from these universities became valuable insight for another university which had a plan to implement virtual university in the future. From implementation experience, sub-themes defined integration among systems or tools to support virtual university, functionality needs to focus on university implementation, tools / facilities should be prepared by university, the learning environment as the main process in university became the most discused s topic by author and the last, collaboration in terms of partnership. It can be stated there is a possibilityof universities' collaboration to share learning material as a way to improve learning content.

iii. Evaluation/Post Implementation

Evaluation is done to enhance and improve learning quality. There were 21 % papers (7 out 32) discussed evaluation or post implementation. This themes focused on evaluation after implementation to capture staff support, learning process, student engagement, satisfaction of students and lecturers, and regulation. Evaluation /post implementation is an important phase in development to make sure the successful of project objective and to improve learning process according to evaluation result.

Table 5
Major themes and sub-themes on the topic of virtual university

Topic	References
Framework	[5]; [7]; [10]; [27]; [17]; [30];
Implementation Experience	
Integration	[4]; [8]; [12]
Functionality	[4]; [28]
Tools/Facilities	[4]; [9]; [28]; [15]; [16]; [24]; [31]; [32]; [33]
Learning Environment	[4]; [6]; [11]; [12]; [26]; [14]; [16]; [1]; [18]; [27]; [28]; [29];
Collaboration	[7]; [12];
Evaluation/Post Implementation	
Staff Support	[25]
Learning process	[3]; [20]; [25];
Student engagement	[3]; [23];
Satisfaction	[13]; [3]; [20]; [25];
Regulation	[19]

B. Successful Factors

Based on literature study, there was 12 key successful factors, as seen in Table 6.

All key successful factors with a brief summary are listed below:

i. Lecturer/tutor

Lecture/tutor is a facilitator who shares knowledge to student. Good knowledge of lecturer or tutor gives some impacts to the learning process. Moreover, lecturer/tutor needs to communicate in group to make sure that they have the same learning outcomes.

ii. Tools

Tools are hardware and operative system administration. Learning Management System (LMS) is used as e-learning content creator and interaction media between lecturer/tutor and student. As a system, LMS can be designed as a management report systems to monitor interaction among lecturer, students, and syllabus realization.

iii. Management

As an institution, implement virtual university will impact to organizational governance. The complexity of processes and the differences of organizational governance change the way employee operate their daily activities.

iv. User support

In virtual university, the ability to use e-learning system is important. The basic user support consists of creating new e-learning course in LMS for user. User guide is prepared to help user understand the use of e-learning system.

v. Communication

Effective communication improves student's understanding to content. In e-learning, communication between lecturer and student is conducted through discussion forum. Using discussion forum, user or management is able to track the trending topics and determine specific pool of knowledge.

vi. Processes

Processes represent delivery process in virtual class. Learning environment creates creativity of determination teaching and learning strategy through internet.

vii. Student

Every student needs to know about their learning outcomes. This understanding helps students to get motivated and engaged.

viii. Curriculum

Curriculum is a set of design about courses, outcome, and assessment. Concerns to pedagogical aspect, structure, and a set of courses is designed to meet the outcomes into curriculum mapping.

ix. Training

Training is conducted to prepare the readiness of lecturer to teach through e-learning media. University conducts direct learning and support just in time training session, advice to a lecturer when they prepare a learning content or virtual training for instruction of e-learning system usage.

x. Collaboration

Collaboration is a business model that provides partnership among universityies to improve their learning quality.

xi. People

To integrate knowledge sharing and identification the person who have experience in e-learning usage or consult with an expert will minimize technical problems and ensure

the readiness of e-learning systems.

xii. Government

Government as legislative support and role. The government supports in accreditation gives direction for university to clarify their learning quality standard.

Table 6
Key Successful Factor mapping to reference

Factors	Reference
Lecturer/tutor	[4]; [13]; [1]; [32]; [33]
Tools	[4]; [5]; [6]; [8]; [21]; [16]; [20]; [12]; [23]; [30]; [33]
Management	[4]; [5]; [7]; [21]; [17]; [28]; [30]
User Support	[4]; [5]; [8]; [12]; [21]; [17]; [20]; [30]; [32]
Communication	[4]; [7]; [8]; [11]; [3]; [21]; [16]; [23]; [27]; [28]
Processes	[4]; [9]; [11]; [12]; [26]; [14]; [17]; [20]; [22]; [25]; [28]; [30]; [31]; [10]
Student	[5]; [3]; [21]; [14]; [1]; [23]; [25]; [27]; [31]; [32]; [33]
Curriculum	[5]; [8]; [9];[16]; [1]; [3]; [17]; [22]; [24]; [25]; [27]; [30]; [31]; [33]
Training	[6]; [20]
Collaboration	[6]; [7]; [9]; [12]; [23]; [28]; [31]
People	[6]; [8]; [17]; [20]; [33]
Government	[9]; [15]; [17]; [18]; [19]; [25]

V. IMPLICATIONS

There are top three factors found from reference reviewed, which are processes in 14 literatures, curriculum in 14 literatures, and tools in 11 literaturers. These three concern factors are relevant with distance learning environment. University needs to prepare a good curriculum and process of teaching learning to make sure that the outcomes achievable by student. And, becuase there are no meeting between students and lecturer, tools becomes important. Using good LMS helps student to learn more interactive and easier to understand learning material.

The implication for science is about learning environment. Some researchers discuss the idea using games or mobile device as teaching tools. The interactive tools is more interesting for student. Additionally, to implement the virtual university, a university has to concern about technology infrastructure to support good teaching learning process in virtual environment. Using technology to explore knowledge in virtual environment in teaching learning activities gives advantage to keep student motivation and achieving learning outcomes.

VI. LIMITATION

This paper has a limitation because the number of databases has restricted access from reputable journal and the publication year is too old. The publication year should be in the last five years.

VII. CONCLUSIONS

A research in virtual university is a promising area. Based on extracting result, this framework has been stable in Europe, Australia, and United Stated, but it still debatable in Asia. The internet usage as learning media gives the opportunity for university to leverage their learning model. Some authors focus on support tools such as learning management systems and embedded learning model through games application. The other authors write on collaboration as a way to enrich content in university. Sharing content gives opportunity to student to learn more deeply about topics and communicate with lecturer and/or expert and student from outside the university.

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