

The Role of Intrinsic Motivation in Explaining Students' Willingness to Use Software Applications

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Abstract—The present study was designed to test the influence of intrinsic ICT-motivation, perceived usefulness and ease of use on business students' willingness to use a particular software package. A questionnaire was completed by 196 business students in Norway. We found that 34% of the variance in the students' willingness to use the software could be explained by the three proposed antecedents. Intrinsic ICT-motivation seems to be the most important predictor of students' satisfaction willingness to use the software package.

Keywords—Spreadsheet, business students, technology acceptance, intrinsic motivation.

I. INTRODUCTION

UNIVERSITY students, studying business administration, use spreadsheet to practice e.g. budgeting, investments analysis and breakeven point analysis. The main purpose of teaching them to use this software package is to provide them with skills that make them qualified to solve economic problems and perform economic analysis in a future job. A necessary prerequisite for students' willingness to use software packages that they perceive this software package to be useful and relatively easy to use. We also know that autonomy, enjoyment and job satisfaction are important issues for young employees. The Technology Acceptance Model (TAM) describes perceived usefulness (PU) and ease of use (EOU), as the two main drivers of users' willingness to use a software package. We propose that TAM is a very technology centric model and that the users' genuine intrinsic motivation to use a software package may be just as important as PU and EOU. Our reason for proposing this is that intrinsic motivation, in contrast to PU and EOU, refers to users' performance of an activity for no apparent reason other than the enjoyment of the process of performing the activity.

As indicated above, the purpose of the present study is to utilize core variables from TAM by Davis [2] to test how critical intrinsic motivation may be for students' willingness to use a software package in a future job. Prior IS-research has typically investigated intrinsic motivation conceptualized as playfulness or enjoyment [4]. Our theoretical platform is

however, self-determination theory (SDT) where intrinsic motivation is conceptualized as genuine autonomous or self-determined motivation [3].

The organization of this paper is as follows: In the next section we present and adapt the original TAM and the concept of intrinsic motivation from SDT in accordance with the purpose of the present study. Then we describe survey procedures, data analysis and provide the results. In the final section, we discuss the implications of our research findings and suggest some directions for further research.

II. THEORY

The technology acceptance model (TAM) consists of five variables; perceived usefulness (PU), perceive ease of use (PEU), attitude toward using, intentions to use and actual use [2]. The short version of TAM consists of three core variables; PU, PEU and intentions to use. In accordance with the purpose of the present study we find the short version of TAM most appropriate.

PU is defined as the degree to which a student believes that using a particular software package would enhance his or her economic problem solving performance. EOU is defined as the degree to which a student believes that using a particular software package would be free from effort. And finally, intentions to use are defined as the students' willingness to use a particular software package in a future job.

Self determination theory (SDT) consists of three basic psychological needs that underlies motivation and two main categories of motivation; extrinsic and intrinsic [3]. Motivation within this theory refers to reasons for carrying out an activity which vary along a self-determination continuum, where a motivation (i.e. lack of motivation) and intrinsic motivation (i.e. genuine interest and enjoyment) are the extremities. Extrinsic types of motivation refer to a spectrum of four intermediate regulations, where perceived usefulness is classified autonomous form of extrinsic motivation (cf. identification). Intrinsic motivation is, in contrast to extrinsic motivation, a question of true enjoyment. There are no external incentives (i.e. salary or social status) involved in intrinsic motivation, only intrinsic pleasure.

Our research model consists of four variables; PU, PEU, intrinsic motivation and intentions to use (cf. Fig. 1). Intrinsic motivation is expected to be a source to PU, EOU and intentions to use, because students that enjoy the process of learning a software package will have a desire to continue to use the software. This is supported by previous research, which has shown that intrinsic motivation (i.e. typically

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perceived playfulness) is a significant antecedent of users' intention to use a technology [4].

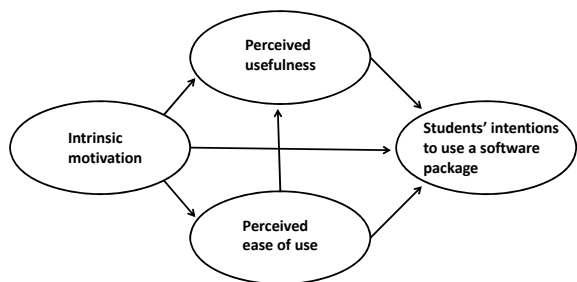


Fig. 1 Conceptual model

III. THE STUDY

A. Sample and Data Collection

The research sample consisted of 196 business students from a University College in Norway. The students were located on two different campuses. All students were in their first semester and participated on an ICT in economics course. The purpose of the course was to learn them to utilize the spreadsheet Excel to perform economic analyses like investments analysis and breakeven point analysis.

