Online Learning Self-Efficacy: The Role in E-Learning Success

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Abstract. The e-learning success factor has been widely researched. One of which is Self-Efficacy, that has a vital role in online learning. Previous research has focused only on Computer Self-Efficacy. While the effect of a more specific factor, Online Learning Self-Efficacy, is unknown. This research has a contribution in revealing the influence of Online Learning Self-Efficacy factor to the success of e-learning by using D & M model. This study uses a quantitative approach to a sample of 101 university students. The result of data processing using Warp PLS shows that the factor of Online Learning has a positive and significant influence on the use of e-learning. Although this research has some limitations, which will be discussed in this paper, this research can still become a starting point for further research in the online learning field.

1. Introduction
E-learning, which enable anyone to learn anywhere on a flexible schedule has been widely used [1]. It allows the transfer of knowledge and skills with low cost and shortens the learning time [2]; [3]. Its effectiveness compared to face to face learning methods was also already researched [4]. But there are several factors which should put into concern. On the user’s point of view, [5] emphasizes the comfortableness of user with online technologies. [6] argue that online education demands a particular set of behavioural patterns and [7] mentions the factor of commitment in the use of e-learning. From the e-learning system viewpoint, [8] conduct research to measure e-learning system success by using the Information System Success Model – (ISSM/ D&M model) [9].

Recent studies have shown that some researchers have adopted the concept of psychology into the measurement of e-learning success which uses the D&M. This is because the D&M model was not fully able to capture the determinant of the success of e-learning [10], [1]. One of the concepts of psychology that have been used to measure the use of e-learning was self-efficacy. Self-efficacy variable was investigated by [11] and [12] which shows that this factor was a key component in online learning. However, the research conducted was limited to computer self-efficacy or technology self-efficacy. [13] on the other hand, shows that online learning self-efficacy (OLSE) has five dimensions. To the best of our knowledge, there has been no research which reveals the influence OLSE on e-learning success. This study uses OLSE and D&M model to measure the effect of OLSE on the success of an e-learning site. Thus this study was not only in line with the suggestion to validate OLSE [13] but also try to fill the existing research gap. The results obtained are expected to complement the determinants of the success of e-learning and enrich knowledge in online learning.

2. Previous Research and Methods
2.1. Distance Learning, Online Learning and E-Learning
There is no a definitive conclusion of the term distance learning, online learning and e-learning [14]. But some characteristics to each terminology exist. Distance learning is a form of two-way relationship between learners and instructor at a different time and/or place using various types of instructional media. While E-Learning is a way of learning by using electronic media. [14] stated that most authors described online learning as access to learning experiences via the use of some technology. The learning
environment can be identified as a Learning Management System (LMS), a Course Management System (CMS), a Virtual Learning Environment (VLE) or even a Knowledge Management System (KMS). With the breadth of the scope of the definition, some researchers have even begun to see the potential of online forums [15] and websites as learning platforms. [16] studies the influence of Youtube.com on teaching and learning. Based on the existing definition, the objects in this study, although cannot be classified as LMS or "e-learning system", can still be classified as "e-learning" or "online learning". More details about the object study are described in Section 2.5.

2.2. Self-Efficacy
Self-efficacy is at the core of Social Cognition Theory which was a concept developed by [17]. [11] stated Self-efficacy is the belief in one’s effectiveness in performing specific tasks. Later, the notion is elaborated, that a person is more likely to engage in a task if he feels that he can do so and vice versa. The positive effect of self-efficacy was indicated in [18], [19], [20] and [21]. [22] described self-efficacy in the context of e-learning as “confidence in one’s ability to perform certain learning tasks using an e-learning system”. [23] uses Computer self-efficacy as a good predictor of Web-based distance education course. [13] describes online learning self-efficacy (OLSE) in more depth and divide it into five dimensions. Based on his research this study uses the OLSE dimension developed, thereby indirectly validating the dimensions of self-efficacy that have been built. However, it should be noted that of all the dimensions and indicators available, not all of them were used. This is due to the limitations of e-learning sites (research object) used.

