# Computer Application Anxiety, Self-Efficacy and Open Source Learning Management System Acceptance

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*Abstract:* - The paper reports a pilot implementation of Claroline an open source learning management system at a public institution of higher learning in Malaysia. The objectives of the research were to establish whether there were relationships between (1) computer application anxiety and system acceptance (2) self-efficacy and system acceptance. The research was conducted with postgraduate business students as research participants who are users of the system. They were encouraged to use the functions available in Claroline although not mandatory. A survey questionnaire was used as the instrument. The research found that contrary to past finding there was no relationship between computer application anxiety and system acceptance. There was a positive and significant relationship between self-efficacy and system acceptance.

*Key-Words:* - Computer application anxiety, self-efficacy, open source software, learning management system, e-learning

## 1 Introduction

The Internet has shaped new business rules, the way people do business and the approaches to learning. With easy access to the Internet, computers have become so pervasive that business transactions and learning take place anywhere and anytime.

A couple of decades ago, new systems would require years to be implemented. With open source software, implementation of a new system can be done in just a matter of a day. For learning management system, open source software presents a variety of options for users to select from. Online Learning and Training (OLAT), OpenElms, Moodle, Sakai Project and Claroline are among popular brands. From educational policy makers' perspective, benefits to implementation of open source learning management systems include among others minimal spending on system development and implementation, facilitating ease in interactions between students and instructors, and reducing costs for paper-based materials.

## 2 Problem Formulation

Although open source software presents benefits to educators and educational policy makers, it may present challenges to students as users. In particular, users may not be ready for immediate adoption of open source software when they have been accustomed to paper-based lecture notes, thick folders and paper-based assignment submission. The research explores the relationship between computer application anxiety, self-efficacy and acceptance of open source learning management system.

Thus, the research question is formulated accordingly: ***Do computer application anxiety and self-efficacy correlate to system acceptance?***

## 3 Problem Solution
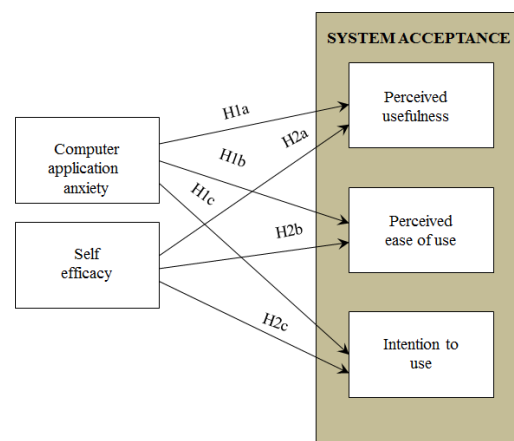
Fig.1 shows the research model.



Fig. 1 Research Model

The research builds on computer anxiety, social cognitive theory and technology acceptance model (TAM). The notion of computer anxiety arises out

of the fast development of technology coupled with individuals' phobia of dealing with computers [6]. Accordingly, individuals with computer anxiety have negative attitudes towards computers, low motivation and low performance [6]. Prior researches found significant and negative relationship between computer anxiety and computer attitudes [8]; between computer anxiety and perceived ease of use [11]; between computer anxiety and intention to use a system [9]. In their research, computer anxiety is correlated to perceived ease of use.

The social cognitive theory defines the existence of a dynamic relationship among personal, behavioural and environmental factors. In this interaction, self-efficacy is a key construct underlying social change [1] and that it is defined as individuals' beliefs about the ability to perform a specific behavior [2]. Accordingly, self-efficacy has been found to correlate to perceived ease of use and perceived usefulness [5]. Lee et al. [10] found that self-efficacy is correlated to Web-usage intention. Hussein et al. [7] found positive and significant relationship between self-efficacy and perceived usefulness. They did not find relationship between self-efficacy and perceived ease of use.

