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# Investigating users' post-adoptive satisfaction and dissatisfaction toward an information system

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## ABSTRACT

An information system can be regarded as successful when a significant number of users use the system in a continued basis. Satisfaction is often regarded as the basis of continued usage, while dissatisfaction may cause users to discontinue the system use. While many studies of information system have investigated user satisfaction, user dissatisfaction seems to be ignored. The purpose of this study is to investigate the factors that influence user satisfaction and the factors that influence user dissatisfaction. Drawing the theoretical assumptions from Oliver's expectation-confirmation theory and Herzberg's two-factor theory, we propose a general theoretical framework that posits environmental factors and job-specific outcome factors may cause satisfaction and dissatisfaction. The framework extends our understanding of user satisfaction and dissatisfaction and helps to underpin and categorize the factors that are salient for causing user satisfaction and dissatisfaction during post-adoption stage of information system usage. By collecting text data responses using open ended survey questions and qualitatively analyzing them, we identify a list of factors that cause educators' satisfaction and a list of factors that cause dissatisfaction in the e-learning tool utilization context. Our study reveals that satisfaction is caused by both environmental and job-specific factors, while dissatisfaction is mainly caused by environmental factors.

## Keywords

Continued use, e-learning, Expectation-Confirmation theory, Dissatisfaction, Satisfaction, and Two-factor theory.

## INTRODUCTION

User satisfaction has often been linked to at least two important outcomes: information system (IS) success (DeLone and McLean, 2003) and IS continued use (Bhattachejee, 2001). Organizations often make significant financial and human resource investments into the measurement and analysis of user satisfaction and its subsequent improvement. As a result, significant amount of research has been conducted in the user satisfaction area over the last two decades (Bailey and Pearson, 1983; Benson, 1983; Doll and Torkzadeh, 1988; Muylle et al., 2004; Islam et al., 2010). Most of these studies presuppose that, to find out how a user feels about a particular system or service, it is enough to analyze his/her satisfaction, measured by an ordinal scale (highly dissatisfied-neutral-highly satisfied). This approach may not be enough in at least two senses.

First, users are usually asked only about a limited number of attributes of a system or service. Specifically, attributes that are considered to be positive and which are often associated with the very reason why users use a system are asked in the survey. These lists of attributes generally exclude possible negative features about the system or service that are experienced by the users during their use. After experiencing such negative features, the users may depend on these to build their overall satisfaction and subsequently their future use.

Second, studies of consumer satisfaction indicate that a one-dimensional concept of satisfaction can be insufficient (e.g., Chan and Baun, 2007). The one-dimensional construct assumes that a single factor can generate both satisfaction (in case everything goes well) and dissatisfaction (when things do not go well). However, past studies provide evidence that the presence of certain attribute generates satisfaction, yet their absence does not necessarily generate dissatisfaction. The reverse is also true given that certain factors may generate dissatisfaction but their absence does not affect satisfaction (e.g., Herzberg et al., 1959; Chan and Baun, 2007). IS researchers have also found that the effect of performance factors of an IS on user satisfaction might be asymmetric (Zhang and von Dran, 2000; Cheung and Lee, 2005).

As a result, despite the huge research on IS user satisfaction, we are not in a position to pinpoint exactly what attributes of system are necessary to build high level of satisfaction and what factors may cause dissatisfaction. Therefore the purpose of this paper is to explore factors that influence educators' satisfaction and dissatisfaction with an e-learning system. We are interested to explore educators' satisfaction/dissatisfaction because they act as the initiators and facilitators of students' utilization of e-learning system. If the educators become dissatisfied with a particular e-learning system and choose to

discontinue its use, the students have no choice but to discontinue their use of the system. In this study, we develop a general taxonomic framework that helps to categorize factors that cause satisfaction and dissatisfaction with a system. The framework also helps to understand the process of developing satisfaction/dissatisfaction with a system. Studying dissatisfaction is particularly important as it is argued in the IS literature that dissatisfaction causes discontinued IS use (Bhattacharjee, 2001). Thus, the inclusion of dissatisfaction-based evaluations can give more detailed information to the managers that could be utilized to avoid discontinuance.

