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Determınants of Students' Effort ın Learnıng ERP: The TAM and UTAUT Model Approach

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ABSTRACT

Adoption of ERP systems is increasingly widespread, this is related to the high demand by large companies and SMEs for graduates with good ERP experience. This demand for ERP skills encourages universities to include this specialized knowledge in the course curriculum. Therefore, this study examines the factors that influence students' efforts when using the ERP system as a learning tool by developing a research model based on the Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT) and dimensions of self-efficacy. The research sample included 225 respondents who took part in ERP-based learning courses, using the convenience sampling method. The results of the PLS_SEM analysis show that attitudes have a significant influence on student learning efforts. This result is supported by the finding that perceived performance expectations and perceived student effort expectations have a positive impact on ERP software. In addition, students' perceived effort expectations have a positive impact on perceived performance expectations, and self-efficacy has a positive impact on students' perceived effort expectations on ERP software. Thus, these findings emphasize that today's students are very interested in technology-based courses with direct practical implementation. Therefore, study program/department managers can follow up on these findings to trigger links and matches between the academic world and industry.

Keywords: Student learning efforts, Attitudes toward learning of ERP, Performance expectancy and Effort expectancy, Self-efficacy

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INTRODUCTION

Organizations are always looking for ways to gain a competitive advantage. Colleges as educational organizations play an important role in student life because they not only provide the necessary education, but also prepare students to earn a living by entering the job market (Tomlinson, 2012). Universities always strive to develop their curriculum to be able to fulfill this role. This is in accordance with Wilton's (2014) statement that educational institutions emphasize on developing skills that are preferred by the industry.

One way to increase practical exposure and improve students' employability is to introduce students to software that is useful for the organization and give students a hands-on experience in using software. For example, valuable software is Enterprise Resource Planning/ERP (Jewer & Evermann, 2014). The development and use of an enterprise resource planning (ERP) system is considered one of the viable alternatives. According to Klaus, Rosemann, and Gable (2000) Enterprise Resource Planning (ERP) software is a comprehensive package solution that integrates all business processes and functions into one complete information system.

The ERP concepts learned experientially by students are very valuable for companies, because the learning is more effective and long-lasting (Jewer & Evermann, 2014). This helps the future of workers, to get better provisions when entering the labor market and to contribute to the business from day one (Nisula & Pekkola, 2012). Hardaway, Harryvan, Wang, & Goodson, (2016) and Wimmer & Hall, (2016) state that students with ERP skills and knowledge have greater job opportunities. ERP systems are important for organizations, so universities have the responsibility to equip students to be able to work in the ERP environment (Alshare & Lane, 2011). The introduction of hands-on ERP training in educational institutions helps in this regard, as the students acquire the technical skills needed through real business problem-solving (Cronan & Douglas, 2012). The relevant literature also shows that students who study ERP systems will improve their business process knowledge (Cronan and Douglas, 2013), feel the benefits to their work (Garača, 2011) and be satisfied with their learning experience (Alshare and Lane, 2011). In addition, studies have shown that ERP training is indeed beneficial for students. For example, it was found that students with broad ERP skills received relatively higher salary offers, even compared to students with higher GPAs (Cronan & Douglas, 2012; Hepner & Dickson, 2013).

According to Strong *et al*., (2006) the adoption of ERP systems is getting wider, and there is a high demand by large companies and SMEs for graduates with good ERP experience. The demand for ERP specialists who are professionally trained in business, has motivated business schools to integrate ERP into their curriculum and form alliances with ERP vendors (Iriberri, Kwon, & Henson, 2015). Business schools with such alliances, train students so that they can develop ERP competencies relevant to the industry. Some ERP vendors help this process by offering hosted ERP solutions that reduce or avoid implementation and maintenance costs for educational institutions (Hepner & Dickson, 2013).