The TAM postulates perceived usefulness and perceived ease of use as two theoretical constructs that determine system use [3]. Davis [3] conceived "perceived usefulness as the degree to which a person believes that using a particular system would enhance his or her job performance". Perceived ease of use is "the degree to which a person believes that using a particular system would be free of effort" [3]. TAM posits that perceived ease of use and perceived usefulness are causally linked to attitudes, intentions and actual use (behaviour) [3]. Davis [3] suggested that external variables such as system features documentation and training affect perceived usefulness and perceived ease of use. In this research, we conceptualised individuals' computer application anxiety and self-efficacy as external variables. System acceptance for this research comprises perceived usefulness, perceived ease of use and intention to use. Thus, we hypothesise:

**H1a**: Computer application anxiety is significantly and negatively correlated to perceived usefulness of open source learning management system.
**H1b**: Computer application anxiety is significantly and negatively correlated to perceived ease of use of open source learning management system.
**H1c**: Computer application anxiety is significantly and negatively correlated to intention to use open source learning management system.

**H2a**: Self efficacy is significantly and positively correlated to perceived usefulness of open source learning management system.
**H2b**: Self efficacy is significantly and positively correlated to perceived ease of use of open source learning management system.
**H2c**: Self efficacy is significantly and positively correlated to intention to use open source learning management system.

### 3.1 Context
The research was conducted with postgraduate business students as research participants at a public institution of higher learning in Malaysia. A survey questionnaire was used as the instrument. Claroline, an open source learning management system was chosen for pilot implementation for a particular course in an eight-week semester. Students of the course were encouraged to use the functions available in Claroline although not mandatory. No penalty was given for students who did not access the Claroline. Students could download course materials, participate in forum and submit their assignments via the Claroline.

### 3.2 Population and sampling
The estimated population for the research is 400. The sample reported in this study is drawn from active postgraduate business students for a particular course that has implemented the open source learning management system. There were 42 students in the sample.

### 3.3 Measures
Table 1 shows the sources for the measures of the constructs used in the research. Students were asked to evaluate the Claroline. The research adopts a five-point Likert scale for computer application anxiety, self-efficacy, perceived usefulness, perceived ease of use and intention to use measures where 1 refers to strongly disagree and 5 refers to strongly agree.

Table 1. Constructs and Measures

| Constructs | Sources |
| --- | --- |
| Intention to use | Davis [3] |
| Perceived usefulness | Davis [3] |
| Perceived ease of use | Davis [3] |
| Self-efficacy | Compeau and Higgin [2] |
| Computer anxiety | Heinssen et al. [6] |

### 3.4 Data analysis
Data was analysed using SPSS version 16. Because the status of the research is pilot implementation of

the system, the research reports the descriptive, reliability and correlation analyses.

## 3.5 Findings

Table 2 shows the breakdown of students by gender and age groups.

Table 2. Profile of respondents

| Profile of Respondents | | Frequency | % |
|---|---|---|---|
| Gender | Male | 19 | 45.2 |
| | Female | 22 | 52.4 |
| | Missing | 1 | 2.4 |
| Age | 20-29 | 15 | 35.7 |
| | 30-39 | 16 | 38.1 |
| | 40-49 | 9 | 21.4 |
| | Above 50 | 1 | 2.4 |
| | Missing | 1 | 2.4 |

The majority of respondents were female (52.4%). In terms of age group, those in the 30-39 age range were the majority. The fewest number of respondents were in the 40-49 age range.

Table 3 shows the reliability analysis of the measures.

Table 3. Reliability analysis

| Constructs | No. of Items | Cronbach's alpha ($\alpha$) |
|---|---|---|
| Intention to use | 4 | 0.854 |
| Perceived usefulness | 4 | 0.811 |
| Perceived ease of use | 6 | 0.881 |
| Self-efficacy | 5 | 0.848 |
| Computer anxiety | 4 | 0.884 |

Reliability analysis is the procedure used to ascertain the internal consistency of the measures. According to Hair et al. [4], Cronbach's alpha above 0.6 for exploratory study is considered reliable. In the research, the range of Cronbach's alpha is between 0.811 and 0.884.; thus all measures in the study are reliable.

Table 4 shows the profile of Likert-scale measures.