## THEORETICAL BACKGROUND

The importance of satisfaction has been illustrated in the studies of job satisfaction, consumer behavior and information system success. Job satisfaction causes employees to maximize their self-actualization to achieve high job performance while consumer behavior studies view satisfaction as a pre-requisite to continue purchasing products/services. In information system studies, satisfaction causes a user to use the system.

User satisfaction in IS has received considerable research attention since the 1980s (Bailey and Pearson, 1983; Benson, 1983; Ives et al., 1983; Harrison and Rainer, 1996). It is an important measure of information systems success, often regarded as the easiest and the most useful way to evaluate an IS. Bailey and Pearson (1983, p. 531) define user satisfaction as the "sum of one's positive and negative reactions to a set of factors." Doll and Torkzadeh (1988, p. 261) describe it as "the affective attitude toward a specific computer application by someone who interacts with the application directly." Eagly and Chaiken (1998, p. 296) regard user satisfaction as a "psychological tendency expressed by evaluating a particular entity with some degree of favor and disfavor".

The commonly adopted methodology for user satisfaction survey consists of first identifying the most important attributes of a system, and second, asking the users to rate them on a symmetrical one-dimensional scale. On this scale, the lowest value indicates the highest dissatisfaction with an attribute, and the highest value represents the greatest satisfaction, while the midpoint indicates neutrality. Following this procedure, many instruments have been developed over the years (e.g., Bailey and Pearson, 1983; Doll and Torkzadeh, 1988; Palvia, 1996; Huang et al., 2004; Muylle et al., 2004; Bargas-Avila et al., 2009; Islam et al., 2010). While these models help us to underpin different factors behind user satisfaction, Oliver (1980) provided the expectation-confirmation theory to understand the process of developing satisfaction with a product/service.

The expectation-confirmation theory hypothesizes that consumers' level of satisfaction with a product/service determines repurchase intention. In turn, consumer satisfaction is determined by two major constructs: initial expectations (pre-purchase expectations) on a product/service, and discrepancies between expectations and product/service performance (confirmation). According to this theory, buyers first develop expectations about a product/service before purchase. Second, their consumption experiences with it build perceptions about its performance. This leads to the buyer either confirming or disconfirming the pre-purchase expectations, after assessing perceived performance against the earlier frame of reference (pre-purchase expectations). A buyer's expectations are confirmed when the product/service performs as much as expected; negatively confirmed when it performs worse than expected; positively confirmed when it performs better than expected (Churchill and Surprenant, 1982).

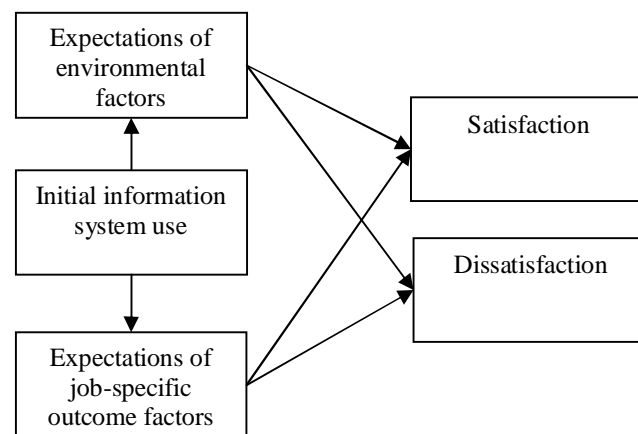
While the user satisfaction instruments do not consider the difference between pre and post adoption, drawing attention to the substantial difference between initial adoption and post-adoption, Bhattacharjee (2001) developed and empirically tested the information system continuance model from the expectation-confirmation theory. Despite the structural adaptation from expectation-confirmation paradigm, Bhattacharjee's information system continuance model possesses a few differences. First, it focuses importance on post-adoption expectations rather than pre-adoption expectations. A user keeps updating expectations towards using a system as he/she gains more experiences by using it. After assimilation of such experiences, the user's expectation can be different from his/her initial expectations prior to use the system (Bhattacharjee, 2001). From this perspective, information system continuance model posits that post-adoption expectations (rather than pre-adoption expectations) are the relevant determinants of satisfaction. Second, information system continuance model selected perceived usefulness as the surrogate for post-adoption expectation. The expectation-confirmation paradigm defined expectation as individual beliefs or sum of beliefs about the level of attributes possessed by a product/service (Churchill and Surprenant, 1982). Following this definition, Bhattacharjee (2001) used perceived usefulness as the measure of expectation, since among the cognitive beliefs in IS adoption and usage, perceived usefulness demonstrated itself to be the most consistent and salient one in determining the user intention over time (Davis, 1989; Venkatesh, 2000). Third, perceived performance is not included in the information system continuance theory. Bhattacharjee (2001) argued that the effect of perceived performance could be captured by the confirmation construct.

