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To cite this article: W Sardjono *et al* 2021 *J. Phys.: Conf. Ser.* **1832** 012025

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**240th ECS Meeting** ORLANDO, FL

Orange County Convention Center Oct 10-14, 2021

Abstract submission due: April 9

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# An evaluation model for the implementation of an electronic learning system in high school on Pramuka Island, the Thousand Island DKI Jakarta

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**Abstract.** In line with the development of information systems and technology today, which has entered the era of the industrial revolution 4.0, the learning process in high schools also develops by utilizing information systems and information technology platforms by developing electronic learning systems or often called e-learning. For the successful implementation of e-learning, it is important to know what factors and indicators can be used to build a performance evaluation model, so that the implementation strategy can be determined in a future that is sustainable and superior in competition. The method used to process data is a factor analysis method, whereas to construct an evaluation model of a number of factors obtained, the regression model is used. The results of the analysis produced 5 (five) new factors, namely a culture of change, a knowledge management system, the latest information, the dissemination of knowledge, and the development of teaching materials.

## 1. Introduction

Formal education institutions such as schools in the current era almost all of them have used information and communication technology to support the business process of learning and administrative support. By looking at the needs and demands of the developing education industry for learning without being bound by time and place to study, in general tertiary institutions try to build information technology infrastructure that can support the education and learning process with special online learning programs that are run through websites or portals education, which is a means or tool for sharing knowledge for students and the wider community. There is a flow of knowledge in the online learning process, because the quality of education can be measured by looking at the development of knowledge in the institution. Therefore, to help manage knowledge in online learning, understanding is needed that is built on the concept of knowledge management.

The culture of sharing knowledge between students and their teachers and between students and students can be seen from the way they participate in the discussion forums provided. For this reason, evaluation must be carried out by conducting research to determine whether the process of sharing knowledge has been successfully carried out through a knowledge management system. By using this system knowledge can be explicit and can be shared among students through the process of sharing



knowledge and presenting knowledge. The main purpose of this article is to describe how the use of e-learning has increased significantly in the current era of the industrial revolution 4.0, e-learning can be utilized and empowered so that it contributes to the development of online learning for schools, through increasing the capacity and competence of students and teachers, through changing the flow of the learning process that is not only teacher oriented, but can be improved into learning that is student oriented. Then the use of information technology is in line with the development pattern of the 4.0 industrial revolution, and the last one is the management of teaching materials, as well as the authorization of teaching and learning materials. So it is necessary to know what factors affect the successful implementation of the electronic learning system in SMA on Pramuka Island, Pulau Seribu DKI Jakarta.

## 2. Literature Review

### 2.1 Digital literacy

Digital literacy is defined by the *United Nations Educational, Scientific and Cultural Organization* (UNESCO) as "the capability to define, organize, operate, assess and share information correctly and thoroughly through technology and network devices to participate in economic and social life" [1].

The framework for digital literacy has been explained by [2]. She explained that there are four crucial abilities that must be owned by individuals so it can be said to have competence in digital literacy, namely:

- 1) Internet Searching  
Capability in searching information in internet networks.
- 2) Hypertext Navigation  
The capability of a person in understanding navigation of hypertext.
- 3) Content Evaluation  
Capability in understanding information. Where someone can evaluate the truth of the information
- 4) Knowledge Assembly  
The capability of a person in creating his own knowledge from information or data that he obtained.

### 2.2 Socio-economic

According to [3], socio-economics has a definition as the position of a person in a society that is indirectly driven by economic activity, education and income. Socio-economics is an important asset because socio-economics will affect many other aspects of life in society, such as cognitive aspect related to morals, affective aspect related to attitudes and conative aspect related to community behavior.