Table 4. Profile of Likert-scale Measures

| | Mean |
|---|---|
| **Intention to use** | |
| 1. It is worth to use the Claroline. | 3.78 |
| 2. I will frequently use the Claroline in the future. | 3.78 |
| 3. I will strongly recommend others to use the Claroline. | 3.68 |
| 4. I plan to use the Claroline. | 3.83 |
| Average intention to use score: | 3.77 |

| | Mean |
|---|---|
| **Perceived usefulness** | |
| 1. Using the Claroline improves my learning performance. | 3.69 |
| 2. Using the Claroline enhances my effectiveness in learning. | 3.64 |
| 3. Using the Claroline improves the quality of learning. | 3.83 |
| 4. Overall, I find using the Claroline useful in learning. | 3.93 |
| Average perceived usefulness score: | 3.77 |
| **Perceived ease of use** | |
| 1. Using the Claroline in learning is easy for me. | 3.81 |
| 2. I find it easy to get the Claroline to do what I want to do. | 3.50 |
| 3. Getting information from the Claroline is easy. | 3.75 |
| 4. My interaction with the Claroline is clear and understandable. | 3.51 |
| 5. It would be easy for me to become skillful at using the Claroline. | 3.61 |
| 6. Overall, I find the Claroline easy to use. | 3.71 |
| Average perceived ease of use score: | 3.65 |
| **Self-efficacy** | |
| 1. I would be able to use the Claroline if there is no one around to show me how to use it. (SE1) | 3.32 |
| 2. I would feel comfortable using the Claroline on my own. (SE2) | 3.68 |
| 3. I feel confident to download and save files from the Claroline when needed. (SE3) | 3.83 |
| 4. I feel confident to post and reply to messages in a forum in the Claroline. (SE4) | 3.56 |
| 5. I feel confident understanding the links in the Claroline. (SE5) | 3.59 |
| Average self-efficacy score: | 3.60 |
| **Computer application anxiety** | |
| 1. I feel nervous about using the Claroline. | 2.22 |
| 2. It scares me to think that I could lose a lot of information using the Claroline by clicking the wrong button. | 2.37 |
| 3. I hesitate to use the Claroline to post and reply to messages for fear of making mistakes I cannot correct. | 2.61 |
| 4. The Claroline worries me. | 2.05 |
| Average computer anxiety score: | 2.29 |

Table 4 provides evidence that generally, users have positive evaluations of the open source learning management systems. The majority of users agreed that they have intention to use the system, perceived its usefulness, perceived its ease of use and, believed that they had the ability to use the system.

Generally, the users did not agree that they had computer anxiety when using the system. In answering the research question, we conducted correlation analysis (Table 5).

Table 5. Correlation Analysis.

|        | ITU      | PU       | PEOU     | SE       | CA  |
|--------|----------|----------|----------|----------|-----|
| ITU    | 1        |          |          |          |     |
| PU     | 0.318*   | 1        |          |          |     |
| PEOU   | 0.524**  | 0.458**  | 1        |          |     |
| SE     | 0.440**  | 0.317*   | 0.605**  | 1        |     |
| CA     | -0.231   | -0.163   | -0.253   | -0.488** | 1   |

** correlation is significant at the 0.01 level (2 tailed)

* correlation is significant at the 0.05 level (2 tailed)

ITU: Intention to use

PU: Perceived usefulness

PEOU: Perceived ease of use

SE: Self-efficacy

CA: Computer anxiety

The correlation analysis results suggest that there is no significant correlation for the relationship between computer application anxiety and system acceptance. This suggests that computer anxiety is not a significant factor in open source learning management system acceptance for postgraduate business students. Further, correlation between students' self-efficacy and system acceptance ranges from low to moderate. All the system acceptance variables (intention to use, perceived usefulness and perceived ease of use) are correlated to each other. The strongest correlation is between self-efficacy and perceived ease of use.

# 4  Conclusion

We began with the research question: ***Is there a correlation between computer application anxiety and system acceptance?*** We build on the computer anxiety, social cognitive theory and TAM as a basis to answer the research question. The context of the research is a pilot implementation of open source learning management system for a course in Master of Business Administration. Surprisingly and contrary to past findings, there is evidence to suggest that computer application anxiety is not a factor for open source system acceptance in students' learning environment. With rapid advancement of technologies, students may have easily adapted to a learning management system and thus computer anxiety is no longer a factor that links to system acceptance. However, and consistent with many past findings, there is evidence to suggest self-efficacy plays a role in system acceptance.

The research presents limitations that should be acknowledged. The research used a cross-sectional survey research approach. Further, only students of a particular course participated in the research. The findings may not be generalized in the context of the entire institution and thus may have to be carefully interpreted. Future research may consider longitudinal approach and postgraduates in other courses as research participants.

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