As described earlier, according to the expectation-confirmation theory, dissatisfaction occurs when buyers' expectations are not met, and dissatisfaction latter causes buyers to discontinue using the product/service. In IS, dissatisfaction affects IS

discontinuance. However, there are only a few studies which assumed that there are particular factors that cause user dissatisfaction (Zhang and von Dran, 2000; Cheung and Lee, 2005). Most of the IS studies assumed that dissatisfaction is simply opposite of satisfaction. This may not be completely true according to the two-factor theory of job satisfaction (Herzberg et al., 1959). According to the two-factor theory (motivator-hygiene), satisfaction and dissatisfaction are different constructs, caused by different facets of interaction between a stimulus (job, product) and the individual. The motivator factors cause job satisfaction while the hygiene factors cause job dissatisfaction. In IS literature, a few studies have found different sources of dissatisfaction from satisfaction (Zhang and von Dran, 2000; Cheung and Lee, 2005).

### A GENERAL SATISFACTION-DISSATISFACTION FRAMEWORK

Figure 1 shows a framework we developed for understanding post-adoptive satisfaction based on expectation-confirmation assumptions (Oliver, 1980) and Herzberg's two-factor theory (Herzberg et al., 1959). According to this framework, the users after first time acceptance and a period of initial use will form an opinion about two generic factors: environmental factors and job specific outcome factors. Environmental factors are the means to a set of ends. These include for example product related factors such as system quality, available support from help-desk, organizational support etc. Job specific outcome factors are considered to be an end themselves. These include for example, perceived usefulness, perceived enjoyment etc. If expectations on these factors are fulfilled, the users remain satisfied. On the other hand, if these expectations are not fulfilled, dissatisfaction is generated among users.



**Figure 1: A general satisfaction-dissatisfaction framework**

Though, the proposed framework has been developed based on Herzberg's two factor theory, it has substantial difference in underlying assumptions. While two-factor theory posits that motivators affect satisfaction and hygiene factors affect dissatisfaction, we argue that the effect of environmental and job-specific factors on satisfaction and dissatisfaction may vary depending on the context and the level of users' expectations in that particular context. Specifically, we argue the following using the assumptions of expectation-confirmation theory (Oliver, 1980).

Depending on the context and users' expectations, a generic factor may have either weak or strong impact on user satisfaction and dissatisfaction. For example, if a user's expectations of environmental factors are fulfilled to some extent, then environmental factors may have weak impact on both satisfaction and dissatisfaction. On the other hand, if the user's expectations of environmental factors are fulfilled well enough, then there might be strong impact on satisfaction but a weak or almost no impact on dissatisfaction. It also implies that depending on the context and users' expectations, the same generic factor may cause both satisfaction and dissatisfaction. For example, a user may remain satisfied with accessibility of a system, but he/she may be dissatisfied with ease of use.

### RESEARCH CONTEXT

The target system of this study is an e-learning system, Moodle (<http://moodle.org/about/>). Moodle is an open source course management system, also known as a learning management system or a virtual learning environment. It has become very popular among the educators to create online dynamic course websites for the students. Moodle can be used to conduct fully online courses and also to augment face-to-face courses. Moodle provides tools such as forums, databases and wikis to build collaborative learning communities. It also provides ways to deliver contents to students and assess learning using assignments and quizzes. To work, it needs to be installed on a web server.