2.3. Research on E-Learning Success
Research using the D & M model in the context of e-learning was conducted by [2] which measured the relationship between worker performance after using e-learning. [24] analysed cultural factors (individual, collectivism) to develop e-learning success model. [25] combines TAM and ISSM models to determine the perspective of users towards eLearning. Several other studies have attempted to look at non-cognitive aspects of the use or success of a system. [1] includes elements of Grit [26] to determine their effect on the use of e-learning. [11] measure the "self-efficacy" factor in the use of e-learning and [12] which measure the relationship of self-efficacy with e-learning environmental quality. Previous studies have shown Self-Efficacy factors as a key role in e-learning success but only focus on the aspect of Computer Self-efficacy. This study aims to reveal the influence of OLSE on the success of an e-learning site, where the results can enrich the determinants of the D & M model which enrich the success factors of an e-learning.

2.4. Research Model and Hypothesis
D&M model has been widely accepted and used by researchers both for measuring the success of an Information System, measuring an application, modifying the model for measuring a system and merging with new constructs. This study aims to determine the influence of OLSE on the success of an e-learning site. The constructs of OLSE were referred to [13]. While the model used to measure e-learning success was the D&M model [9]. The research model used can be seen in figure 1. In the context of e-learning, self-efficacy is defined as "one's belief in the ability to do a job - (in this case: learning)" [22]. This theory has been widely used by researchers to reveal the behaviour of learning of a person. [27] and [28] identified the effect of self-efficacy for using e-learning. And [23] concluded that self-efficacy is a factor that can estimate the level of e-learning user satisfaction. Hence in this research have a hypothesis:
H1a&b – SE→US; SE→USE. OLSE (SE) has a positive and significant relationship to the use and user satisfaction of e-learning.

The quality of information is the ability of the system to produce useful information [1]. The availability of information in various forms (multimedia) supports the learning process [29]. Hence in this research have a hypothesis:
H2a IQ→Use. Information Quality has a positive and significant relationship to the use of e-learning.
The quality of information has been researched by previous researchers where it has several dimensions: ease of understanding, reliability, and relevance [9], [30], [31]. It was also supported by [31] that Information Quality has a strong influence on User Satisfaction. Therefore, this study has a hypothesis: H2b IQ→US. Information Quality has a positive and significant relationship to user satisfaction. System Quality has a strong relationship to system usage [31]. [1] Argued that if the system is well structured, this will encourage the use of e-learning systems. Hence in this study have hypotheses: H3a SQ→USE. System Quality has a positive and significant effect on the use of e-learning. System Quality affects user satisfaction [32]. [1] Argue that the quality of the system is a factor in the achievement of user satisfaction e-learning system. Hence, this research have hypotheses: H3b SQ→US. System Quality has a positive and significant influence on User Satisfaction (US).

The quality of service of the e-learning system is the response/service when there is a problem with the system [33], [32]. In addition, one important aspect was the availability of support services in the form of attention and willingness of the IT department to overcome difficulties faced by e-learning users. In the context of e-learning, service quality can affect the attitude of the system/user, and if the services provided are excellent, it will be the impetus for someone to use e-learning. Hence this research have hypotheses:

H4a SEQ→USE. Service quality positively and significantly influences the use of e-learning (Use). If the system is responsive and always available, users will be able to enjoy the service and will, therefore, be satisfied [3]. Therefore, this study have hypotheses:

H4b SEQ→US. Quality of service (Service Quality) positively and significantly affect the user satisfaction (user satisfaction).

As mentioned in [9] and affirmed in [31] that the USE precedes Satisfaction, it can be viewed that use is a predictor of individual impact and satisfaction. Therefore, this study have hypotheses:

H5 USE→US. Use affects positively and significantly to user satisfaction.

[1] proves that there is a positive impact between e-learning use (use) on the performance of individuals. The research shows that the more a person uses e-learning, the impact will be directly proportional. Therefore, this study have hypotheses:

H6. USE→IMPACT. Use variable positively and significantly influence to personal impact (individual impact).

Research show that system quality, system usage, user's behaviour and attitude are indicators of satisfaction which will lead to system success. Therefore, this study have hypotheses:

H7. US→IMPACT. Satisfaction has a positive and significant impact on personal impact.

