Analysis of Factors Affecting Continuance Intention of E-Learning Adoption in Lecturers’ Perspectives

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Abstract. E-learning is an internet-based learning program. It has been adopted in Institut Teknologi Sepuluh Nopember (ITS) since 2006, and called SAHRE-ITS. It is managed by Directorate of Academic Affairs in ITS. Despite quite long adoption in ITS, there are still a number of problems to confront. One of them is lack of intent of the lecturers as the main and vital users to adopt e-learning continuously. The research was to identify factors affecting the continuance intention of lecturers to adopt SHARE-ITS using some model: expectation–confirmation model (ECM), technology acceptance model (TAM), theory of planned behaviour (TPB), and FLOW theory. The variables used comprised 10 variables, i.e.: perceived usefulness, perceived ease of use, attitude, perceived enjoyment, concentration, subjective norm, perceived behavioural control, confirmation, satisfaction, and continuance intention. The results of the research indicate some factors affecting the continuance intention of the lecturers to use SHARE-ITS and suggest some recommendations for strengthening those factors. This research showed the factors of lecture’s satisfaction and perceived usefulness to SHARE-ITS positively and significantly affected the continuance intention to use SHARE-ITS. The factor of perceived ease of use among the lecturers positively and significantly affected the perceived usefulness among the lecturer towards SHARE-ITS. Those three factors were essential to consider as they affected the continued intention the lecturers to use SHARE-ITS. In addition, it is identified that the factor of perceived enjoyment in using SHARE-ITS by the lecturers positively and significantly affected their attitude in using SHARE-ITS. Accordingly, the researchers addressed recommendation within the contexts of service rendered by the administrator of SHARE-ITS, data integration, SHARE-ITS menu and navigation designs.

1. Introduction
The information technology advancement indisputably contributes positive impacts to the world in various spectrums, specifically in education sectors adopting information technology in their business processes. One of a great number of information technology contributions in education sectors is E-learning.
E-learning is an internet-based learning program functioning as pedagogical tools to address information pupils through interactions using computers [1]. Amer et al. [1], suggested that there are
five benefits for lecturers from the e-learning: (1) Ease for lecturers to update instructional materials (2) personal development or research for broadening insight (3) control over the study activities of the students and more flexible lecturing processes. Due to such various positive impacts it offers, many entities are fond of implementing e-learning. Unfortunately, there are many failures in implementing it due to low level of users’ continuance intention [2]. User continuance intention represents the users’ intention to continuously use products or services after the users have passed system acceptance phase [3]. There are cases where the users discontinued adopting e-learning after they had initially used it [4]. The User continuance intention in e-learning is the prime determinant and phase in the course of acceptance of a system adoption [5]. The stronger the user continuance intention is a system is, the more actual usage of the system will be [6].

There are a number of models adoptable for analyzing the User continuance intention, namely: Expectation–Confirmation Model (ECM), Technology Acceptance Model (TAM), Theory of Planned Behavior (TPB), and FLOW theory. Expectation–Confirmation Model (ECM) is a model used for analyzing the continuance of IT adoption [7]. It comprises 3 variables for explaining the continuance of usage intention: satisfaction, confirmation, and pre adoption expectation [7]. TAM is a model adopted from Theory of Reasoned Action (TRA) consisting of two important elements: Perceived ease of use and perceived usefulness [1]. TPB is a model developed from TRA explaining the intention of one to a behavior due to 2 main factors: attitude toward the behavior and subjective norms [8]. FLOW is described as a condition where those involved in an activity find no troubles [9].

At present, the adoption of e-learning is getting increased. Yet the degree of user continuance intention is still low [10]. The same happens to an e-learning system managed by Institut Teknologi Sepuluh Nopember (ITS) and called SHARE-ITS. It is administered by Directorate of Academic Affairs in ITS and was firstly launched in 2006 with 3 departments actively accepting SHARE-ITS: Information Systems Department, Informatics Department and Electrical Engineering Department. Unfortunately, despite long history of adoption in those departments, not all lecturers in those departments continuously adopt it. In addition, those three departments also operate other e-learning systems independently. In fact, the Directorate of Academic Affairs of ITS awaits that all departments can integrate and manage their subjects in SHARE-ITS in order that the Directorate of Academic Affairs can monitor, control and evaluate to maintain quality on-line lecturing.