This study was conducted in an internationally acknowledged, multidisciplinary scientific university. The university has seven faculties. The university has been using Moodle since 2007 as the platform to create course pages online. However, educators are mostly free to choose the traditional way to create course pages under the university domain. Thus, using Moodle is not seen as mandatory in the university in this sense.

## RESEARCH METHOD

### Data collection

Data was collected using open ended survey questions from the educators of a university who had been using Moodle for teaching purpose. In particular, the educators were asked to report their satisfying and dissatisfying experiences with the system. A total of 1012 email invitations were sent to the educators of the university who had been the registered Moodle users. Out of these, 85 educators reported their satisfying points while 106 educators reported their dissatisfying points about Moodle. Respondents were free to report their satisfying and dissatisfying experiences with Moodle which resulted in thick descriptions for many respondents.

### Data analysis

The reported descriptions of experiences were content analyzed and classified into two broad categories: environmental factors and job-specific outcome factors following the framework presented in Figure 1. Two coders coded and categorized the sample data separately. The coders then met to compare the classifications. The Holsti's (1969) inter-coder agreement was 83%. There were a few disagreements which were resolved by discussion.

## RESULTS

### Satisfaction: major groups and categories within groups

The sorting of the experiences led to two major groups of factors that appear to be associated with satisfying experiences: environmental factors and job-specific outcome factors. The list of factors and sample quotes from the data are shown in Table 1.

Within environmental factors, two groups emerged from data: system quality factors and available support related factors. Within system quality factors, five categories emerged from the data. These are ease of use (the users felt the system to be easy to use), access (the users felt the system to be quick to respond and available), security (the users felt the system to be capable to share information securely), functionality (the users felt the system had enough functionalities to meet their needs), and mobility (the users felt the system could be usable from any place). Within available support related factors, two categories were identified: support (the users felt that sufficient support were available to solve their problems) and training (users felt that available training was sufficient and useful).

Within the job specific outcome factors, four categories emerged from the data. These are easy knowledge sharing (users felt the system provided an easy way to communicate and share knowledge), improved control (users felt the system provided them improved control on the overall management of teaching), flexible teaching (the users felt the system provided a flexible way to administer the teaching), and students' appreciation (users got feedback from the students that they were happy with the overall management and learning outcome of the course using the system).

### Dissatisfaction: major groups and categories within groups

The sorting of the experiences led to only one major group of factors that appear to be associated with dissatisfying experiences: environmental factors. The list of factors and sample quotes from the data are shown in Table 2.

Within the environmental factors, two categories emerged from the data. These are system quality related factors, and available service related factors. Under system quality related factors, six categories emerged. These are lack of access (the users felt the system to be slow and unresponsive), high complexity (the users felt the system to be very complex to use), lack of reliability (the users felt the system to be unreliable), lack of integration (the users felt the system to be not capable of integrating information from different course pages), lack of functionality (the users felt that the system did not have enough functionalities to meet their needs), and poor usability (the users felt the system to be old-fashioned and not visually appealing).

Within service oriented factors, three categories emerged from the data. These are lack of training (the users felt that the training was not sufficient), lack of support (the users felt that sufficient support was not available when they faced problems with the system) and lack of user rights (the users felt that a sufficient user right is not provided to the students in a course).

Factor		Sample quote from data
Environmental factors	Ease of use	"...At the beginning I found the system to be very complex but I am very happy that I now find the system to be very easy to use...."
	Access	"...I find the system mostly available when I need to check something...."
	Security	"...The good thing is that I can share lecture materials securely...."
	Mobility	"...I can use Moodle through net, thus it is not bound by place...."
	Functionality	"...The wiki is excellent-it saves a lot of emailing and you don't have to remember specific password for everything...."
	Support	"...Moodle support is available...."
Job-specific outcome factors	Training	"...Moodle training in the university has been very useful...."
	Easy knowledge sharing	"...Being able to upload materials directly to Moodle without having Xerox copies....and the materials are saved in the Moodle server which can be used latter also...."
	Improved control	"...Now I can control my course easily for example, I can see which participant has spent time on the course page, also I can make grouping easily in Moodle...."
	Students' appreciation	"...One satisfying incident was the first time I ever used Moodle- at the end of the course a student wrote on the course evaluation, "We 'heart' Moodle"...."
	Flexible teaching	"...It is possible to arrange exam via Moodle which I often use...."

