

IMPORTANCE-PERFORMANCE ANALYSIS ON INFORMATION TECHNOLOGY APPLICATIONS IN HIGHER EDUCATIONAL INSTITUTIONS IN THAILAND

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Abstract

This study aims at determining the attributes of information technology that significantly affect user satisfaction in institutions of higher education. A qualitative survey suggested that such institutions should work on improving management information system (MIS) quality and put more focus on the needs of users as a means of improving their satisfaction. A quantitative component indicated the existence of a strong relationship between the quality of MIS related to user satisfaction and the perceived importance of the IT attributes of IT applications provided by Higher Educational Institutions. Furthermore, the study also suggests practical uses of its model as a comparative tool for the organizational management of user satisfaction.

INTRODUCTION

In the past, managers focused on producing quality products, hiring and training the best workers, and finding ways to create value for their customers. As competition gets tougher and tougher in the global marketplace, business must look for opportunities to provide the quality goods and services that customers want and need but do it faster, better, and with greater customization than anyone else. To accomplish this feat, they need information and technology.

Advances in technology mean that it can now be an effective tool in learning and development. Many organizations and educational institutions

are utilizing technology as an effective tool for monitoring and improving organization's performance. For this reason, whether technology should be used in educational institutions is no longer the issue in education. Instead, the current emphasis is ensuring that technology is used effectively to create new opportunities for learning and to promote student achievement. Development for technology use should be an integral part of the educational institutions technology plan or an overall improvement plan. Most colleges and universities in Thailand have already offered Internet-based coursework. With a PC connected to the web, the Internet allows user to enable receiving, updating and processing of information immediately worldwide.

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Technology is credited as being a significant factor in increasing productivity in many industries; some people believe that more effective use of technology in educational institutions could do more to improve educational opportunities and quality. Research indicates that while there are poor uses of technology in education, appropriate technology use can be very beneficial in increasing educational productivity (Byrom & Bingham, 2001; Clements & Sarama, 2003; Mann, Shakeshaft, Becker, & Kottkamp, 1999; Valdez, cNabb, Foertsch, Anderson, Hawkes, & Raack, 2000; Wenglinsky, 1998).

As such, to become a leader in educational arena is not easy. Many administrators of educational institutions may be uncomfortable providing leadership in technology areas. They may be uncertain about implementing effective technology in ways that will improve learning. Of significance here, it is vital for educational institutions to determine that the uses of technology have linkages to important educational learning expectations.

THEORETICAL ISSUES

Various studies indicate that poor, incomplete, late or missing information is perceived as a most serious quality problem (English, 1999; Ferguson and Lim, 2001; Crump, 2002). Huang *et al.* (1999) stated that information should not be treated as a mere by-product of various activities but with the same seriousness as products. Quality of information, however, seems to be an elusive concept. As attempting to define the quality of information, one of the obvious approaches is to focus on customer requirements. High quality information satisfies application criteria specified by the use (Salaun and Flores, 2001; English, 1999; Strong, 1997). Another approach is to produce lists of conceivable information quality dimensions or attributes (Salmela, 1997; Tozer, 1999), following the well-known framework de-

veloped by Garvin (1988). Huang *et al.* (1999) also produced the list of Quality of information by defining into 15 dimensions as intrinsic quality: accuracy, objectivity, believability, and reputation; accessibility quality: access, and security; contextual quality: relevancy, value-added, timeliness, completeness and amount of data; and representational quality: interpretability, ease of understanding, concise representation, and consistent representation.

Delone and Mclean (1992) mentioned about information quality, which can be described in term of accuracy, timeliness, reliability, format and meaningfulness while James (2002) suggested that information is of high quality if it has characteristics that make it useful for the tasks. He also described the characteristics of high-quality information into three broad categories: Time: Information should be available and provided when needed, up to date, and related to the appropriate time period (i.e. timeliness, currency, frequency and time period). Content: Useful information is error free, suited to the user's needs (i.e. accuracy, relevance, completeness, conciseness, scope and performance). Form: The information should be provided in a form that is easy for the user to understand and that meets the user's needs for the level of detail (i.e. clarity, detail, order, presentation and media).

Simon (1992) pointed out that design of information systems must consider in depth business processes of the organization. Hayes and Wheelwright (1979) also indicated that one of the key success factors of Japanese industries is no separation between strategies and operations. However, a limited consideration of the first two roles for IT in Modern Corporation is sub-optimal with potentially dysfunctional consequences.

While, as noted earlier, IS success is a multi-dimensional construct (Delone and McLean, 1992; Saarinen, 1996), so surrogates measures

have been developed and are usually in use to measure IS success. Two surrogate measures are system usage (Swanson, 1974; Ein-Dor et al., 1984; Snitkin and King, 1986) and user satisfaction (Bailey and Pearson, 1983; Ives *et al.*, 1983; Baroudi and Orlikowski, 1988).