In ERP learning, students are expected to learn and utilize different software packages during their studies, however they may not utilize and exert effort in learning the software, as they may feel that the software package is imposed on them (Alshare, 2009). Therefore, it is very important to know the efforts of students in studying ERP. Based on the existing literature, it appears that only a small part of the research is devoted to the integration of ERP systems in education. In addition, very few articles examine the factors that affect students' efforts when using ERP systems as learning tools. In this study, the researcher proposed a study on the factors that affect students' efforts in learning ERP by including students' self-efficacy. In addition, specifically, the researcher proposed a *model of Unified Theory of Acceptance and Use of Technology* (UTAUT).

Context of Research and Hypothesis Development

ERP in Education

Adequate ERP skills are in high demand in the market. This demand is mainly due to the fact that almost all large companies have adopted ERP systems and more and more SMEs are adopting them. It is true, user education and training is one of the most mentioned determining factors for the success of ERP implementation (Al-Fawaz, Al-Salti, and Eldabi, 2008). ERP software supports the integration of business processes and benefits management (Tsai, Lee, Shen, & Lin, 2012) because it facilitates the flow of information within the company by storing data in a common database (Alcivar & Abad, 2016). Today, ERP is ubiquitous in commercial organizations and is useful for running business operations (Patterson, 2013). However, learning how to use this software is very challenging (Bueno & Salmeron, 2008; Rajapakse, 2012) and prospective employees who understand ERP well and feel comfortable using it will have added value for the organization. Today, several ERP vendors such as SAP, Oracle, and Microsoft are supporting business schools to integrate ERP in their curricula (Cronan & Douglas, 2012). The introduction of ERP software in the business school curriculum is driven by the need to integrate knowledge from various management disciplines such as operations and logistics, marketing, accounting, and information systems (Cronan & Douglas, 2012).

The opportunity to gain hands-on experience on ERP software increases students' intrinsic motivation to learn and provides a challenging environment for problem-based and experiential learning (Legner, Estier, Avdiji, & Boillat, 2013). The combination of hands-on experience along with management learning through reading and discussion is an effective classroom teaching method (Jewer & Evermann, 2014). This method equips students with practical skills that add value to their theoretical knowledge (Hardaway et al., 2016).

ERP Acceptance Theory

The adoption and use of new technologies in educational settings is becoming increasingly important, especially with the increasing prevalence of enterprise resource planning systems (Frank & Milković, 2018). Previous research has applied models such as the Technology Acceptance Model and the Integrated Theory of Technology Acceptance and Use to understand the factors that affect the acceptance and use of these learning technologies by students.

The Technology Acceptance Model is a widely used framework that states that two key factors, perceived usability and perceived ease of use, determine an individual's intention to use technology (Reinicke & Marakas, 2005; Scherer et al., 2019) . Perceived usability refers to the extent to which a person believes that using a system will improve their performance, while perceived ease of use reflects the extent to which one expects a system to be effort-free (Reinicke & Marakas, 2005; Scherer et al., 2019) .

Building on TAM, the Integrated Theory of Technology Acceptance and Use incorporates additional determinants such as performance expectations, effort expectations, social influence, and facilitation conditions (Scherer et al., 2019). These factors are hypothesized to influence behavioral intent and usage behavior, with the effects moderated by factors such as gender, age, experience, and willingness to use (Scherer et al., 2019).

Understanding the determinants of students' efforts in studying enterprise systems is essential for designing effective educational initiatives and interventions. Factors such as performance expectations, which capture the extent to which students believe the ERP system will help them achieve better academic results, as well as effort expectations, which reflect perceived difficulties in learning and using the system, tend to play a key role (Huang & Kao, 2015).

Social influence, which reflects the extent to which students perceive others who are important (e.g., instructors, peers) believe that they should use an ERP system, may also be an important determinant of students' efforts (Huang & Kao, 2015). Additionally, facilitating conditions, such as the availability of resources and support to help students use the ERP system, can affect their willingness to invest effort in learning the system (Alshehri et al., 2019).