Accordingly, the research was to analyze the factors affecting the user continuance intention in the perspective of lecturers as users of Share ITS. The perspective of lecturers was adopted as the on-line lecturing through SHARE-ITS as opened and initiated by the lecturers, instead of by the students. The research was to identify the factors affecting the intention of the lecturers to adopt SHARE-ITS sustainably and the bring positive contribution to the ITS Quality Assurance Bureau and Directorate of Academic Affairs in order that they can enhance the continuous adoption of SHARE-ITS by the lecturers for attaining the objectives of quality lecturing processes.

2. Literature Review

2.1. Previous Researches
A research on user continuance intention to e-learning by mixing the models of ECM, TAM, TPB, and FLOW was conducted by Ming-Chi Lee (2010). It was to identify the factors affecting the intention of students in the National Pingtung University in Taiwan to continuously adopt e-learning. The results of the research showed that: the variables of satisfaction, perceived usefulness, attitude, concentration, and perceived behaviour control positively and significantly affected the continued intention [6].

2.2. Conceptual Model
The conceptual model in the research was formulated based on some models, namely: ECM, TAM, TPB, and FLOW theories with variables of confirmation, satisfaction, perceived usefulness, perceived ease of use, attitude, continued intention, subjective norm, perceived behavior control, subjective norm, perceived enjoyment, and concentration [6].
Based on the above Figure 1, there are 4 dependent variables, comprising: Continued Intention, Satisfaction, Perceived Usefulness, and Attitude. In addition, there are 6 independent variables, i.e.: Confirmation, Perceived Ease of Use, Perceived Enjoyment, Concentration, Subjective norm, and Perceived Behaviour Control.

Confirmation is perception on suitability between compliance expectation and actual performance in a system [7]. The confirmation on this is the match between lecturers’ expectation and actual performance of the SHARE-ITS.

Perceived ease of use is a perception about ease of use of technology defined as a parameter where one perceived that computers are easy to understand and use [9]. The perceived ease of use in this research is a state of condition where lecturers perceive that it is easy to use SHARE-ITS.

Perceived enjoyment is perceived as fun when doing activities by using the system [9]. The perception on enjoyment in this research is a state of condition where lecturers perceive that it is fun when using the SHARE-ITS.

Concentration is a state of condition to focus concentration on a certain activity [11]. The concentration in this research is a state of condition where lecturers can focus their attentions when using the SHARE-ITS.

Subjective norm is a social norm from other people that can influence one to behave [8]. The subjective norm in this research is a state of condition from others driving the lecturers to use the SHARE-ITS. Perceived behavior control is a perception to ease or difficulty in doing activities affected by supports, resources and challenges [12].

The perceived behavior control in this research is a state of condition where it is easy or difficult to use SHARE-ITS as affected by the supports, resources and challenges.

Continued intention is the intention of users to continuously use a system [7]. The intention in this research is the intention of lecturers as users to continuously use SHARE-ITS.

Satisfaction is a state of condition where users are satisfied with expected performance of a system [7]. The satisfaction in this research is the contentment of lecturers in using SHARE-ITS. Perceived usefulness is a perception to usefulness of a technology [7].

The perceived usefulness in this research is the usefulness perceived by the lecturers in using SHARE-ITS.

Attitude is an outlook to the use of the system in form of an acceptance or rejection as an impact when users use a technology in undertaking
3. Research Methodology

3.1. Planning Phase
It is the first phase in the research methodology. It comprises 4 main processes, i.e.: conceptual model formulation, hypothesis formulation, population and sample determination, and questionnaire building and testing.

The conceptual model formulation is supposed to identify how the method will be adopted in the research. The conceptual model is used as a basis for analyzing each data testing and model testing. The researchers adopted quantitative approach. The data were explored through survey by distributing questionnaires to ITS lecturers of SHARE-ITS and as respondents. The data were analyzed by means of quantitative and objective statistical method through scientific calculations with reference to the responses given by the respondents completing the questionnaires.

