The Analysis of E-Learning Model with Technology of Acceptance Model (TAM) Method in Faculty of Computer Science Sriwijaya University

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Abstract. Sriwijaya University is one of the state universities located on the island of Sumatra, precisely in south Sumatra. It has 10 Faculties, and one of them is faculty of Computer Science (Fasilkom). As one of the best universities with A accreditation, Sriwijaya University always improves the learning system to make it easier for academic community to do teaching and learning process to be more effective and efficient. Therefore, its faculty of Computer Science also applies the learning process using e-learning. That is why we need a method of Technology Acceptance Model (TAM) to analyze the level of student acceptance of the implementation of e-learning because with the e-learning, lecturers, students and employees in Fasilkom can conduct the learning process more easily and quickly. In addition, with the implementation of e-learning, students and lecturers can do the teaching-learning process without having face-to-face sessions in the classroom. The students can also directly interact and discuss each other in terms of group work.

1. Introduction
In this era of globalization, the role of technology is very influential on the development of the world. Especially in the field of education, technology can support the development of education. For example, Sriwijaya University that has been using e-learning as a medium of learning between students and lecturers. E-learning can be used by every faculty at Sriwijaya University. One of them is faculty of Computer Science. With e-learning students and lecturers of faculty of Computers Science can share the subject materials, manage online discussions, and also send assignments. The use of e-learning in faculty of Computer Science, Sriwijaya University greatly supports the learning process for both students and lecturers. Therefore, we did an evaluation on the acceptance of e-learning in Sriwijaya University for students of faculty of Computer Science. The goal is to find out if the e-learning that has been used is running well, effectively, efficiently, and accepted and well-used by the students. The result of the evaluation is to find out what factors affect the acceptance of e-learning are, so that these factors can be used as a parameters in developing e-learning for the future. The importance of this
research is to determine whether the learning process by e-learning can improve the quality of learning or the students knowledge

2. Literature Review

The majority of the university students are generation Y and Z and they are known as digital natives. It is expected that using technology in teaching and learning is the most appropriate and wise decision done by the university to implement online learning [5]. According to Proffitt, 2008 [8] research on e-learning involves several studies that investigate the influence of some students' attributes on their acceptance and usage of online technology. Students' preference for an online delivery system could be attributed to their perceived ease of use which would be evident from their competence in using the internet and electronic communication, alongside their ability to engage in autonomous learning [1].

According to Hernandez Gracia, 2012 [4] among all these models, the most extended one is the TAM (Technology Acceptance Model). This model has been subject to modifications by researchers, both to adapt it to different contexts and to increase the percentage of variance it can explain by adding new construct from other theories. According to Dasgupta et al, 2002 [7], technology acceptance model can be enhanced with the measures of student performance from course-related assessments.

According to Avlonitis & Panagopoulos [10], TAM, usage behavior is determined by intentions towards using the system, while intention is jointly determined by two related beliefs: perceived ease-of-use [PEOU] and perceived usefulness [PU]. Two antecedent factors that the literature generally agrees on are facilitating or enabling conditions or the degree to which technology is perceived to be supported and subjective norm or the degree to which technology is perceived to be adopted by society. According to King & He and Sun & Zhang [6], many other antecedent factors have been proposed to moderate the relationships between core factors, including demographic characteristics, such as age, gender, and cultural context, and other situative factors that can be classified by belief modality (i.e., necessity, certainty, and probability/conditionality) as modalities influence decisions and behaviors in different ways.

According to Davis [3], this study develops a technology acceptance model that integrates the innovation diffusion theory, perceived risk and trust in the classic TAM model in order to shed light on what factors determine user acceptance of mobile banking applications. The participants had to examine a mobile application of the largest European bank. In the proposed model, an approach to external influences was included, theoretically and originally stated. Additionally, according to Kim [9], the supposition that those traits are variables of TAM finds considerable support in the attitude-behavior models from the social psychology literature.

According to Gong, Ong, TAM has also been extended to address constructs of computer self-efficacy. The research from Gong [2], shows that computer self efficacy directly influences the ease of use and the intention to use technologies to support learning. According to Dasgupta [11], technology acceptance model can be enhanced with the measures of student performance from course-related assessments.

3. Methodology

The type of research that we use in this journal is quantitative research. In the process of retrieving data, the researchers conducted a questionnaire. The data analysis method that we use is descriptive statistics method. The research aims to prove the hypothesis from the questionnaires given to the students in faculty of Computer Science of Sriwijaya University. The questionnaire is about the acceptance of e-learning technology that has been applied in teaching and learning process with Technology Acceptance Model (TAM) approach, which then is analyzed using SPSS.