To collect data, we developed a questionnaire based on established and widely used measurement instruments (i.e. these are described in the next section). Prior to the distribution of the questionnaire, we refined the instruments through an informal pre-test among students and experienced teacher in economics. The interviews resulted in important insights in measurement instruments and wording of items. This test led to some minor adjustments of the questionnaire items, mainly through more precise wording relative to the context chosen. We believe that our use of previously validated instruments together with the process of item improvements resulted in sufficient content validity for all the measurement instruments.

Questionnaire distribution and returns were by ordinary mail. Out of 261 potential respondents, a total of 196 usable questionnaires were collected, for a response rate of 75%. The response rate was not unexpected, since not all students were present in the classroom when we distributed the questionnaire. Fifty-nine percent of the respondents were women. Eighty-seven percent of the respondent was 30 years old or younger.

B. Measurement Instruments

The items used to operationalize the variables in our research model were adapted from the literature, with changes in wording reflecting the IS targeted in our sample and the specific user context. The Instruments on PU were adapted from Bhattacharjee [2] while the EOU and intention to use instruments was adapted from Davis [1]. Intrinsic motivation was measured with an instrument adapted from Roca and Gagé [4]. All items were measured using a seven point Likerttype scale, with "strongly agree" and "strongly disagree" at each end of the scale.

IV. RESULTS

We used the structural equation modeling (SEM) tool LISREL to analyze the proposed research model. Fig. 2 summarizes the results from the test of the structural model. The effect of the explanatory variables in the research model is represented by the path coefficients followed by asterisk to indicate whether the coefficient is significant. All six path coefficients in the model had significant t-values (i.e. value > 1.96) and their range is from weak (0.22) to medium magnitude (0.36).

Fitting the model to the sample data resulted in a Chi-Square value of 88.28 (df = 59, p < 0.008), a Chi-Square/df ratio of 1.50, a GFI (goodness-of-fit index) value of .93, and a RMSEA (rootmean-square error of approximation) of .05. The model explains 42% of the variance in students' intentions to use Excel in a future job.

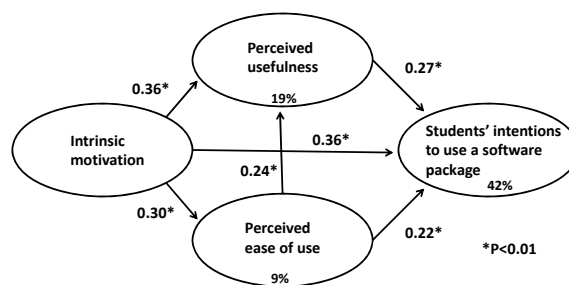


Fig. 2 Results from SEM analysis

V. DISCUSSION AND CONCLUSION

ICT in general, and particularly spreadsheet applications, is a critical tool to prepare business students on the reality they will meet in a future job. In this paper we have investigated whether it is traditional ICT centric motives as PU and EOU or pure experience of enjoyment that influence business students' willingness to utilize a spreadsheet in a future job.

We found support for six hypotheses in our self-determination theory extended IS-acceptance model. The obtained results suggest that intrinsic motivation, which was the variable we added from the self-determination theory, is important in explaining students' willingness to utilize a spreadsheet in a future job. Fourth two percent of students' intentions to use spreadsheet were explained by intrinsic motivation, PU and EOU. More specifically, 13% of the variance was explained by PU (i.e. identified regulation), 18% was explained by intrinsic motivation and 11% by EOU. Based on these findings, the main theoretical implication is that an extension of IS-acceptance theory (i.e. TAM) with intrinsic motivation has merit.

Based on the empirical results, some challenging implications for teachers emerge from this study. Most important of all, students' level of intrinsic motivation toward usage of a software package like Excel seems to be the most critical factor for their development of intentions to use the package in a future job. The question is how teachers may facilitate students' development of intrinsic motivation. According to self-determination theory, intrinsic motivation

grows when three basic psychological needs are covered through the learning process; the need for autonomy, competence and relatedness. This indicate e.g. that teachers' may facilitate students' possibility to self-initiate and self-regulate own behavior as a part of the learning process. Possible measures may be to initiate problem and/or project based learning where students' has the possibility to be in charge of their own learning process.

The results also indicate that PU and EOU are important for students' development of intentions to use a software package in a future job. Teachers' should therefore be aware of students need to understand why a spreadsheet is important for efficient performance of economic analyses and further that they need support to reach a adequate level of proficiency.

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