By integrating perspectives from TAM and UTAUT, this review aims to provide a comprehensive understanding of the key factors that influence students' efforts in ERP learning (Aljarboa & Miah, 2020; Tarhini et al., 2013). This knowledge can inform ERP learning system design and related pedagogical strategies to better support student engagement and success.

Hypothesis Development

The UTAUT and TAM models affirm that users' perceptions of the usefulness (performance expectations) and ease of use (effort expectations) of an information system, social influences, and facilitating conditions affect their intentions and subsequent usage behaviors. In mandatory situations where usage is necessary, Brown, *et al* (2002) argue that the attitude of the user replaces the intention. Indeed, previous studies have shown that attitudes are strongly correlated with usage behavior when examined in a mandatory setting (Brown et al., 2002; Yousafzai, Foxall, and Pallister, 2007a; Yousafzai, Foxall, and Pallister, 2007b). In the classroom, usage behavior is related to the effort students make in learning a particular type of ERP system. Therefore, this study hypothesizes that students' attitudes are the main factors influencing their efforts in studying ERP:

H1: Positive attitudes (AT) towards ERP software have a significant influence on students' (EF) efforts in learning ERP software.

Students' perception of effort expectations (EE) and performance expectations (PE) of certain information systems can explain their attitudes. In addition, EE positively affects the way students perceive its usefulness (PE).

Therefore, the following hypothesis is proposed:

H2: Students' perception of performance expectations (PE) has a positive impact on their attitude (AT) towards ERP software.

H3: Students' perception of effort expectations (EE) has a positive impact on their attitude (AT) towards ERP software.

H4: Perception of student effort expectations (EE) has a positive impact on the perception of performance expectations

In the original model, Davis (1989) suggested that the model could be extended by exploring other external variables that might affect ease of use, usability, and user intent and use. This study combines the external variable of self-efficacy, as an independent variable in the study. Self-efficacy is an individual's belief in his or her ability to perform certain tasks (Roca, Chiu, and Martinez, 2006). The concept of self-efficacy starts from social cognitive theory. This has previously been observed as a prelude to user acceptance of technology and has been found to have an impact on user attitudes (Shivers-Blackwell and Charles, 2006).

The assessment that students feel about their own ability to carry out ERP activities will affect their perception of the ease of use of ERP (EE) software. Therefore, the researcher proposes the following:

H5: Student Self-Efficacy (SE) has a positive impact on the perception of effort expectation (EE) of ERP software.

METHOD

This study uses a quantitative research approach. Survey methodology is used to collect data. The items used to construct each of the variables were mostly adopted from previous literature reviews. The questionnaire consisted of items that measured attitudes, business expectations, performance expectations, self-efficacy and ERP learning efforts on a five-point scale of Likert type. The target group is ERP system users, namely students who take ERP-based courses at the Faculty of Business and Economics, Islamic University of Indonesia, totaling 225 respondents, using the convinience sampling method.

After the data is collected, the data is processed using *the* Software Package for Social Sciences and *the* Smart PLS software (SEM software). The causal relationship of the hypothesis model was tested using the least squared partial path (PLS) modeling method. Following the instructions of Becker, Klein and Wetzels (2012) the following steps are taken to prepare a model of structural equations using Smart PLS: (1) a latent variable is created and a related measurement item is assigned to it; (2) and the independent variable is related to one dependent variable.

In the descriptive analysis, this study relies on the Software Package for Social Sciences, while Smart PLS, an SEM program, has been used for confirmatory factor analysis, model suitability, and effect analysis. PLS can be applied in many small sample examples when other methods fail (Henseler et al., 2014). Regular PLS algorithms and bootstrapping techniques are performed in Smart PLS to perform exploratory factor analysis, confirmatory factor analysis, and investigate the direct influence of variables in the model. To ensure the stability of the results, following the recommendations of Hair, Sarstedt, Ringle and Gudergan (2023), PLS bootstrapping was completed using 10,000 bootstrap subsamples.

