Analysis of e-learning implementation readiness based on integrated ELR model

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Abstract. E-learning nowadays has become a requirement for institutions to support their learning activities. To adopt e-learning, an institution requires a large strategy and resources for optimal application. Unfortunately, not all institutions that have used e-learning got the desired results or expectations. This study aims to identify the extent of the level of readiness of e-learning implementation in institution X. The degree of institutional readiness will determine the success of future e-learning utilization. In addition, institutional readiness measurement are needed to evaluate the effectiveness of strategies in e-learning development. The research method used is survey with questionnaire designed based on integration of 8 best practice ELR (e-learning readiness) model. The results showed that from 13 factors of integrated ELR model being measured, there are 3 readiness factors included in the category of not ready and needs a lot of work. They are human resource (2.57), technology skill (2.38) and content factors (2.41). In general, e-learning implementation in institutions is in the category of not ready but needs some of work (3.27). Therefore, the institution should consider which factors or areas of ELR factors are considered still not ready and needs improvement in the future.

1. Introduction
The rapid development of Information and Communication Technology (ICT) has encouraged various institutions to use it in order to provide added value to the products or services offered while enhancing the competitiveness of organizations in a very competitive era. It is sooner or later that an educational institution will be "forced" by a community which demands to adopt ICT in its learning activities. This is because the process of learning is a major business process in educational institutions. It is proven that more than a thousand institutions in 50 countries used e-learning to support their learning activities [1]. Many studies have identified the advantages of implementing e-learning, but in reality not all institutions that have used e-learning got the desired results [2]. Implementation of e-learning is not just uploading teaching material or doing learning content but more to change the paradigm of learning process. The change or paradigm shift of the learning system...
begins to appear in the transfer of science. The current learning process tends to emphasize more on the teaching process, based on the content base, abstract and only for certain groups. Along in the development of ICT, the process in learning began to shift in learning, based on the problem (case base), contextual and not limited only to certain groups. To adopt e-learning, organization required well strategy and plan to give optimal result as expected. In addition, an institution also need to evaluate e-learning readiness level. Measurement of ELR could be conducted at the analysis stage or evaluation stage. In the analysis phase, the ELR is used to compile the baseline requirement document for the next design phase. While at the evaluation stage, ELR is used to measure success and determine recycling decision for further improvement process. In other words, an evaluation is needed to determine the level of achievement of desired goals [3]. Institution X has utilized ICT to improve the learning process through e-learning. In this study, the measurement of ELR was conducted in the evaluation phase so the organization could know what factors or areas that are considered not ready or still far from expected.

2. Literature Review

Measurement of readiness of e-learning implementation is needed to know the condition and suitability of institutional strategy compared with ideal condition expected. E-learning readiness (ELR) is defined as the mental or physical readiness of an organization for a learning experience [4]. ELR becomes important because in the implementation of e-learning often encountered a variety of obstacles such as resistance, computer literacy, infrastructure to organizational culture [5]. The ELR model is designed to simplify the process of obtaining the basic information necessary to develop e-learning. Many researchers have developed both individual and organizational ELR models such as Kirkpatrick's model that the e-learning evaluation consists of 4 (four) levels of reaction, knowledge, behaviour and result. These four levels further illustrate the evaluation of the results obtained by an institution after implementing e-learning. At each level there are a number of assessments that can be used as information for each characteristic [6]. ELR models developed by other researchers such as the proposed Swatman & So (2005) model measure the readiness of e-learning implementation based on six assessment components: Student's Preparedness, Teacher's Preparedness, IT infrastructure, Management Support, School Culture and Preface to meet face-to-face [7]. The ELR model proposed by Akaslan & Effie (2011) specifically measures the level of e-learning readiness of the faculty aspect based on three components: Technology, People, Content and Institution [8]. Besides, the proposed ELR model of Seakow & Samson (2011) related to e-learning readiness in higher education in Thailand consists of five dimensions of measurement namely Policy, Technology, Financial, Human Resources and Infrastructure [9]. While the ELR model proposed by Kaur & Abas (2004) that measures e-learning readiness in Malaysia has several components of assessment that are Learner, Management, Personnel, Content, Technical, Environment, Culture and Financial [10]. The ELR model proposed by Chapnick classified the readiness of e-learning implementation into the following eight factors [11], they are psychological readiness, sociological, environmental, human resource, financial, technological skill, equipment and content readiness.