The conceptual model in the research was formulated [6] without modification. The hypotheses were formulated to identify the relationship between dependent variables and independent variables, strengthened with moderate ones. The hypotheses were also formulated based on the formulated conceptual model [6]. The arrangement of the items of statements were cited based on the researches of Bhattachje (2001), Taylor & Tood (1995), Moon & Kim (2001) and Davis (1989).

The research subjects were ITS lecturers having used SHARE-ITS in the Information System Department, Informatics Department and Electronic Engineering Department, with minimum limit of respondents by 34% as suggested in the theory of Slovin. The prepared questionnaires were distributed to respondents both online and offline. The testing involved 20 respondents (minimum limit) completing the questionnaires. The results of the test suggested that 40 of the 44 items were state reliably and validly.

3.2. Implementation Phase
Descriptive statistical analysis was adopted to represent the questionnaire data processing results descriptively to identify the demography of respondents’ data. Having completed the descriptive statistical analysis, the researchers proceeded with instrument tests.

The instrument test was to identify the reliability of the measurement test and the extent of its reliability and validity. It was conducted by testing the reliability and validity of a data. The results of the test by means of SPSS Software showed that all items were reliable and valid. Next, it was followed with classical assumption test.

The classical assumption test was adopted to assure that the resulted regression equation was accurate and consistent in estimation and not bias [13]. It comprised normality, multicollinearity and heteroscedasticity tests. The results of the tests suggested that all data are reliable. Then, it was followed with inferential analysis.

The inferential analysis was conducted using SmartPLS Software. The model was tested and analyzed in term of outer model and inner one. The outer model test was to identify the reliability and validity of the items of indicator statement in a variable by observing the values of convergent validity, discriminant validity, composite validity, and average variance extracted (AVE). The results of the convergent validity test was valid as the loading factor of all indicator items was greater than 0.5, meaning that it was good, as the loading factor of each variable had the strongest correlation when compared to the one of other variables. The results of the composite reliability on each variable was good as the value of all composite reliability was greater than 0.7. Besides, the value of cronbach’s alpha was more than 0.6. Accordingly, it was conclusive that the research variables were reliable to represent the original data scores.

Having completed the outer model test, the researchers proceeded with inner model test. The results of the inner model test showed that the regression coefficient was of all variable relationship was positive and its level of significance was more 1.68. There were 4 variable relationships having positive regression coefficient with level of significance (T-Statistic) more than 1.68, meaning that the relationships were positive and significant. The following are the results of
inner model test using SmartPLS:

### Table 1. Value of Path Coefficients

| Variable Relationship | Name of Relationship | Parameter Coefficient | T-Table | T-Statistic |
|------------------------|----------------------|-----------------------|---------|------------|
| AT -> CI               | Attitude -> Continued Intention | 0.139                 | 1.697   | 0.587      |
| CC -> AT               | Concentration -> Attitude | -0.099                | 1.697   | 0.516      |
| CC -> CI               | Concentration -> Continued Intention | -0.649               | 1.697   | 0.225      |
| CF -> PU               | Confirmation -> Perceived Usefulness | 0.256                 | 1.697   | 1.424      |
| CF -> SF               | Confirmation -> Satisfaction | 0.279                 | 1.697   | 1.081      |
| PBC -> CI              | Perceived Behaviour Control -> Continued Intention | -0.075               | 1.697   | 0.277      |
| PE -> AT               | Perceived Enjoyment -> Attitude | 0.622                 | 1.697   | 4.054      |
| PE -> CI               | Perceived Enjoyment -> Continued Intention | 0.035               | 1.697   | 0.152      |
| PEU -> AT              | Perceived Ease of Use -> Attitude | 0.219                | 1.697   | 0.853      |
| PEU -> PU              | Perceived Ease of Use -> Perceived Usefulness | 0.460               | 1.697   | 2.819      |
| PU -> AT               | Perceived Usefulness -> Attitude | 0.200                | 1.697   | 1.282      |
| PU -> CI               | Perceived Usefulness -> Continued Intention | 0.361              | 1.697   | 1.842      |
| PU -> SF               | Perceived Usefulness -> Satisfaction | 0.001               | 1.697   | 0.003      |
| SF -> CI               | Satisfaction -> Continued Intention | 0.667                | 1.697   | 2.900      |
| SN -> CI               | Subjective Norm -> Continued Intention | 0.018              | 1.697   | 0.102      |