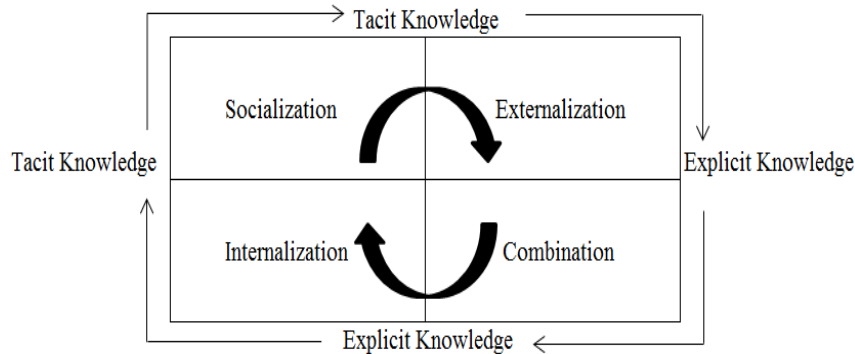
### 2.3 Knowledge management

Knowledge is increasingly being recognized as an important asset of the organization. The most recent paradigm is that knowledge is power. In a modern economy, organizations that utilize knowledge are organizations that have a competitive advantage. Competitive advantage is realized through the full use of information and data combined with utilizing skills, ideas, commitment and motivation from employees. The new paradigm today is that knowledge in organizations must be shared in order to support organizational growth and development [4]. There are two types of knowledge, namely:

- (1) Implicit knowledge (tacit) which is knowledge that is still in the minds of individuals who have that knowledge and is personal. Whereas as such, it is important for an organization to find, disseminate and utilize the implicit knowledge of each employees in order to optimize the use of their own intellectual capital. [5].
- (2) Explicit knowledge is explicit knowledge available in organizations. In general, explicit knowledge is structured and reflected in various references to regulations and work standards in organizations.

The difference between tacit knowledge and explicit knowledge suggests 4 basic patterns for creating knowledge in organizations [6].

Many definitions of knowledge management from various researchers. Each gave an interpretation based on professional background and research objectives. This study refers to [7] which suggests the main processes in knowledge management include the creation of knowledge (creation), the use of knowledge (utilization) and knowledge sharing. [8].



**Figure 1.** SECI MODEL (Nonaka and Takeuchi)

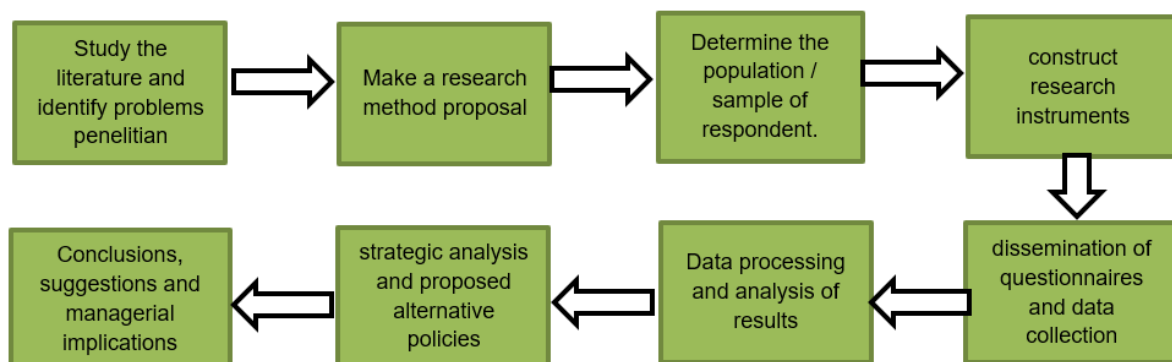
In the concept of developing knowledge management, it is known that the SECI model theory, SECI stands for socialization, externalization, combination and internalization. This theory describes the communication relationship between the type of knowledge, tacit knowledge and explicit knowledge [9]. The communication relationship between tacit knowledge and tacit knowledge is called socialization, while the communication relationship between tacit knowledge and explicit knowledge is called externalization [10]. Next, the communication relationship between explicit knowledge and explicit knowledge is called a combination, while the communication relationship between explicit knowledge and tacit knowledge is called internalization [11]. Figure 1.

