

# Understanding E-Learning Satisfaction in the Context of University Teachers

Anne M. Sørebo, and Øystein Sørebo

**Abstract**—The present study was designed to test the influence of confirmed expectations, perceived usefulness and perceived competence on e-learning satisfaction among university teachers. A questionnaire was completed by 125 university teachers from 12 different universities in Norway. We found that 51% of the variance in university teachers' satisfaction with e-learning could be explained by the three proposed antecedents. Perceived usefulness seems to be the most important predictor of teachers' satisfaction with e-learning.

**Keywords**—E-learning, User satisfaction, Teachers, IS success.

## I. INTRODUCTION

WHILE traditional learning methods, such as lectures and project work, remain dominant in higher education, universities are investing considerable resources in e-learning technology, to support traditional methods with access to complementary electronic information and possibilities to communicate. The potential advantage of using this technology in connection with on-site courses is that it supports flexibility, through resources that facilitate learning anytime and anywhere [10]. However, the basic nature of e-learning technology is that it enables teachers and students with possibilities, not with a "ready to use" resource. The utilization of these possibilities is the key to success, and especially the teachers will to utilize these systems is critical. Teachers deliver the main part of the content and they are also important initiators behind students' utilization of the system.

We assert here that in teachers' motivation to utilize e-learning technology, satisfaction is an important indicator of success after the technology has been in use for a while. Our argument is supported by previous information systems (IS) research that views user satisfaction as the key antecedent to predict success of a particular technology [5, 6], or to anticipate a users' behaviour of reuse [3]. Therefore, the purpose of the present study is to explain teachers' satisfaction with e-learning technology, in a context where teachers has years of experience with the technology.

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## II. THEORETICAL FRAMEWORK

Despite the fact that e-learning is a relatively new technology, with a view to systems like e.g. Blackboard, Fronter and Itslearning, there are a number of empirical studies on use of these systems. Some of the studies are concerned with students use [e.g. 10, 14], other with teachers use [e.g. 11, 1]. The archetypical study, founded on a "successful use of e-learning" perspective, investigates users' acceptance of e-learning (e.g. 18, 17, 16, 13). The value of such studies is that they have identified a lot of potential antecedents of e-learning success that can guide IS practitioners in planning of e.g. training and support. In this connection, variables like confirmation of users' initial expectations and perceived usefulness are typical emphasized as key antecedents in the literature [15, 16, 4]. There are, however, a lot of other variables that has a potential to explain e-learning success beyond these two. Some researchers have emphasized that variables like e.g. playfulness [15], self-efficacy [8] and intrinsic motivation [12].

We assert that key variables in IS success research as confirmation of users' initial expectations and perceived usefulness is important for explaining teachers satisfaction with the technology in the long run, as well as their initial and continued acceptance of the technology. Therefore, confirmation of users' initial expectations and perceived usefulness is seen as core variables in our research model.

We further assert that there are a lot of others variables that may play a role in explaining. Teachers perceived e-learning competence is, however, a variable that we believe is a key variable on an equal level with confirmations and usefulness. The next section will present the research model with the appurtenant research hypotheses.

## III. RESEARCH MODEL AND HYPOTHESES

The research model builds on the assumption that teachers using an e-learning solution, after first-time acceptance and a period of use, form an opinion of the extent to which their initial expectations are confirmed. Simultaneously, they form an opinion about the benefits of use, which is manifest through their beliefs concerning the usefulness of the e-learning solution. After a period of time, the degree of confirmation and perceived usefulness are the basis for teachers' perceived satisfaction with the technology. In addition, we also believe that the teachers perceived e-

learning competence will play an important role in explaining the teachers' perceived satisfaction with the technology. The research mode is presented in Fig. 1.

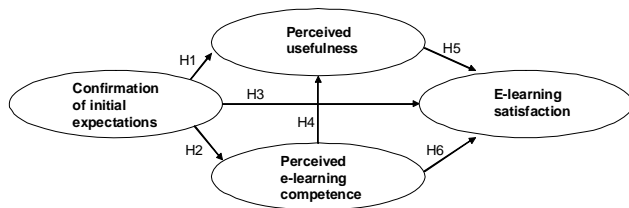


Fig. 1 Research model

H1: Teachers' degree of confirmation is positively associated with their perceived usefulness of e-learning use.

H2: Teachers' degree of confirmation is positively associated with their perceived e-learning competence.

H3: Teachers' degree of confirmation is positively associated with their e-learning satisfaction.

H4: Teachers' degree of perceived e-learning competence is positively associated with their perceived usefulness of e-learning use.

H5: Teachers' degree of perceived usefulness of e-learning use is positively associated with their e-learning satisfaction.

H6: Teachers' degree of perceived e-learning competence is positively associated with their e-learning satisfaction.

#### IV. METHODS

The items used to operationalize the variables in our research model were adapted from acknowledged literature, with a few changes in wording reflecting the IS targeted in our sample and the specific user context. Instruments on confirmation, usefulness and satisfaction were adapted from Bhattacharjee [3]. The perceived e-learning competence instrument was based on a homogeneous competence instrument from Baard et al. [2]. All items, except the satisfaction items, were measured using a seven point Likert-type scale, ranging from 'strongly agree' to 'strongly disagree.' The satisfaction of the e-learning tool was measured using a semantic differential scale.

Twelve universities, having implemented an e-learning tool accessible to all faculty members for at least five years ago, agreed to participate in the study. The implementation of e-learning was initiated by the management at all twelve institutions, with the purpose to support teaching activities. The faculty was offered basic training, and a super user function was also established. The usage of the system at all twelve institutions was basically in connection with on-site courses and the utilization of the system was voluntary for

both teachers and students.