In this study, the primary data was obtained from the questionnaires administration and the secondary data was from several samples of students from each department in faculty of Computer Science. With the use of TAM, it will be easy to analyze the factors that can affect the users at accepting e-learning. The related variable is the variable of technology acceptance, in this case the
acceptance of e-learning. There are 5 variables in this TAM method approach: (H1) perceived ease of use, (H2) perceived usefulness, (H3) perceived ease of use (H4), behavioural intention and (H5) actual system use.

4. Results and Discussion

From the collected questionnaires, 77 respondents gave different answers to the effect of perceived ease of use. From the results, chi-square test was performed using SPSS to perform hypothesis testing on the relative proportions of the already grouped cases.

### Table 1. Perceived Ease of Use (PEU)

| Observed N | Expected N | Residual |
|------------|------------|----------|
| Is easy to learn | 23 | 19.2 | 3.8 |
| Makes what the students do easier | 17 | 19.2 | -2.2 |
| Adds up students skills | 20 | 19.2 | .8 |
| e-learning is easy to understand | 17 | 19.2 | -2.2 |
| Total | 77 | | |

**Test Statistics**

|               | PEU         |
|---------------|-------------|
| Chi-Square    | 1.280*      |
| df            | 3           |
| Asymp. Sig.   | .733        |

*0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 19.3.

**Figure 1.** The result of perceived ease of use (PEU) using chi-square

Analysis of the results of the data:

1. Hypothesis
   Ho: Perceived ease of use has a positive impact on the acceptance of e-learning in faculty of Computer Science, Sriwijaya University.
   H1: Perceived ease of use does not positively affect the acceptance of e-learning in faculty of Computer Science, Sriwijaya University.

2. If X2 count > X2 table α 0.05 dk (k-1, then Ho is rejected [H1 accepted]) If X2 count < X2 table α 0.05 dk (k-1, then Ho is accepted)

3. Conclusion
   The value of X2 table with α 0.05 with dk = 4 - 1 = 3 is 7.815 while the value of X2 count is 1.286. So X2 count = 1.286 < X2 table α 0.05 dk 3 = 7.815. Thus Ho is accepted and H1 is rejected. Consequently, perceived ease of use has a positive impact on the acceptance of e-learning in faculty of Computer Science, Sriwijaya University.

### Table 2. Perceived ease of use (PEU) from perception of use

| Observed N | Expected N | Residual |
|------------|------------|----------|
| Makes the tasks easy | 21 | 19.2 | 1.8 |
| Is very useful | 28 | 19.2 | 8.8 |
| Increases productivity | 6 | 19.2 | -13.2 |
| Increases work performance | 22 | 19.2 | 2.8 |
| Total | 77 | | |

The table above is the result of frequency that has been filled by 77 respondents from the students of faculty of Computer Science. The result then is analyzed using SPSS.
Data result analysis:

1. **Hypothesis**
   
   **Ho:** Perceived usefulness has a positive impact on the acceptance of e-learning at faculty of Computer Science, Sriwijaya University.
   
   **H1:** Perceived usefulness does not have a positive impact on acceptance of e-learning at faculty of Computer Science, Sriwijaya University.

   Based on the analysis from 77 students of faculty of Computer Science, the results are: 27% of the respondents said the learning model with e-learning can facilitate the work. 36% of them mentioned the learning model with e-learning is very useful. The other 8% stated that the learning model with e-learning can improve productivity. Last, 28% of the respondents said the learning model with e-learning can intensify work performance.

   **Figure 2.** Results of perceived ease of use (PEU) using chi-square

   | Test Statistics | PU   |
   |-----------------|------|
   | Chi-Square      | 13.649* |
   | df             | 3     |
   | Asym. Sig.      | .003  |

   a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 19.3.

2. **Conclusion**
   
   The value of X² table with α = 0.05 dk (k-1) = 7.815 while X² count is 13.694. So X² count > X² table α = 0.05 dk (k-1), then Ho is rejected [H1 compared]. Consequently, perceived usefulness does not have a positive impact on acceptance of e-learning in faculty of Computer Science in Sriwijaya University.