Based on the above table, it was found that the variable relationships positively and significantly affecting were: (1) Perceived enjoyment to attitude. (2) Perceived ease of use to perceived usefulness. (3) Perceived usefulness to continued intention. (4) Satisfaction to continued intention.

Next to the calculation of R-Square. R-Square is a statistical measure to know how close the data are to the fitted regression. R-Square is also known as the coefficient of determination, or the coefficient of multiple determination for multiple regression. 0% indicates that the model explains none of the variability of the response data around its mean. The following were the values of R-Square resulted by SmartPLS:

### Table 2. Value of R Square

| R Square of Latent Variable | Variable |
|-----------------------------|----------|
| AT                          | 0.622    |
| CI                          | 0.716    |
| PU                          | 0.322    |
| SF                          | 0.078    |
Based on the above Table, each of the variables was analyzed:

- The $R^2$ of Attitude was 0.622, suggesting that Attitude could be explained by the variability of concentration, perceived enjoyment, perceived ease of use, and perceived usefulness by 62.2%.
- The $R^2$ of continued intention was 0.716, suggesting that continued intention could be explained by the variability of attitude, concentration, perceived behaviour control, perceived enjoyment, perceived usefulness, satisfaction, and subjective norm by 71.6%.
- The $R^2$ of perceived usefulness was 0.322, suggesting that perceived usefulness could be explained by the variability of confirmation, and perceived ease of use by 32.2%.
- The $R^2$ of satisfaction was 0.078, suggesting that satisfaction could be explained by the variability of perceived usefulness by 7.8%

Having identified the path coefficient, the hypotheses proposed based on the conceptual model of the research through bootstrapping on the structural model were tested to identify whether they were accepted or declined. The following were the research hypotheses:

![Figure 2. Research Hypotheses (Researchers, 2016)](image)

A hypothesis is accepted when having positive loading factor and value of $T$-statistic greater than the one of $T$-Table. The following were the results of the hypothesis test:
Table 3. Results of Hypothesis Test

| Hypotheses | Parameter Coefficient | T-Statistic | Remarks                  | Result   |
|------------|-----------------------|-------------|--------------------------|----------|
| SF -> CI   | 0.667                 | 2.900       | Affecting & Significant  | Accepted |
| CF -> SF   | 0.279                 | 1.081       | Affecting & Not Significant | Rejected |
| PU -> SF   | 0.001                 | 0.003       | Affecting & Not Significant | Rejected |
| PU -> CI   | 0.361                 | 1.842       | Affecting & Significant  | Accepted |
| CF -> PU   | 0.256                 | 1.424       | Affecting & Not Significant | Rejected |
| PU -> AT   | 0.200                 | 1.282       | Affecting & Not Significant | Rejected |
| PEU -> AT  | 0.219                 | 0.855       | Affecting & Not Significant | Rejected |
| PEU -> PU  | 0.460                 | 2.819       | Affecting & Significant  | Accepted |
| AT -> CI   | 0.139                 | 0.587       | Affecting & Not Significant | Rejected |
| SN -> CI   | 0.018                 | 0.102       | Affecting & Not Significant | Rejected |
| PBC -> CI  | -0.075                | 0.277       | Not Affecting & Not Significant | Rejected |
| PE -> AT   | 0.622                 | 4.054       | Affecting & Significant  | Accepted |
| PE -> CI   | 0.035                 | 0.152       | Affecting & Not Significant | Rejected |
| CC -> AT   | -0.099                | 0.516       | Not Affecting & Not Significant | Rejected |
| CC -> CI   | -0.049                | 0.225       | Not Affecting & Not Significant | Rejected |

With reference to the above Table 3, it suggested that there were 4 hypotheses accepted, i.e.: the hypotheses explaining the relationships between perceived enjoyment to attitude, Perceived Ease of Use to perceived usefulness, perceived usefulness to continued intention and satisfaction to continued Intention.