Delone and Mclean (1992) described a number of IS success measures after reviewing 180 studies. According to them research has focused on areas such as systems quality (i.e. IS interface, availability, response time, etc.), system usage, user satisfaction, individual impact and organizational impact.

Much has been written about how information technology (IT) could be and has been used to enhance quality management. Hughes (1994) used a qualitative case study methodology to investigate the role of IT in quality management. On his analyzing, he found that IT was perceived to be a tool that facilitated QM. But on his study, he did not attempt to answer how and where IT should be used in QM processes. IT has been identified as one of the critical success factors determining the impact of QM on organizational performance, although how IT could be used to enhance QM was never addressed (Cho, 1994).

The concept of user satisfaction can be traced back to several decades (Swanson, 1974; Nolan and Seward, 1974). According to Bailey and Pearson (1983, p. 531) "satisfaction in a given situation is the sum of one's feelings and attitudes toward a variety of factors affecting the situation". As with system usage, a variety of measures have been proposed for the quantification and assessment of user satisfaction (Bailey and Pearson, 1983; Doll and Torkzadeh, 1988; Baroudi and Orlikowski, 1988).

Delone and Mclean (1992) included about 33 articles that address the subject of user satisfaction in their research. They conclude that user

satisfaction is widely used as a measure of IS success because reliable instruments have been developed to measure satisfaction, and other measures of IS success are problematic. However, while user satisfaction has been widely used as a surrogate for systems performance and IS success, critics have questioned its general applicability (Galletta and Lederer 1989).

RESEARCH OBJECTIVES

In this study, research objectives are stated as the following: 1) to investigate the importance of the attributes of IT applications provided by Higher Educational Institutions in Thailand, as perceived by faculty members and students, 2) to investigate the performance of the attributes of IT applications provided by Higher Educational Institutions in Thailand, as perceived by faculty members and students, 3) to compare the perceived importance and performance of the attributes of IT applications by faculty members and students, 3) to compare the perceived quality of IT applications in Higher Educational Institutions in Thailand from the faculty members and students' standpoint, 4) to study the relationship between the perceived management quality of IT applications and user satisfaction.

CONCEPTUAL FRAMEWORK, AND HYPOTHESES

As broached in the previous section, the measure of MIS success has achieved prime importance among researchers. Measures of success include assessment of satisfaction and the evaluation of the management information success, described in various terms such as information quality, system performance, organizational encouragement, effective information technology, and user satisfaction. To cover the full spectrum of MIS success on IT Applications that meets user satisfaction, this research will broadly cat-

egorize the information technology management that is deemed critical in meeting user satisfaction into 3 major categories with their respective dimensions to be studied into: information; system; and organizational management.

Hypothesis Statements are conjectural statements of the relationship between two or more variables that carry clear implication for testing the stated relations. In addition, hypotheses are constructed for answering these research questions and testing relationship between independent variables. Hypotheses in this study are propositions that are deduced logically from theory and practical surveys used in the previous studies. There are nine hypotheses in this study as the following: H_a 1: There is a difference between users' perception about the importance and performance of Information quality attributes. H_a 2: There is a difference between users' perception about the importance and performance of system quality attributes. H_a 3: There is a difference between users' perception about the importance and performance of organizational management attributes. H_a 4: There is a difference between users' perception about the overall management information system quality. H_a 5: There is a difference between users' perception about the overall satisfaction on IT applications. H_a 6: There is a relationship between users' perception about information technology attributes and the overall management information system quality. H_a 7: There is a relationship among users' perception about the overall management information system quality and users' satisfaction. H_a 8: There is a relationship among users' perception about the overall management information system quality and users' satisfaction with information technology attributes. H_a 9: There is a relationship among users' demographic characteristics, the overall management information system quality and users' satisfaction with IT applications with information technology attributes.

METHODOLOGY

The research comprises of 2 phases. Both qualitative and quantitative methods were used for achieving the research objectives. A nationwide cross-sectional survey was conducted for measuring the perception of faculty members and students about the importance-performance analysis and user satisfactions on IT applications in Thai Higher Educational Institutions. The statistical analysis will be conducted based on the quantitative data from the survey.

The qualitative method was used to search some related documentary data to the study and conduct a focus group interview. These qualitative approaches helped the research to gather information and formulate hypotheses. The required sample size in this study was 1,048 persons, who are the faculty members and students of Thai Higher Educational Institutions who have participated or experienced in using IT applications offered by institutions.

A sample group in this study is being primarily Thai native speakers and Non-Thai native speakers, the actual survey instrument will be translated into both Thai and English version. To ensure minimal semantic or interpretation errors, the translation will be done separately by an individual who is well-versed in linguistic for the English/Thai translation of the questionnaires, and the questionnaires will be re-checked by an expert in order to get the statements that best retain the original meaning and semantic in the English version.

In this study, descriptive and inferential statistics methods are used. Descriptive statistics are used in describing parameters of the faculty members and students' personal data.