All hypotheses integrated with the model can be seen in Figure 1.

2.5. Object of Study

The Object (in this case eLearning site) used was w3schools.com. It was selected because of its popularity and used by a various individual with a different educational background [34]. And most importantly, all respondents in this study have used w3schools.com. But regardless of the positive aspects, the object chosen has a limitations. The topics provided focuses only on web-based programming languages. Second, w3schools.com cannot be categorized as an e-learning system let alone classified as a Learning Management System. Thus some dimensional items from OLSE cannot be measured. Regardless of the limitations, w3schools.com can still be considered as the appropriate research object due to some consideration. The choices of material/topics provided were substantial and respondents in this study are students in the field of Information Technology. Last but not least, w3schools.com has features of practice and exam (hands-on). These aspects were expected for OLSE to have a role in the success of the research object.

2.6. Construct Operationalization

The constructs of OLSE was based on [13]. While the model used to measure e-learning success was the D&M model [9]. The OLSE Construct defined as independent variables with reflective items and related to the USE and US dependent variable. Information Quality measures the benefits of information...
and information reliability. System Quality measures the ease of navigation, structure and ease of finding information. Service Quality measures system updates and system reliability. Use variables measure the utilization rate of eLearning features, the frequency of use, and intention to reuse. User Satisfaction measures the level of user satisfaction. Individual Impact measures the number of benefits of the user perceived. Indicator items used in this study can be seen in Table 1.

Table 1. Variable Indicators

| Nr | Indicator | Statement | Variable |
|----|-----------|-----------|----------|
| 1. | SE11 | I am sure that I can complete all the tasks (e.g. quizzes) that exist in the e-learning site. | Self-Efficacy |
| 2. | SE12 | I believe I can master the difficult material | [13] – Factor 1 |
| 3. | SE13 | I am willing to accept the challenge | |
| 4. | SE14 | I am sure that I can complete all the stages that exist on e-learning site well. | |
| 5. | SE16 | I am sure that I can adapt to the e-learning environment | |
| 6. | SE17 | I am sure that I can independently evaluate the learning outcomes in online learning | |
| 7. | SE21 | I am sure that I can master the instructions on the e-learning site. | Self-Efficacy |
| 8. | SE22 | I am sure that I can use all the features | [13] – Factor 3 |
| 9. | SE23 | I am sure that I can run the features to engage (practice) in online learning actively | |
| 10. | IQ1 | The information available is helpful | Information |
| 11. | IQ3 | The information available is interesting | Quality - [9]; |
| 12. | IQ4 | The information available can be trusted | [1] |
| 13. | SQ1 | The e-learning site has easy-to-understand navigation | System |
| 14. | SQ2 | The e-learning site allows me to find the information I need easily | Quality - [9]; |
| 15. | SQ3 | The e-learning site has a good website structure | [1] |
| 16. | SQ4 | Online learning is easy to use | |
| 17. | SEQ1 | The e-learning has a mechanism for overcoming the problems that I am facing quickly | Service |
| 18. | SEQ2 | The system on e-learning site is up to date. | Quality - [9]; |
| 19. | SEQ3 | The system is reliable | [1] |
| 20. | USE1 | As I learn about a material, I use all the features available | USE - [9]; [1]; |
| 21. | USE2 | I often use the e-learning site. | [10]; [8]; [3] |
| 22. | USE3 | I use the e-learning site to find information | |
| 23. | USE4 | I use e-learning to assess my skills | |
| 24. | USE5 | I use e-learning to increase the chances of achieving better results. | |
| 25. | USE6 | I would like to use the e-learning site voluntarily | |
| 26. | Impact1 | The e-learning site helped me to solve the problem | Individual |
| 27. | Impact2 | The e-learning site increases my productivity | Impact - [9]; |
| 28. | Impact3 | The e-learning site makes it easier for me to do my work | [1]; [3] |
| 29. | Impact4 | The e-learning site is useful for me. | |
| 30. | US1 | If there is any chance to use online learning again, I will gladly do it. | User |
| 31. | US2 | I am satisfied with the learning process | Satisfaction - |
| 32. | US3 | I feel online learning gives me what I need | [9]; [1]; |
| 33. | US4 | I would like to take the theme / other lesson topics from online learning | |

2.7. Data Collection

All respondents came from only one university students in Surabaya – Indonesia, who have used w3schools.com, where all respondents fill out the online questionnaire. The number of respondents in this study was 101. With the composition of male respondents 66 and female 35.