**2.4 Factor analysis**

Factor analysis is used to reduce data and interpret it as a new variable in the form of formed variables. Factor analysis is also used to find out the dominant factors in explaining a problem. In the analysis of variance, multiple regression and discriminant, one variable is called the dependent variable or criterion and the other variable is the independent variable or predictor. In factor analysis is called interdependence technique in which all sets of independent relationships are examined [12]. In factor analysis, variables are not grouped into independent and non-independent variables, instead the whole set of interdependent relationships between variables is examined. Factor analysis can also be seen as an extension of principal component analysis. Both are analytical techniques that explain the structure of relationships between many variables in a concrete system [13].

**3. Methodology**

The research design was carried out in accordance with Figure 2.



**Figure 2.** Research Design

1. The first stage  
Determine what factors will be used to evaluate the E-LEARNING SYSTEMS. There are three factors used, were: People Factor, Process Factor, and Technology Factor.
2. The second stage  
After knowing what factor are used, the next step is determining the right indicators and appropriate. These indicators can be used to determine the value of the information related to the things that will be evaluated.
3. The third stage  
The next stage is to develop a questionnaire from factors and indicators that have been obtained. Questionnaire were distributed to the respondents according to the research targets and the results of questionnaire were collected for analysis to the next stage.
4. The fourth stage  
After the questionnaire were collected, the result are recorded and analyzed. At this stage, we did the analysis test with the reliability test, factor analysis and regression. Of each test phase analysis will be obtained each new factor and indicator and analysis models.
5. The fifth stage  
After getting a new factor, results of the analysis of made a conclusion that will be used as advice to the organization.

#### 4. Results and Discussion

From the reliability test results obtained that Cronbach's Alpha value of 0.908. So that the instrument used was considered reliable for the questions in each of the variables used in this study.

From the test results of factor analysis, it can be seen indicators that affect *user* awareness in using e-learning systems.

The first new factor, consisting of indicator variables:

- 1 Te5 : The company as a provider of electronic learning system, make a *user friendly* use technology facility effectively.
- 2 PR6 : The information provided and stored in electronic learning system accessible anywhere and anytime.
- 3 Te6 : Available of technology can be easily used by the user for support and sharing knowledge.
- 4 PR7 : The information provided and stored has been effective by the *user*.

The second new factor, consisting of indicator variables:

- 1 PE1 : The use of electronic learning system support for the *user* to interact socially with each other.
- 2 Pe4 : The use of electronic learning system allows *users* to express themselves, either individually, or as a group organization of science (general) to seek knowledge or information required by the experience.
- 3 PR9 : The use of electronic learning system assist *the user* in solving an existing problem.
- 4 PR10: The use of electronic learning system assist *users* in evaluating the resolution of a problem.

The third new factor, consisting of indicator variables:

- 1 Te3 : Organizational structure that exist allow for the sharing / transfer of knowledge.
- 2 Pr4 : Information / knowledge contained in the electronic learning system has a value that useful for all *users*.
- 3 Pr3 : Information / new knowledge contained in electronic learning system according to the context (in this case is the subject).
- 4 PR2 : The information provided and obtained through electronic learning system is the latest information, which is used to update knowledge
- 5 Te4 : Organizational structure that there is useful to create and share knowledge.
- 6 PR5 : electronic learning system makes it easy to manage knowledge because knowledge is stored in digital form and more structured.

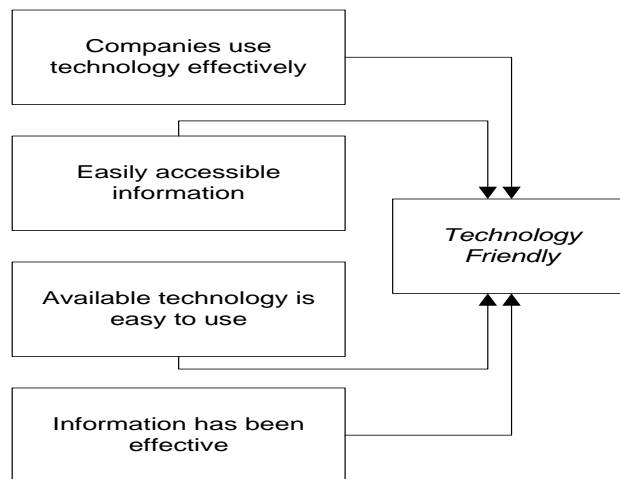
The fourth new factor, consisting of indicator variables:

- 1 PE7: electronic learning system facilitate the creation of new knowledge between *users*.
- 2 PE5: Submission of information / knowledge in electronic learning system can be well understood by the *user*.
- 3 Pe6: electronic learning system can provide an integrated *link* to the *knowledge base* such as blogs, *websites*, etc., so as to bring new knowledge.