An early version of the questionnaire was presented to 10 prospective respondents. They were asked about their own and their co-workers present utilization of the IS. Subsequently they filled in a close-to-final version of the instrument without the researchers being present. The test group were at this stage encouraged to write comments if items were found to be ambiguous or non-understandable. Improvements were made at each of these steps, particularly with a view to contextual adjustments in original item wording. Data and respondents participating in the refining of the instruments were not included in the final sample. The final instruments are shown in Table I.

The data collection period was 14 days, and 125 usable questionnaires of 430 were returned, this gives a response rate of 29 percent. Twenty-one percent of the respondents were women and seventy-nine percent were men. The average respondent was 45 years old, held a master degree, and had 15 years of experience in using computers. Both the gender and age distribution reflects the true distribution at the twelve universities, which indicates a representative sample.

#### V. DATA ANALYSIS

We employed Partial Least Squares (PLS), a second generation regression method that combines confirmatory factor analysis with linear regression, as our analysis approach and utilized the tool PLS-Graph (version 3.00).

##### A. Measurement Model Results

The adequacy of the four reflective variables in the research model can be determined by looking at: (1) individual item reliabilities, (2) the convergent validities of measures associated with individual variables, and (3) discriminant validity between variables [9].

Table I shows items and loadings for the four constructs in the model. For each construct the assessment of convergent validity or internal consistency is also included [7]. All the items, except two, have loadings close to 0.5 or above. Item five in the perceived competence instrument was deleted due to unacceptable low item reliability (i.e.  $0.28^2 = 0.08$ ).

TABLE I  
 ITEMS AND FACTOR LOADINGS

Confirmation	Loading
My experience with using e-learning was better than what I expected	.87
E-learning helps me more in my educational work than what I expected	.88
Overall, most of my expectations from using the e-learning were confirmed	.80
Perceived usefulness	Loading
Using e-learning increases the quality of my educational work	.87
Using e-learning helps me in being more productive in my educational work	.85
Using e-learning makes my a more productive teacher	.86
Overall, e-learning is useful in performing my educational work	.84
Perceived competence	Loading
I do not feel that I am particular competent in using e-learning	.59
My colleges tells me that I am competent in using e-learning	.56
I have acquired new and interesting e-learning competence through my educational work	.67
After most of the work days I have a feeling of achievement through my use of e-learning	.84
In my work as a teacher, I frequently has the possibility to show others how competent I am in using e-learning	.28
I do not feel competent when using e-learning	.53
Satisfaction	Loading
Very dissatisfied / Very satisfied	.89
Very displeased / Very pleased	.90
Very frustrated / Very contented	.78
Absolutely terrible /Absolutely delighted	.69

The inspection of discriminant validity among variables is based on the squared correlations between variables and their respective average variance extracted [7]. As table 2 shows, the average variance extracted value for the reflective variables is consistently greater than the off-diagonal squared correlations, suggesting satisfactorily discriminant validity among variables.

TABLE II  
 CORRELATIONS AND AVERAGE VARIANCE EXPLAINED

	Confirm	Useful	Comp	Satis
Confirm	<b>.73</b>			
Useful	.40	<b>.74</b>		
Comp	.14	.27	<b>.43</b>	
Satis	.34	.45	.23	<b>.70</b>

### B. Structural Model Results

Fig. 2 summarizes the structural model results. Standardized regression coefficients are shown above each path and R<sup>2</sup> is shown in conjunction with each endogenous latent construct.

Five out of six path coefficients show positive associations with dependent variables. We conclude that hypotheses 1, 2, 3, 4 and 5 are supported. The structural model analysis documents acceptable levels of explained variance for satisfaction (i.e. 51%), perceived usefulness (i.e. 49%) and perceived e-learning competence (i.e. 15%).

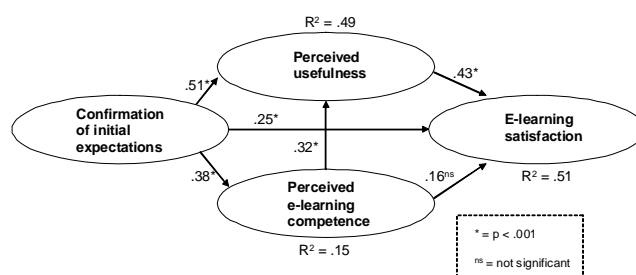


Fig. 2 PLS Results

## VI. DISCUSSION AND CONCLUSION

We found support for five out of six hypotheses in our research model. The obtained results suggest that teachers' confirmation of expectations, perceived usefulness and competence are important in explaining their satisfaction with an e-learning tool. However, hypothesis 6 was not supported, and hence, perceived level of e-learning competence seems not to influence teachers' satisfaction with an e-learning tool.

The results indicate that teachers' perception of how useful an e-learning tool is, together with their confirmation of initial expectations, constitute the most important factors in explaining their satisfaction level. Moreover, both the level of confirmed expectations and perceived e-learning competence has a notable influence on satisfaction through perceived usefulness (i.e. respectively .25 (.51\*.49), .16 (.32\*.49)).

The message to IS practitioners are that they should not only focus on technical aspects (e.g. IT maintenance) in connection with e-learning tools, but also use resources ensure and develop users' motivation (cf. confirmed expectations and perceived usefulness) and competence. An example of a IS initiative with the purpose of motivating teachers in their use of e-learning would be to let some teachers representatives participate in the process of choosing "the right" e-learning package for the university's distinctive task needs. This may influence the teachers' level of perceived usefulness in a positive manner.

Future research should continue to investigate the relevance of the investigated independent and intervening variables in conjunction with teachers satisfaction with e-learning, especially with a view to the generalizability of the findings in the present study.

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