4. Research Findings and Discussion

4.1. Effect of Satisfaction to Continued Intention

Based on the results of inferential analysis it was found that satisfaction variable positive and significantly affected continued intention, as the value of the parameter coefficient was 0.667 and the one of t-statistic was 2.900. The value of parameter coefficient was used to explain that the positive relationship between satisfaction and continued intention. The value of T-Statistic that was greater than the one of T-Table was adopted to explain that there was significant relationship between satisfaction and continued intention. Accordingly, it was conclusive that there was positive and significant relationship between satisfaction and continued intention.

The following are recommendations for better relationship in between those two variables:

- Enhancing service deliveries through SHARE-ITS helpdesk; and
- Coordinating better with the Directorate of Information Technology and Communication in ITS

4.2. Effect of Perceived Usefulness to Continued Intention

Based on the results of inferential analysis it was found that Perceived Usefulness variable positive and significantly affected continued intention, as the value of the parameter coefficient was 0.361 and the one of t-statistic was 1,842. The value of parameter coefficient was used to explain that the
positive relationship between Perceived Usefulness and continued intention. Therefore, it was conclusive that there was positive and significant relationship between Perceived Usefulness and continued intention.

The following are recommendations for better relationship in between those two variables:

- Making enhancement and exploration of features complained by the lecturers; and
- Integrating data in SHARE-ITS with the ITS Academic Information System as these two factors are related with academic process.

4.3. Effect of Perceived Ease of Use to Perceived Usefulness

Based on the results of inferential analysis it was found that Perceived Ease of Use variable positive and significantly affected Perceived Usefulness, as the value of the parameter coefficient was 0.460 and the one of t-statistic was 2.819. The value of parameter coefficient was used to explain that the positive relationship between Perceived Ease of Use and Perceived Usefulness. The value of T-Statistic that was greater than the one of T-Table was adopted to explain that there was significant relationship between Perceived Ease of Use and Perceived Usefulness. Consequently, it was conclusive that there was positive and significant relationship between Perceived Usefulness and continued intention.

The following is a recommendation for better relationship in between those two variables: Simplifying navigation through deeper explorations (by trainings or continuous usage to get accustomed).

4.4. Effect of Perceived Enjoyment to Attitude

Based on the results of inferential analysis it was found that Perceived Enjoyment variable positive and significantly affected Attitude, as the value of the parameter coefficient was 0.460 and the one of t-statistic was 2.819. The value of parameter coefficient was used to explain that the positive relationship between Perceived Enjoyment and Attitude. The value of T-Statistic that was greater than the one of TTable was adopted to explain that there was significant relationship between Perceived Enjoyment and attitude.

Thus, it was conclusive that there was positive and significant relationship between Perceived Enjoyment and Attitude.

The following is a recommendation for better relationship in between those two variables: Enhancement of user interface by SHARE-ITS Administrator.

5. Conclusion

Based on the results of the research to identify the factors affecting the continuous intention of lecturers to use SHARE-ITS, it was concluded as follows:

- Satisfaction variable had positively and significantly affected the continued intention variable;
- Perceived usefulness variable had positively and significantly affected the continued intention variable;
- Perceived ease of use variable had positively and significantly affected the perceived usefulness variable; and
- Perceived enjoyment variable had positively and significantly affected the attitude variable.

And, it was found that there were factors directly affecting the continued use of SHARE-ITS by the lecturers, namely: satisfaction and perceived usefulness, while the one indirectly affecting the continued use of SHARE-ITS by the lecturers was the perceived ease of use. In fact, not all lecturers perceived that it was easy to use SHARE-ITS. In addition, there was a factor not related with continued intention to use SHARE-ITS by lecturers, i.e.: perceived enjoyment when using SHARE-ITS.

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