The Adoption Elements in Network Environment on Cloud Services in Higher Learning Institution-Instruments Pretesting

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Abstract— The success factor elements adoption in a network environment on cloud services by Higher Learning Institution (HLI) is necessary to be defined appropriately. Most of the HLI know the advantage in using network environment on cloud services but they still fear to utilize it because of lack of awareness, guideline, and experience. The success factor elements in using network environment on cloud services are defined and retrieve from the literature and validated by the expert at the preliminary studies. The expert came from the institutions that have experience in used cloud services for an identified the accuracy of the elements. The clear elements define are purposed and stated as an important element. The designing of the questionnaire survey is made before distributed to pilot study. This paper went thru the step at the designing questionnaire survey. The output was getting onward will be used as elements adoption of designing in proposed a guideline for HLI in selecting the correct elements that influence the success of selecting the network environment on cloud services. The content and construct validity were done by the reviewer expert in the different fields. The experts were checking the validity of the questions. The questionnaire survey was revised base on the comments of the experts. The understanding and reliability of the questionnaire were getting as a final stage before distributed to the pilot study. This paper will depict an impact of the questionnaire survey development in getting the comprehensive and understanding of the questions design onward to get the smooth process at the pilot test to get the actual result.

Keywords— Cloud, Content, Validity, Construct and Network Environment

I. INTRODUCTION

One of the main agenda of the ministry of higher education is to ensure in early 2015 all the HLI at Malaysia used the eLearning [1]. The increasing of the users and huge of the teaching material, HLI need a suitable technology and infrastructure to implement the successful network environment [2]. Preparing and managing network infrastructure is a complex process requires started on how to manage and planning the suitable network infrastructure [3].

The HLI also seriously will put an effort to increase the awareness for eLearning implementation by providing the appropriate network technology and infrastructure to implement the best quality of teaching and learning activities [4]. They are also committed to implementing the eLearning because they believe it is the effective alternative approach compare to the traditional classroom method for distributing information. The current financial crisis append complication to HLI to provide the higher quality of learning network environment [5].

The HLI need to find the other alternative for network environment to make efficient learning by reducing the cost of operation [6]. Moving to a network environment on the Cloud Services are one of the solutions to reduce the cost of maintenance where all the network component are maintained and overseen by the cloud provider. The cloud environment are new in Malaysia and lack of research in the cloud environment was done [7]. The success factor elements adoption is defined to get the important elements in implementing the network environment on cloud services. This paper will describe the process of designing a questionnaire survey from the success factor elements adoptions getting for network environment on cloud services for eLearning. This study is arranged orderly the questionnaire survey, as a result, provided for pilot study.

II. ELEMENTS ADOPTION

The elements adoption in this research aims to be a recommendation and references for HLI in using the network environment on cloud services for eLearning. Before the elements were proposed, the elements arise for the literature were taken as important elements in the network environment on Cloud Services. Then the elements were reviewed by the IT expert for provides the groundwork study that covers in particular statements regarding the initial situation, opinion and problems. The groundwork study was to determine the validation of elements that reach out for propose there research elements.

The important elements of the research are addressed through the research, elements are categorized into four categories which are perception, policy, operation and execution. From the preliminary, the sub-element related inside the main elements is adopted. The sub-elements addresses under the perception are awareness and benefit. Whereas the sub-elements under the policy are business needs

and cost saving. The procedure sub-elements are security and implementation is vendor selection. Table I shows the elements adoption of network environment on Cloud Services for eLearning.