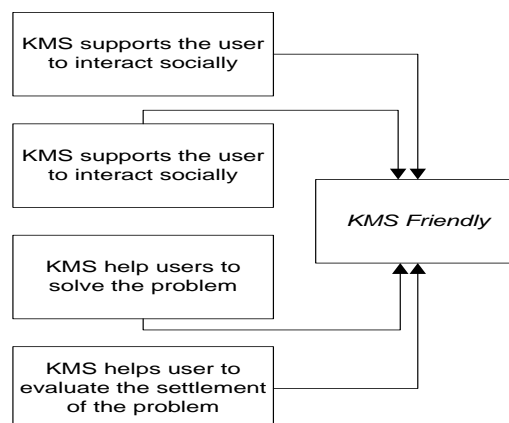
The new factor group 5, consisting of indicator variables:

- 1 TE2 : Learning culture (*self-learning*) to help develop and create a new knowledge.
- 2 PE8 : With the use of electronic learning system, *the user* can share his experience of training and observations that have been followed to fellow colleagues.

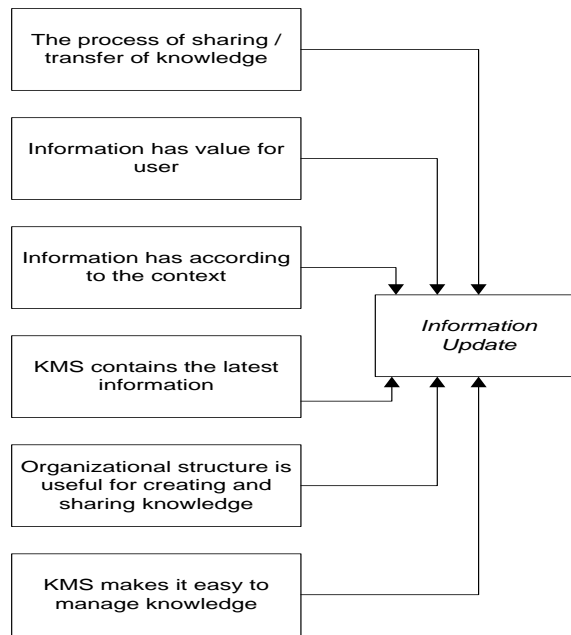
The next stage is to perform the naming of the new factors and indicators. Here is the naming of the them, figure 3., figure 4., figure 5., figure 6., and figure 7.



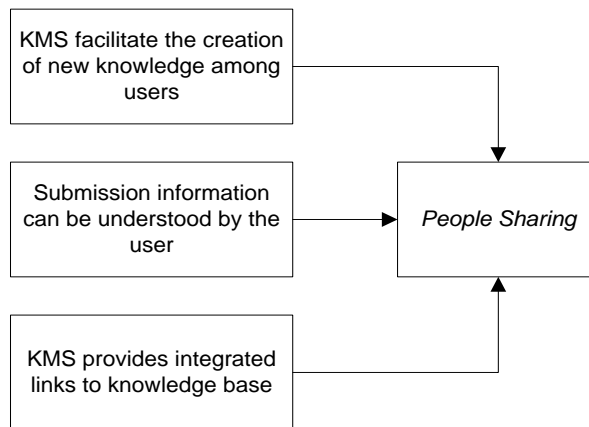
**Figure 3.** Indicator and factor of the technology friendly