The questionnaire is processed using SPSS to find out the descriptive statistics used in de-

scribing parameters of the respondents' personal data. In addition, SPSS is used to conduct factor analysis. However, the Analysis of Moment Structures (AMOS) utilized to analyze multiple regression has a unique graphical interface and is specifically designed to make fitting SEM easier.

RESULTS

The results showed that for the overall, the respondents' evaluation percentage on overall MIS quality of Higher Educational Institutions. The results reveal that 16.8% of total respondents were neither high nor low for the overall MIS quality of Higher Educational Institutions, followed by 7.9% for low, and 2.8% for very low. Meanwhile, the majority of 59% indicated high quality for overall MIS.

Regarding the overall satisfaction level with the IT application provided by Higher Educational Institutions, the results show that although 12.7% of respondents were very satisfied, most respondents which accounted for 58.1% were satisfied with the IT application provided by Higher Educational Institutions. About 19.1% were neither high nor low, 8.1% were dissatisfied. Only 2% were very dissatisfied.

Moreover, the comparison of the users' perception indicated a significantly higher value for the importance of updated and related to the appropriate time period than the performance. The users also perceived the benefit factors e.g., effective in helping the user complete tasks, provided in a form that is easy for the user to understand.

Meanwhile the respondents indicate that the high mean of the performance regarding system attribute in term of use of advance IT, accessibility, and computer interface.

Lastly, the results revealed that users have the highest mean of the indicated importance of IT management related to the availability of equipment in a convenient location

In identifying independent relationships, the finding that subjects' age, access frequency, and experience were a significant predictor ($\beta = -.104$, $t = -2.426$, $p < 0.05$; $\beta = .125$, $t = 2.8514$, $p < 0.05$; $\beta = -.101$, $t = -2.371$, $p < 0.05$, respectively), indicated that user younger than 25 years old, and accessed into institution's website less than once a week along with positive attitude on experience of using the website provided by other institutions attributed greater level of satisfaction.

Furthermore, to compare directly the relative relationship between each independent variable and the dependent variable, the results revealed that rating on the variable of information, system, and organization are all significantly and positively related to MIS quality ($\beta = .216$; $\beta = .253$; $\beta = .182$, respectively). Thus, it can be concluded that the greater quality of information, system, and organizational management, the greater MIS quality is. The squared multiple correlation (SMC) for each relationship in the model was also examined. The results revealed that the overall user satisfaction has a high R^2 of .634 or the predictor of variable MIS quality accounted for 63.4% of the variance of overall satisfaction, and the overall MIS quality has a low R^2 of only .143 or 14.3% of the variance of MIS quality. As such, the residual or the amount of unexplained variable for the model is .857 or 85.7%; .357 or 35.7%, respectively).

Based on the research findings, understanding how information technology attributes impacts the MIS quality and user satisfaction, the implication of this research suggested that user satisfaction correlated to MIS quality with a common basis whereas there appeared to be three dimensions which underline MIS quality and users' sat-

isfaction on IT applications provided by the higher educational institutions in Thailand: one representing information aspect and the other representing system aspect and organizational management aspect.

CONCLUDING REMARKS AND DISCUSSION

In this research, after examining the variables of IT applications model, the findings of the research indicate a significant positive relationship between system usage, in term of accessibility, availability, response time, ease of use, conservation of time, convenience, privacy, accuracy, multifunctional capabilities, interface and use of advanced IT and user satisfaction. It is believed that the better quality of system usage dimensions, the high level of user satisfaction. The outcome of this research is very educational, though not necessarily as expected.

The research also contributes to our knowledge by providing support with the contention that user satisfaction depends on MIS quality that means the quality of management information system has an influence on user satisfaction. A user who has perceived better MIS quality is more satisfied with IT applications provided by his or her institution. In addition this study found that the demographic variables such as age, access frequency, and experience were found to be significant predictors of level of user satisfaction attribution. An explanation for this might be that gender and duration of use are not a function of the overall user satisfaction. A user who rates higher levels of overall satisfaction with IT applications provided by the institution might not spend more time on institution website. Conversely, a user who rates lower levels of overall satisfaction might be male or female.

As we know, today the world has become completely dependent on computerized systems

for almost everything. Managing information and related information technology (IT) is critically important to the survival and success of organization and advances in technology mean that it can now be an effective tool in learning and development. Many educational institutions are utilizing technology as an effective tool for monitoring and improving organization's performance. For this reason, whether technology should be used in educational institutions is no longer the issue in education.

The researcher suggested that in future studies the IT applications attributes such information, system, and organizational management could be used to research in school level in supporting quality management practices in order to promote teachers' use of information technology and achieve better quality performance with higher level of satisfaction. These attributes have been proven to be a nonthreatening means of quantifying the efficiency and effectiveness of newly implemented IT applications. Furthermore, the instrument provides not only an overall assessment of user satisfaction, but also the capability to analyze which aspects of IT application attribute are most problematic.

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