Table I: Elements Adoption

Elements adoption of a network environment on Cloud Services			
Perception	Policy	Procedure	Implementation
Awareness	Business Needs	Security	Vendor Selection
Benefit			
Cost Saving			

Base on the elements adoption identifies the solution to address the success factor elements adoption in network environment on cloud services. Each element will explain below:

A) Perception

The knowledge about network environment on the cloud services are required before the HLI migration to the cloud services. Most of the HLI was afraid to lose the value of data and information because the cloud infrastructure is behind the safety firewall. Therefore the knowledge and perception of IT officer is important for cloud network infrastructure design [8]. Realizing the challenges, the HLI tried to find the effective way how to save the data beside reduce the cost setup and operation [9]. Moreover using the network environment on cloud services can help to improve performance and increase the efficiency [10].

i) Awareness

The clarification about network environment on the cloud services for the organization is important awareness given before they move to the cloud. The top management must give the awareness on using the network environment on the cloud services. The understanding about the benefit of the cloud service and how the cloud service help the HLI to be more proactive besides saving the cost of operation must reviews. The awareness given by the top management provide the effectiveness way on how to save the data beside reduce the cost and maximize the accessing [11].

ii) Benefit

By using the network environment on cloud services it most economical and helping the HLI to make faster access. By using the network environment of cloud service has convey many benefits to HLI such as scalability, pay per use, availability, usability and integrity [12]. It also can improve performance, the processes and utilize the resources in the organization. Moreover, the other benefit is the user will be accessed outside of the campus which faster access.

B) Policy

A policy is a principle to guide decisions to achieve

rational outcomes for HLI. The policies of the government must in line with network environment selected. Policies are adopted by governance within an organization. The HLI the policy stated is important to make the smoothing process of management. The categories of the elements in the policy are:

i) Business Needs

Business needs are about identifying and understanding the business goals, strategies direction, business success, challenges and risks. The understanding of the overall of cloud the business process by the HLI is important before migrate to cloud services. The HLI must decide the investment objective and business needs of their institution.

The understanding about the service requirements for each cloud service model also must street up before making the decision. It also must emphasize the requirement to making faster and easy accessing by using a network environment for cloud services.

ii) Cost Saving

By using the cloud services there is no cost for hardware setup, maintaining and upgrading. The software upgrading becomes a part of the cloud, there is no need to download or install specific software. However, the internet the connection is required. The cost of licensing in different software packages are moved to the cloud service level, so there is no need to upgrade the local system when new service packs or patches are released. In addition, the abilities to transfer from hard-copy to online will be able to reduce the paper usage.

C) Procedure

The procedure in network environment on cloud service is the procedure in the services process. The security is the important success element procedure in the network environment on cloud services:

i) Security

The challenges are to find the suitable of cloud deployment for IHL onward for high security. Moreover, using the cloud services the network can be shared a pool of configurable computer resources like networks, servers, storage, application and services that can be rapidly provisioned and enable a minimal management effort for services provider [13].

The advantage of cloud services, data can be access from any location, any time, better access to services, decreased expenses, availability, easy to cooperation and easier data recovery [14]. HLI and service provider must have agreement and control deployed to protect the data applications and infrastructure in using network environment on cloud services. Moreover, if the client computer crashes there are almost no data lost because everything is stored in the cloud.

D) Implementation

The implementation is the carrying out of a plan in order to

complete a course of action. The implementation and execution of network environment on cloud services is based on the vendor selection.

i) Vendor selection

The selection of the vendor or provider for the capability to deliver services is the very important factor for Institution of Higher Learning. The Institution of Higher Learning must make sure the vendor or provider capability to deliver the god services. The Institution of Higher Learning must work together with the cloud provider to take the responsibility to make sure all the setup process, maintaining, reporting, management, detection and clarifies the security responsibilities are done properly. The challenges are the Private institution of Higher Learning cannot depend to cloud provider totally. Privacy has been provided for this purpose, they cannot restrict unwanted access to the data only [15].

III. QUESTIONNAIRE DESIGN

The research data can be obtained in quantitative approaches through a questionnaire survey. The questions of survey designed base on the elements getting from the preliminary study. The questionnaires survey which is close ended and Likert scale questions. There have a few steps in designing the questionnaire survey.