RESULTS

Respondent Description

Respondent Profile Based on Year of Higher Education Enrollment

Figure 1. Respondent Profile Based on Batch of Higher Education Year

Based on the data in Figure 1, it appears that most students who take ERP-based courses are 92% of the 2021-2022 batch. Meanwhile, based on gender, the most are men at 55.6% and women at 44.4% (Figure 2).

Respondent Profiles by Gender

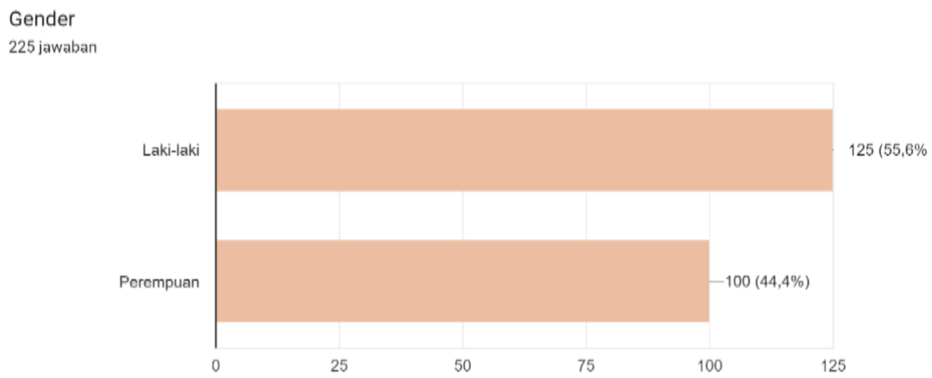

Figure 2. Respondent Profiles by Gender

Measurement Model Testing (*Outer Model)*

This research was carried out by testing the validity and reliability of each variable to be tested. Validity and reliability analysis is an important step in the measurement and evaluation of structural models. This study uses the Structural Equation Modeling Partial Least Squares (SEM PLS) method to analyze the constructs involved. Validity and reliability analysis is an important step in the measurement and evaluation of structural models.

Table 1. Construct Reliability and Validity

Construct	Item	Outer Loading	AVE	Cronbach Alpha	CR
Attitude toward using ERP	AE1	0,841	0,760	0,895	0,927
	AE2	0,870			
	AE3	0,903			
	AE4	0,873			
Effort Expectancy	EE1	0,825	0,678	0,842	0,894
	EE2	0.824			
	EE3	0.825			
	EE4	0,820			
Learning Effort to ERP	LE1	0,942	0,889	0,937	0,960
	LE2	0,933			
	LE3	0,953			
Performance Expectancy	PE1	0,883	0,761	0,895	0,927
	PE2	0,875			
	PE3	0,904			
	PE4	0,824			
Self-Efficacy	SE1	0,722	0,603	0,781	0,858
	SE2	0,761			
	SE3	0,838			
	SE4	0.779			

The reliability of the construct is evaluated using two main metrics: Cronbach's Alpha and Composite Reliability (CR). These two metrics are used to assess the internal consistency of the items that make up each construct. A Cronbach's Alpha value above 0.7 is considered to indicate good reliability, while a CR value greater than 0.7 indicates that the construct has adequate reliability (Hair et al., 2014). From the data presented in Table 1, all constructs have values above 0.7 which indicates that the items in each construct are internally consistent.

The validity of the construct was tested using Average Variance Extracted (AVE) and Outer Loading. Average Variance Extract (AVE) is used to assess the validity of convergence, i.e. how much an indicator variable explains the latent variable. An AVE value greater than 0.5 is considered adequate, indicating that more than half of the variance of the items in the construct can be explained by the construct. Based on the data in Table 1, all constructs have an AVE value above 0.5, which indicates good convergence validity. Outer Loading is used to assess the validity of convergence at the item level, an outer loading value above 0.7 is considered to indicate a strong contribution of the item to the construct. The data in Table 1 shows that almost all items have an outer load above 0.7, which indicates that these items are valid in measuring their respective constructs.