**Table 1: Classification of factors influencing satisfying experience**

Factor		Sample quote from data
Environmental factors	Access	"...The problem has been that often Moodle has been inaccessible or unstable so that I or the students have not been able to access the materials in Moodle...."
	Poor usability	"...In a course with several teachers, all teachers received notifications when any group of students returned their solutions to an exercise project. This was somewhat annoying; It required several clicks with a mouse to find whether I am the instructor of the student group in question...."
	Ease of use	"...Storing and moving files and referring to them is complicated and old-fashioned...."
	Reliability	"...Backing up hasn't been tested well. I accidently lost the list of participants on the course and had to manually add each from the page access log (twice)...."
	Integration	"...Copying the course to a new course is a complicated process and doesn't always succeed...."
	Functionality	"...Text editor is poor, cannot use font size, tabs and the way I wanted to show like...."
	Support	"...Lack of support and answers like look at from the manual...."
	Training	"...I would like more courses on improving my use of Moodle...."
	User rights	"... Students cannot create materials in the course because the settings make it impossible. I have not been able to do anything about this. If the students could participate in creating the course in Moodle there would be no problem in interaction...."

**Table 2: Classification of factors influencing dissatisfying experience**

## DISCUSSIONS

The frequency of the identified factors is summarized in Table 3. It shows that the educators were satisfied due to both environmental factors and job-specific outcome factors of the e-learning system. However, environmental factors were not as critical as job-specific factors for educators' satisfaction. On the other hand, environmental factors were very critical to lead

user dissatisfaction, while job-specific outcome factors were not. This supports study on consumer behavior literature. For example Swan and Combs (1976) postulated that:

*“Consumers judge products on a limited set of attributes, some of which are relatively important in determining satisfaction, while others are not critical to consumer satisfaction but are related to dissatisfaction when performance on them is unsatisfactory”*

Specifically, Swan and Combs (1976) hypothesized that instrumental (the performance of the physical product) factors, similar to environmental factors in our context would be more critical for generating user dissatisfaction while expressive (the psychological performance of the product) factors, similar to job-specific outcome factors in our context would be more critical for generating user satisfaction.

Generic Factor	Specific factor	Satisfying	Dissatisfying	Total	Percentage
Environmental factors	Access	3	31	34	17.2
	Ease of use	6	13	19	9.6
	Reliability	0	10	10	5.1
	Integration	0	4	4	2.0
	Functionality	3	3	6	3.0
	Usability	0	17	17	8.6
	Security	6	0	6	3.0
	Mobility	4	0	4	2.0
	Training	3	9	12	6.1
	Support	4	15	19	9.6
	User rights	0	6	6	3.0
Job-specific outcome expectations	Easy knowledge sharing	25	0	25	12.6
	Improved control	20	0	20	10.1
	Flexible teaching	8	0	8	4.0
	Students' appreciation	8	0	8	4.0

**Table 3: The frequency of identified factors**

The educators were satisfied with the job-specific outcome factors. The educators cited these factors as the source of their satisfaction 61 times. For example, ease of knowledge sharing was cited 25 times, improved control in teaching was mentioned 20 times, flexible teaching was cited 8 times, and students' appreciation as a benefit of using an e-learning system was cited 8 times. The findings that these benefits make the educators satisfied is supported by Bhattacharjee (2001), who reported that perceived usefulness (the degree to which a user believes that using a particular system would enhance his or her job performance) has an influence on user satisfaction. Our findings are also in line with the task-technology fit theory (Goodhue and Thompson, 1995), which suggests that an IS will have a positive impact on task performance when the system provides features that fit the task requirement. Our finding implies that this positive impact on the performance of task latter leads to user satisfaction.

