Simulink Matlab applications program in power system: Study of effect of simulink matlab program acceptance in power system analysis

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Abstract. The Simulink Matlab application program in electrical power system analysis needs acceptance from its users. This research is purposed to investigate the effect of Simulink Matlab application program acceptance to power system analysis. This research uses a quantified approach. The sample of this research is 119 students using the Simulink Matlab application program to do power system analysis. The data is analyzed with path analysis with the Partial Least Square approach. The result shows that the perception of ease has a direct effect to the perception of usage, behavior, and intention to use the Simulink application program with the path coefficient of 0.581, 0.574, and 0.249 respectively; the perception of usage and easiness in the usage of the Simulink application program has a direct effect to behavior in using the Simulink application program with the path coefficient of 0.218 and 0.574 respectively; the behavior in using the Simulink application program has a direct effect to the intention in using the Simulink application program with the path coefficient of 0.581, and the intention in using Simulink application program has a direct effect to the usage of the real Simulink Matlab application program with the path coefficient of 0.491. This research concludes that the usage of the Simulink application program for power system analysis is affected by the easiness and the usage of the application as well as the attitude of users.

1. Introduction
The Simulink program from Matlab can help the students of the electrical engineering study program in power system analysis. Even though there are many benefits from the application program, there will be many obstacles and failures if not planned well. Chapnick and Gold in Aydm concluded that unplanned ICT utilization would fail [1]. Aydin dan Tasci concluded that e-learning implementation is needed in increasing the quality of human resources [2]. The Simulink application program is very dependent on the user so that it has to consider the socio-cultural aspect of the users. The research of Daryanto et al. in ICT usage in school management found that user motivation has a significant effect on school success [3]. In line with that, the research of Mohammad Chuttur concluded that ICT usage is a predicted response with the user motivation in their turn is directly affected with the external stimulus to the skills and real system features [4]. Daryanto et al. also found that the perception of
Ease of ICT usage will increase school management effectiveness [5]. ICT adoption in school management is also affected by the leadership model, especially authentic leadership.

2. Methods
This research used path analysis with Partial Least Square approach. Simulink is used to analyze voltage drop in the power system, which consists of voltage sources, transmission lines, and loads such as Figure 1.

![Figure 1. Electrical power system in simulink Matlab.](image)

The behavior of the power system is observed with a scope that shows numerical data and graphs after doing the simulation in Simulink. Moreover, the behavior of Simulink users for power system analysis can be seen from the path analysis with a p-value of less than 0.05 for the alpha of 5%. The hypothesis of the research is verified if t-calculated > t-table. The value of t-table for the level of confidence of 5% is 1.96. Furthermore, the path coefficient with a value of less than 0.1 has a weak influence and cannot be predicted directly.

3. Results and discussion
The graph of voltage simulation on the acceptance and delivery side of the power system is shown in Figure 2.

![Figure 2. Voltage simulation result in simulink Matlab.](image)
The path coefficient and latent variable relationship that shows the structural model is shown on figure 3 below:

![Diagram of path coefficients and latent variables](image)

**Figure 3.** Research latent variable relationship with path coefficient.

| Path Coefficient | Original Sample (O) | Sample Mean (M) | Standard Deviation (STDEV) | T Statistics (|O/STDEV|) | P Values |
|------------------|---------------------|----------------|---------------------------|------------------------|---------|
| Easiness → Usage | 0.581               | 0.579          | 0.058                     | 10.018                 | 0.000   |
| Easiness → Intention in usage | 0.249               | 0.243          | 0.084                     | 2.979                  | 0.002   |
| Usage → Behavior in usage | 0.574               | 0.576          | 0.070                     | 8.168                  | 0.000   |
| Behavior in usage → Intention in usage | 0.581               | 0.589          | 0.073                     | 7.999                  | 0.000   |
| Intention in usage → Simulink real usage | 0.491               | 0.496          | 0.059                     | 8.294                  | 0.000   |

Table 1 shows that the perception of easiness affects the perception of usage, behavior, and intention in using the Simulink Matlab application program in power system analysis. The perception of usage also affects the behavior to use the Simulink application program. Moreover, behavior in using the program affects the intention of using the program. The intention of usage affects Simulink-program's real usage. The perception of easiness in ICT usage is defined as tiers, where a person believes that using ICT will free the person from all physical and mental effort [6]. The relationship of the behavior of ICT usage to the intention to use ICT has an implication that everything is equal. People create an intention to do a behavior that has positive impacts on themselves. The relationship of the perception of usage with the user’s intention to use ICT is based on the views that in organization management, people with the intention to do behavior will have their performance increased.

The behavior in using things according to Aakers dan Myers is the behavior of like or not-like to the usage of a product [7]. That behavior can be used to predict the intention of a person to use a product or not. According to that definition, the behavior of a person consists of the component of cognition, affection, and the component which has a relation to his/her behavior. The behavior of computer users...
can also be shown with the optimistic behavior that believes that computers can be very helpful and beneficial to solve problems or works. Triandis concluded that a leader has to motivate the subordinates in using ICT with positive behavior [8].

Jalaluddin concluded that a person’s interest in responding to stimulus is affected by internal and external factors [9]. Internal factors consist of the habit (tendency to maintain a specific mindset which only sees a problem from one point of view), interest (condition when a person sees a temporal characteristic of a situation that is connected to his/her needs), emotion (a person’s biological condition).

On the other hand, external factors consist of movement, stimulus intensity, novelty, and repetition. Visually, a person will be interested in moving objects, prominent stimulus, as well as new, different, and repeated things.

A person’s interest in using ICT can be seen from his/her ICT usage level so that it can be predicted from his/her behavior to the technology, such as the intention to add supporting tools, the motivation to use technology, and the willingness to motivate other users.

A person will do a behavior if he/she has an intention or interest to do that. A principal will be happy to engage and facilitate all school residents to be happy in using ICT.

Actual system usage is a real condition in using the system [10]. In the context of information technology system usage, the behavior is defined in real usage, which is a measuring form to frequency and duration in using the technology. Therefore, the real usage is measured with spent time interacting with technology and the value of usage frequency. A person will be satisfied with using the system if he/she believes that the system is easy to use and able to increase productivity, which is reflected by real usage conditions.

4. Conclusion

According to this research, empirical facts in Simulink application software acceptance used to do power system analysis is gathered. The acceptance is affected by the easiness and the program usage in analyzing the power system. User motivation gives an important role, which is very decisive in Simulink application usage in analyzing the power system.

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