In addition, other ELR best practice models, such as the proposed Psycharis (2005), consist of 8 factors of readiness: technology, human resource, economic, content, educational, entrepreneurial, culture and leadership [12]. Engholm (2001) also developed an ELR model consisting of five dimensions: organizational & industry, learning content, individual learner, organization culture and ICT [13]. Haney (2002) uses seven categories in the ELR model: human resources, learning management systems, learners, content, information technology, costs and vendors [14]. ELR models will produce scores that can determine the e-learning readiness rating of an institution. The ELR model at the evaluation stage is useful for measuring the success of e-learning implementation and determining the policies and strategies for the improvement process over the next period based on the recommendations and recommendations provided.
3. Research Methodology
The research conducted descriptively by using questionnaire-based survey method to know the level of organizational readiness in the implementation of e-learning system. The questionnaire was design based on several studies of ELR best practice model. The Chapnick ELR model (2000) as well-known model in this study was integrated with other best practices models such as Engholm (2001) model, Haney model (2002), ELR Kaur & Abas model (2004), Swatman & So (2005), Psycharis model (2005), Akaslan & Effie (2011) model and Seakow & Samson (2011). Those models have been widely used and highly suitable for the case of e-learning implementation in developing countries including Indonesia [15][16]. The integration of eight ELR best practice models in the form of mapping of e-learning readiness factors could be presented as follows [7] [8] [9] [10] [11] [12] [13] [14]:

| No | E-learning Readiness Factors | Chapnick (2000) | Engholm (2001) | Haney (2002) | Kaur & Abas (2004) | Swatman & So (2005) | Psycharis (2005) | Akaslan & Effie (2011) | Seakow & Samson (2011) |
|----|-------------------------------|-----------------|----------------|-------------|-------------------|-------------------|-------------------|----------------------|------------------------|
| 1  | Psychological                 |                 | √              |             |                   |                   |                   |                      |                        |
| 2  | Sociological                  |                 | √              |             |                   |                   |                   |                      |                        |
| 3  | Environmental                 |                 |               |             |                   |                   |                   |                      |                        |
| 4  | Human Resource                |                 |               |             |                   |                   |                   |                      |                        |
| 5  | Financial                     |                 |               |             |                   |                   |                   |                      |                        |
| 6  | Technological                 |                 |               |             |                   |                   |                   |                      |                        |
| 7  | Skill                         |                 |               |             |                   |                   |                   |                      |                        |
| 8  | Equipment                     | √               |               |             |                   |                   |                   |                      |                        |
| 9  | Innovation                    |                 |               |             |                   |                   |                   |                      |                        |
| 10 | Institution                   |                 |               |             |                   |                   |                   |                      |                        |
| 11 | Leadership                    |                 |               |             |                   |                   |                   |                      |                        |
| 12 | Culture                       | √               |               |             |                   |                   |                   |                      |                        |

Based on Table 1 above, the integration of eight ELR best practice model resulted 13 readiness factors as the basis for the assessment of e-learning implementation readiness (ELR) in Institution X. The questionnaire in this study adopted Likert scale which consists of 5 measurement scale, where 1 = "Strongly Disagree", 2 = "Disagree", 3 = "Neutral", 4 = "Agree" and 5 = "Strongly Agree" had been distributed to 104 respondents by purposive sampling. The criteria of respondents are lecturers who had conducted e-learning at least three years. This criterion is determined because to obtain valid data from a number of teachers who have experience in the learning process of e-Learning so as to know the problems or conditions that run. Total data of 105 respondents will be tested on validation and reliability criteria to be processed in the next stage. To know or map the degree of readiness of the organization in the implementation of e-learning, this research used Aydin and Tasci scale that divided the readiness in four levels as Figure 1 below [17]:

Figure 1. Measurement scale of model ELR Aydin & Tasci [17].
In Figure 1 above, it could be seen that the average score of 3.41 is the minimum score for the degree of e-learning readiness either for the average score of questions for a factor or the total average score of all questions to be considered or categorized as ready level in e-learning implementation.

4. Result and Discussion
Based on the next approach, the level of readiness of e-learning implementation was analysed. Before the data processing and analysis, the results of questionnaire measurement tested the validity and reliability. For reliability testing is through calculation coefficient reliability Cronbach Alpha where each item is above 0.6 (> 0.6) shows an accurate internal consistency [18]. The results of reliability testing as a whole showed Cronbach Alpha coefficient value of 0.895 (> 0.6), meaning that each item in the questionnaire is considered to be reliable because it meets the minimum requirements. The results of the validity test questionnaire in this study seen from the value of \( r_{\text{count}} \) (corrected item-total correlation) where if the value of \( r_{\text{count}} \) greater than \( r_{\text{table}} \) then the item is valid [18]. From the results of testing the validity of the questionnaire obtained that each measurement item has a value \( r_{\text{count}} > 0.191 \) with 5% significance level where for 104 respondents \( r_{\text{table}} \) value is 0.191 based on table r product moment. Thus, each item of the questionnaire have met validity and reliability as required.