3. **Table 3.** Perceived ease of use (PEU) of behavioral intent

   | Observed N | Expected N | Residual |
   |------------|------------|----------|
   | Always use e-learning | 19 | 25.7 | -6.7 |
   | Use it in every opportunity | 33 | 25.7 | 7.3 |
   | Intend to always use e-learning | 25 | 25.7 | -.7 |
   | Total | 77 | | |
This last table is the result of the frequency that has been filled by 77 respondents of the students from faculty of Computer Science about behavioral intention or the actors intention which will be analyzed using SPSS.

|                |     |
|----------------|-----|
| Chi-Square     | 3.844* |
| df             | 2   |
| Asymp. Sig.    | 1.46 |

*0 cells (0%) have expected frequencies less than 5. The minimum expected cell frequency is 25.7.

**Figure 4. Result of perceived ease of use (PEU) using chi-square**

Analysis:
1. **Hypothesis**
   - Ho: Behavioral intention has a positive impact on the acceptance of e-learning at faculty of Computer Science, Sriwijaya University.
   - H1: Behavioral intention perception does not have a positive impact on the acceptance of e-learning at faculty of Computer Science in Sriwijaya University.
2. If $X^2$ count $> X^2$ table $\alpha$ 0.05 $dk \ (k \ - \ 1$, then Ho is rejected [H1 accepted] ) If $X^2$ count $< X^2$ table $\alpha$ 0.05 $dk \ (k \ - \ 1$, then Ho is accepted
3. **Conclusion**
   - The value of $X^2$ table with $\alpha$ 0.05 with $dk = 3 \ - \ 1 = 2$ is 5.911 while the value of $X^2$count is 3.844. So $X^2$ count = 3.844> $X^2$ table $\alpha$ 0.05 $dk = 2 = 5.911$. Thus Ho is accepted and H1 is rejected. Consequently, perception behavioral intention has a positive impact on the acceptance of e-learning in faculty of Computer Science, Sriwijaya University.

5. **Conclusion**
   - Based on the research results that has been done through the administration of questionnaires to the students of faculty of Computer Science in Sriwijaya University, the results for perceived ease of use (variable 1) had produced an acceptable Ho, in which perceived ease of use has a positive impact on acceptance of e-learning at faculty of Computer Science Sriwijaya University. Then behavioral intention (variable 3) had produced an acceptable Ho, where behavioral intention has a positive impact on the acceptance of e-learning in faculty of Computer Science, Sriwijaya University. In addition, perceived usefulness (variable 2) has produced an acceptable H1, while perceived usefulness does not have positive impact to acceptance of e-learning at faculty of Computer Science, Sriwijaya University.

**References**
[1] Ibrahim A 2018 Implementing customer relationship management to increase education service using service quality method *Journal of Information Systems Engineering and Business Intelligence* 4 2 pp 148-155
[2] Dinçer S and Sahinkayasi Y 2011 A cross-cultural study of ICT competency, attitude and satisfaction of Turkish, Polish and Czech university students *Turkish Online J. Educ. Technol.* 10 4 pp 31–38
[3] Muñoz-Leiva F, Climent-Climent S and Liébana-Cabanillas F 2017 Determinantes de la intención de uso de las aplicaciones de banca para móviles: una extensión del modelo TAM clásico *Spanish J. Mark.* – *ESIC* 21 1 pp 25–38
[4] Sánchez-Prieto J C, Olmos-Migueláñez S and García-Peñalvo F J 2017 MLearning and pre-service teachers: An assessment of the behavioral intention using an expanded TAM model *Comput. Human Behav.* 72 pp 644–654

[5] Hussein Z 2017 Leading to intention: The role of attitude in relation to technology acceptance model in e-learning *Procedia Comput. Sci.* 105 December 2016 pp 159–164

[6] Lemay D J, Morin M M, Bazelaïs P and Doleck T 2018 Modeling students’ perceptions of simulation-based learning using the technology acceptance model *Clin. Simul. Nurs.* 20 pp 28–37

[7] Cheung R and Vogel D 2013 Predicting user acceptance of collaborative technologies: An extension of the technology acceptance model for e-learning *Comput. Educ.* 63 pp 160–175

[8] Farahat T 2012 Applying the technology acceptance model to online learning in the egyptian universities *Procedia - Soc. Behav. Sci.* 64 pp 95–104

[9] Pantano E and Di Pietro L 2012 Understanding consumer’s acceptance of technology-based innovations in retailing *J. Technol. Manag. Innov.* 7 4 pp 1–19

[10] Avlonitis G J and Panagopoulos N G 2005 Antecedents and consequences of CRM technology acceptance in the sales force *Ind. Mark. Manag.* 34 4 pp 355–368

[11] Harrigan P and Choudhury M M 2012 Technology acceptance model and the social crm: a model for customer engagement *Acad. Mark.* pp 1–9