A) Content Validity

Before the questionnaire is distributed to the pilot study, the content validation of questionnaire question will be conducted. The content validity is to ensure the consistency, liability and coefficients content of the questions [16]. The purpose of content validity is to check the linker scale, language, word writing and reliability and understanding of the questions [17]. In this research five experts were selected in the focus group. Focus group was being interviewed with each of the experts on elements at each of the topic. The focus groups are from the IT person that experiences in network environment and language person to check the understanding of the sentences. The group of the expert was check and revises the question to make sure the item and the content was clear and reliable. Apart from that, the IT expert that revise the word base on the of technical meaning. Whenever the statistical expert looked at the correlation and combat alpha of the expectation of the output produce base on the questions design. In addition, the eLearning users were also selected to make their opinion about the eLearning in network environment in cloud services.

After all the idea and opinion was taken the content validity ratio (CVR) will be made for produce the appropriate questionnaire for the pilot study. The content validity for each item in the questionnaire was determined using content validity ratio (CVR) and was calculate using the formula below:

$$CVR = \frac{Ne - N/2}{N/2} \quad (1)$$

Where CVR = Content validity ratio for item i (the number of items)
N_e = is the number of experts who agreed on the relevance of the item
N = is the total number of a panel of expert judges

To calculate the CVR each item must evaluate, the expert must determine either the question is important or not. If the value of CVR less than minimum value then the item must be remove from the list [18]. In this research only 5 experts selected which is the minimum value was CVR>0.99 are selected. When all of the experts say the description is appropriate, the computed CVR is 1. When it is more than half of them, but less than all the CVR goes between zero and .99. Table II shows the ratio value for content validity (CVR) for each item for this research.

Table II: The example of ratio value for content validity CVR for each item in this research

Construct	Item	Design	CRV	Remain/Remove
Perception/ awareness	1.0	(3-2.5)/2.5=0.4	0.4	Remove
	1.1	(3-2.5)/2.5=0.4	0.4	Remove
	1.2	(5-2.5)/2.5=1	1	Remain
	1.3	(5-2.5)/2.5=1	1	Remain
	1.4	(5-2.5)/2.5=1	1	Remain
	1.5	(5-2.5)/2.5=1	1	Remain
	1.6	(4-2.5)/2.5=0.6	0.6	Remove
	1.7	(4-2.5)/2.5=0.6	0.6	Remove

B) Construct Validity

The construct validity was made base on the observations of the IT expert in the content validity. The construct validity is to perceive the overall of the validity test. In this research, the construct validity was made by remove or remains the item base on the CVR value results at content validity. The statement of items also was rephrasing base on the expert comment. There also have a few items were placed in another construct of elements.

Table III shows a part of construct correction extraction and item instrument success factors based on the value of CVR in this research. There have either the item want to remove, remain, rephrase or located in another construct item.

IV. CONCLUSION

As a conclusion, this paper discusses the process of the questionnaire survey design in this research. The person selected for involvement in the design and analyst a questionnaire survey was important to make sure the output is valuable and understanding. The process was made for

accurate written format before distributed the questionnaire to the pilot test. After sorting and rearrange the number of the question, the questionnaire was release to pilot test. The pilot test will observation by a few of people from the real study. From the process of the questionnaire design will be able for next process. Hope through this process everyone in the pilot test sampling will understand the questionnaire survey in the same way but can point out the problems answering with the clear item instructions are given and understanding for the research issues. Onward the reliability statistical analyses are checking using statistical software. The reliability refers to the results obtained with an instrument and an estimate of reliability to a particular type of consistency but not sufficient the condition for validity analysis.

Table III: Construct correction and item instrument Success factors elements adoption base on the value of CVR value

Construct	Item and Explanation	Action
Perception	1.0 Which solutions do you see as the most suitable for HLI according to this possible security Cloud Service for eLearning?	Remove
	1.1 Public Cloud - owned and managed by an unrelated business	Remove
	1.2 Availability of data services by Private Cloud owned and managed Internally Availability of data services	Remain &Rephrase
	1.3 Integrity of services	Remain
	1.4 Confidentiality of data	Remain
	1.5 Loss of service control	Remain
	1.6 Fully outsourced disaster recovery and business continuity	Remove
	1.7 A contingency plan based on internal resources	Remove

*Remove-base on the result at Table II where CRV<0.09

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