3. Result and Discussion

Loading values of each item in Table 1 have values above 0.6 and P values below 0.05 so that the model formed has acceptable convergent validity. The test results in Figure 1 also show the structure analysis result which was described by $R^2$, path coefficient and P Value. The $R^2$ value describes the ability of an independent variable to support the dependent variable. Figure 1 shows that User Satisfaction (US) variable can be explained by the independent variable by 0.76, thus indicating that the model could support the factors User Satisfaction. For Personal / Individual Impact (Impact), independent variables could describe the dependent variable by 0.75. Use variable can be described by independent variable by 0.62. Those values indicate that the model can support/describe the independent variable adequately.
Figure 1 describes the results of the correlation between the variables/paths coefficients generated by Warp PLS.

![Figure 1. Structural Model Analysis Results](image)

Based on Figure 1, there are three path that have a P value above 0.05, so that the relationship is not significant. The three values are Hypothesis 1b, the relationship between SE → US, Hypothesis 2a, the relationship between IQ → Use, and Hypothesis 2b, the relationship between IQ → US. A more detailed explanation of the path coefficient will be explained in the next paragraph.

OLSE has a positive and significant relationship to Use. This indicates that the use of e-learning site will increase if the value of OLSE high. Thus H1a Hypothesis accepted. The results of this study enrich the research conducted by [11]. Which found that there was a strong influence between Self Efficacy (in this case computer's self-efficacy) in the use of e-learning. With regard to hypothesis 1b, the relationship between SE and US, the hypothesis was rejected, because no significant relationship was found. Apart from that, user satisfaction in using e-learning systems was obtained when users use the e-learning. These results reflected in the hypothesis 5.

Information Quality has a positive relationship to Use and User Satisfaction, but was not significant. Thus Hypothesis H2a and H2b Rejected. The results differ from those obtained in [1] and [25]. But these results reinforce existing findings in [31] that the relationship between Information Quality and Use does not have sufficient evidence to suggest that there is a strong relationship between the two. The narrow scope of topics offered by object study and also the Information Quality dimensions used was expected to affect this outcome. Another factor that might also support these results is that in this study the use of e-learning is mandatory. On the other hand hypothesis H3a, H3b, H4a, H4b, H5, H6 and H7 was accepted. These results support theories as explained in section 2.4. Summed up briefly, this study, which reveal the effect of OLSE on the success of e-learning sites can be explained as follows: that self-efficacy affects/supports the use of e-learning sites, the use of e-learning sites affect/ support user satisfaction, on the other hand, user satisfaction and USE has a positive and significant impact on the use of e-learning sites.

Based on the results of this study there are several implications. (1) E-learning users should be aware of the magnitude of self-efficacy factors, and thus must pro-actively improve their self-efficacy level. (2). Instructors who use e-learning as a learning medium should be able to support the improvement of student self-efficacy, especially if the instructor is involved in the learning process in blended learning process. (3). E-learning developers should be able to provide features that take into account the dimensions of the OLSE factor. (4). Further research still needs to be done to validate all
the dimensions of the OLSE toward existing E-learning systems and on different learning topics/subjects in different areas or countries.

4. Conclusions
This study has shown the positive effect of the OLSE [13] factor on e-learning success by using the D&M model [9]. But this research still has some limitations. The research object (e-learning site) used still cannot be classified into the Learning Management System, therefore some of the OLSE dimension couldn’t be incorporated into the research instrument. The limited scope of the research object also limits the dimensions of the D & M model that can be used. The sample size used in this study is also small and homogeneous. Future research is expected to overcome the existing constraints. Regardless of the limitations of the study. This research can provide an early foothold on research from the point of view of the "individual" factor, in this case, the OLSE towards the success of an e-learning system.

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