The environmental factors also impact satisfaction given that the educators cited these factors as the source of their satisfaction 29 times. For example, ease of use was cited 6 times, access was cited 3 times, functionality was cited 3 times, security was cited 6 times, mobility was cited 4 times, training was cited 3 times, and support was cited 4 times. Ease of use, access, functionality, security, and mobility might be considered as the system quality related factors, while support and training can be considered as service related factors. The IS success model posits that system quality and service quality have an influence on user satisfaction (DeLone and McLean, 2003). Our finding implies that the system quality factors: ease of use, access, reliability, security, mobility and offered functionality cause user satisfaction. On the other hand, service factors: available training and support also cause user satisfaction. Thus, our findings are in line with the literature.

The educators were dissatisfied with the environmental factors. The educators mentioned these sources as the reasons of their dissatisfaction 108 times. For example, the educators pointed that the system was not accessible 31 times, complex to use was cited 13 times, poor usability was cited 17 times, reliability problem was cited 10 times, Integration problem was cited 4 times, lack of functionality was cited 3 times, lack of support was cited 15 times, lack of sufficient training was cited 9 times, and lack of sufficient user rights was cited 6 times. In particular, the educators had higher expectations on these factors, but the system did not meet their expectations. Thus, these lead dissatisfaction.

## IMPLICATIONS

Our study findings have at least three theoretical implications. First, we have proposed a theoretical framework to categorize different factors that may contribute to satisfaction and dissatisfaction. In general, this framework deepens our understanding on how user satisfaction is shaped by different post-adoption expectations. Second, our results show that there are other factors (e.g., environmental factors such as system quality and available support) in addition to perceived usefulness that may contribute to user satisfaction. Thus, it gives an indication that the expectation-confirmation based IS continuance model is incomplete and needs further extensions. Third, we found that sources of satisfaction and dissatisfaction may differ. In particular, some factors are critical to user satisfaction while others are not. On the other hand, some factors are very critical to user dissatisfaction while others are not. Our study partly supports the Herzberg's two factor theory that some factors may cause satisfaction but in the absence of these does not necessarily cause dissatisfaction. Specifically, we found that job-specific outcomes caused satisfaction but their absence did not lead dissatisfaction. However, this finding could be context dependent. It might be that users' expectations of the job-specific factors were fulfilled in our study context so well that no user pointed their dissatisfaction on this factor. The result can be different if the target system does not meet the users' job-specific expectations well enough. Thus, similar kinds of studies are needed to conduct in different contexts to confirm our finding.

Our study has practical implications too. Knowing the factors that influence user satisfaction and the factors that influence user dissatisfaction provides an awareness to the IS management. The management should develop appropriate strategies to maximize user satisfaction and avoid user dissatisfaction to have continued users, and thus ensuring IS success. Developers may also find ways how to build a system that would make user satisfied. In particular, they may decide to include more features that may help in completing educators' tasks to make the educators satisfied with the e-learning system. They should also consider improving the technical capabilities of the system to increase satisfaction and avoid dissatisfaction. For example, developers should put more effort to improve the system quality related features such as usability, accessibility, ease of use, reliability and so on. The support team should put more effort to improve support and the management should organize more training.

## CONCLUSIONS

This study identified the factors that influence user satisfaction and the factors that influence user dissatisfaction of information system in the context of educators' utilization of e-learning system. We proposed a theoretical framework that extends our understanding of user satisfaction and dissatisfaction in IS and helps to underpin the factors that are salient for causing user satisfaction and dissatisfaction. Specifically, we proposed that satisfaction and dissatisfaction can be generated from two kinds of generic factors: environmental and job-specific outcomes factors. Our study with an example e-learning system revealed that environmental factors were more salient to cause dissatisfaction while job-specific outcome factors were more salient to cause satisfaction. This implies that the factors that affect dissatisfaction may differ from the factors that affect satisfaction.

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