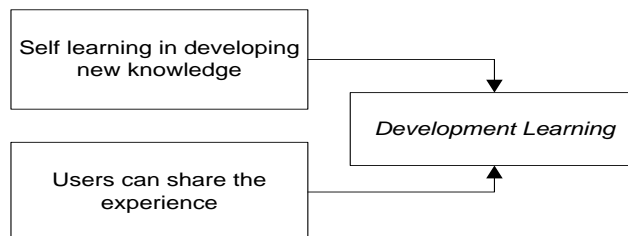
**Figure 4.** Indicator and factor of the KMS friendly



**Figure 5.** Indicator and factor of the information update



**Figure 6.** Indicator and factor of the people sharing



**Figure 7.** Indicator and factor of the development of learning

From the analysis, we can determine the model by using the regression analysis. Therefore, the model similarities in linear regression are:

$$Y = 5.30 - 0.05 X_1 + 0.07 X_2 + 0.16 X_3 + 0.26 X_4 + 0.25 X_5$$

With the explanation:

1. Y is *Learning Process*
2. X<sub>1</sub> is *Technology Friendly*
3. X<sub>2</sub> is *KMS Friendly*
4. X<sub>3</sub> is *Information Update*
5. X<sub>4</sub> is *People Sharing*
6. X<sub>5</sub> is *Development Learning*

The minimum and maximum value can be seen from the process of the regression factor, namely:

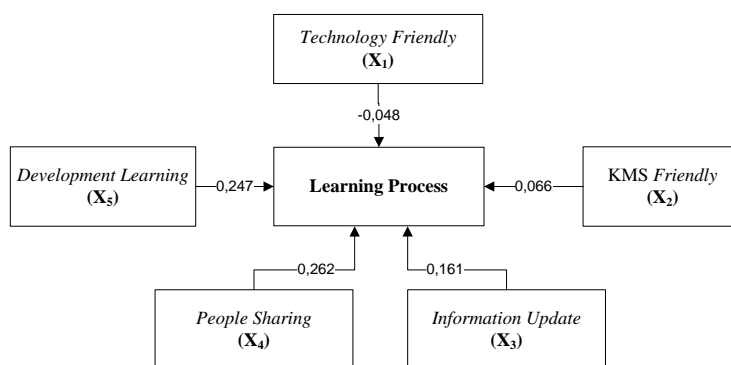
$$\begin{aligned} -3.67 &\leq X_1 \leq 2.16 \\ -3.16 &\leq X_2 \leq 1.55 \\ -3.31 &\leq X_3 \leq 2.36 \\ -4.19 &\leq X_4 \leq 1.92 \\ -2.32 &\leq X_5 \leq 2.14 \end{aligned}$$

With a simulation of the model as follows Table 1.

**Table 1.** Simulation Result

Simulation	Y	B <sub>0</sub>	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>
Current	5.30	5.30	0	0	0	0	0
Unexpected	2.79	5.30	2.16	-3.16	-3.31	-4.19	-2.32
Expected	6.99	5.30	-3.67	1.55	2.36	1.92	2.14

With a picture of the model as follows



**Figure 8.** The factor and value model of learning process

### 5. Conclusion

From the results of processing respondent data, it can be obtained an evaluation model of the development of the electronic learning system in high school on the island which shows the current condition with a current evaluation value of 5.296 on a scale of 0.000 to 10,000. The conditions like this reflect that the level of readiness in using e-learning is at a sufficiently ready level and can be developed further. In practice, this value can be increased by maximizing the factor 2 (KMS Friendly)



which means more intensive socialization to teachers and students, also emphasizes factor 3 (Information Update) which means the renewal of teaching material, then increases interaction between individuals on factor 4 (Sharing of People), as well as encouraging the improvement of the learning climate at factor 5 (Learning Development), and then minimizing the manual process or conventional learning on factor 1 (Learning Process).

### Acknowledgement

The authors would like to thank BINUS Universitas Indonesia for supporting publications related to community service programs by building prototypes of learning management system development in schools in the Pulau Pramuka Kepulauan Seribu environment - DKI Jakarta so that later it can be implemented realistically.

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