The next step is analysis the data obtained by descriptively using tools SPSS IBM version 16.0. The statistically mean was computed of each item and also total mean that indicated existing level of e-learning readiness in organization. The result then mapped to Aydin & Tasci (2005) scale as shown which consists of 4 (four) readiness category that are category not ready and needs a lot of work, category not ready but needs some of work, ready category but needs a few improvement as well as the ready category of implementation of e-learning could be continued. The results of ELR could be presented in Table 2 as follows:

| No | ELR Factor     | Mean Score | Readiness Category              |
|----|----------------|------------|----------------------------------|
| 1  | Psychological  | 3.58       | Ready but needs a few improvement|
| 2  | Sociological   | 3.62       | Ready but needs a few improvement|
| 3  | Environmental  | 3.45       | Ready but needs a few improvement|
| 4  | Human Resource | 2.57       | Not Ready and needs lot of work  |
| 5  | Financial      | 3.52       | Ready but needs a few improvement|
| 6  | Technological Skill | 2.38   | Not Ready and needs a lot of work|
| 7  | Equipment      | 3.79       | Ready but needs a few improvement|
| 8  | Content        | 2.41       | Not Ready and needs lot of work  |
| 9  | Innovation     | 3.56       | Ready but needs a few improvement|
| 10 | Institution    | 3.53       | Ready but needs a few improvement|
| 11 | Leadership     | 3.71       | Ready but needs a few improvement|
| 12 | Culture        | 3.60       | Ready but needs a few improvement|
| 13 | Policy         | 3.48       | Ready but needs a few improvement|
| Total Mean | 3.27 | Not Ready but needs some of work |

Based on the results of data processing presented Table 2 above that of 13 e-learning readiness factor obtained total average score is 3.27 which indicates the institution is in the category of not ready but needs some work in the implementation of e-learning if it refers to the Aydin & Tasci value category [17]. Consecutive score of ELR obtained were Psychological 3.58, Sociological 3.62, Environmental 3.45, Human Resource 2.57, Financial 3.52, Technological Skill 2.38, Equipment 3.79, Content 2.41, Innovation 3.56, Institution 3.53, Leadership Factor 3.71, Culture of 3.60 and last Policy for 3.48. It could be seen that from 13 factors of readiness of e-learning implementation measured, there are 10 (ten) factors which are considered or included in the ready category ie Psychological,
Sociological, Environmental, Financial, Equipment, Innovation, Institution, Leadership, Culture and Policy. But on the other hand there are 3 (three) ELR factors included in the category of not ready is Human Resource, Technological Skill and Content readiness. Of the 10 (ten) factors that are considered ready, there is one factor that obtained the highest value of Equipment factor of 3.79. Equipment factor is related with infrastructure or technology owned by institutions that support the implementation of e-Learning system both hardware and software. Thus, in terms of ICT infrastructure, institutions have been perceived to be ready for having adequate capacity such as dedicated servers in the form of Web-application Server as well as Database Server, Bandwidth connection large enough, power supply and Moodle-based open source software has also been used so that it is expected to ensure easy and fast accessibility to the e-learning system implemented. But on the other hand, human resource, technology skills and content are still considered not ready or still low of all factors. Of the three factors, technological skill factor has the lowest level of readiness that is equal to 2.38. This suggests that human resource factors need to be a concern and a priority for institutions to further improve their capacity. Infrastructure or technology that is ready without dissertation of qualified human resources then e-learning system will not run well even tend to technology will not be utilized optimally. Therefore, the readiness of human resources becomes very important in determining the success of a technology including e-Learning. The low technology skills factor also shows that users are not familiar with e-learning system being implemented. In other words, the e-learning system is still considered difficult to use which can be caused, among others, interface design, in-site navigation, layouts, precise information, etc. In addition, the content factor is still considered not ready where the learning content provided is mostly still in the form of text only. Whereas in e-Learning need to process the digitalization of learning content to the multimedia in the form of video, audio or animation so as to enrich the learning and improve the understanding of the teaching participants. This is certainly related to the quality of human resources to be able to process and present learning content that is able to meet the learning needs of learners.

5. Conclusion
Based on the results of research that has been done can be drawn some conclusions as follows:

- The contribution of this study compared with previous work was to proposed integrated eight (8) ELR best practice model. This integrated ELR model consisted of 13 factors which useful to measure the readiness of e-learning implementation.
- The degree of institutional readiness in the implementation of e-learning included in the category of not ready but still requires a small increase shown ELR score obtained by 3.27. Thus institutions need to pay attention to which factors that considered not ready then the one could be improved.
- There are 10 ELR factors that are considered as ready level: Psychological, Sociological, Environmental, Financial, Equipment, Innovation, Institution, Leadership, Culture and Policy.
- There are 3 ELR factors included in the category of not ready level: Human Resource, Technological skill and Content readiness.
- Research in the future could be conducted is in depth analysis of any critical factors that influence the readiness of e-learning. Additionally, the addition of number and kind of respondents could be extended to student and management.

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