Cross-loading tables are used to evaluate the validity of the discrimination. The SEM-PLS criterion says if there is a greater correlation between the latent variable and each item than the correlation between other latent variables, then that latent variable has a better prediction than other latent variables. The results of the validity of discrimination in Table 2 show that the majority of each variable has a greater value than the variable below it. Thus, the results of the validity of the discrimination can be used to determine that this research variable has good results.

Table 2. Discrimination Validity Results

Construct	Attitude toward using ERP	Effort Expectancy	Learning Effort to ERP	Performance Expectancy	Self - Efficacy
Attitude toward using ERP	0,872				
Effort Expectancy	0,773	0,823			
Learning Effort to ERP	0,707	0,597	0,943		
Performance Expectancy	0,798	0,725	0,693	0,872	
Self -Efficacy	0,658	0,651	0,556	0,619	0,776

Testing the Structural Model (*Inner Model)*

One of the methods to conduct structural model tests is the collinearity test, which assesses the relationship between latent variables. Potential collinearity problems arise if the VIF value is greater than 5 and the tolerance value is 0.20 or lower (Hair et al, 2017). When the level of collinearity is very high or the VIF value is 5 or more, then it should be considered to remove one of the corresponding indicators (Hair *et al*, 2017).

Table 3. Collinearity Test

	Attitude toward using ERP	Effort Expectancy	Learning Effort to ERP	Performance Expectancy	Self- Efficacy
Attitude toward using ERP			1,000		
Effort Expectancy	2,108			1,000	
Learning Effort to ERP					
Performance Expectancy	2,108				
Self-Efficacy		1,000			

Based on the results of the collinearity test (Table 3), it can be concluded that all relationships between variables do not have collinearity problems because all scores are more than 0.50. Furthermore, the predictive ability of the research variables was tested. Predictive capabilities are carried out to measure the strength or predictive ability of independent variables against dependent variables (Hair *et al*., 2017). In measuring predictive capabilities, there are two measurement parameters, namely using R-Square to test the determination coefficient and Q-Square to test predictive relevance.

The standard for measuring R-Square is that if you get a score of 0 - 0.25, it can be said that the prediction ability is weak, if you get a score of 0.26 - 0.50, it can be said that the prediction ability is moderate, and if you get a score of 0.51 - 0.75, it can be said that the prediction ability is high. The data in Table 4 shows the combined effect of variables on the endogenous latent variable that is already good.

Table 4. R Square Value

	R Square	Information
Attitude toward using ERP	0,716	High
Effort Expectancy	0,424	Moderate
Learning Effort to ERP	0,500	Moderate
Performance Expectancy	0,526	High

The Q-Square *value* is a structural model signal generated from a sample or precise data predictor, which is not used in model estimation (Hair *et al*., 2017). In a structural model, the Q- Square value must be greater than zero ($Q^2>0$) to indicate a specific endogenous latent variable that indicates the relevant path model prediction for a given dependent construct. If the Q-Square value is less than zero, then the path model or hypothesis has no predictive relevance. The Q-Square value is obtained by using the blindfolding procedure. The Q-Square test results have a positive value so that they have met the cut-off (Table 5).

Table 5. Q Square Value

	SSO	SSE	Q^2 (=1-SSE/SSO)
Attitude toward using ERP	900,000	417,266	0,536
Effort Expectancy	900,000	647,376	0,281
Learning Effort to ERP	675,000	377,801	0,440
Performance Expectancy	900,000	546,697	0,393
Self-Efficacy	900,000	900,000	

The coefficient significance test or hypothesis test is carried out by bootstrapping technique. The hypothesis test was measured by t-value and p-value parameters. The hypothesis is considered significant if the t-value is greater than 1.96 and the p-value is less than 0.05.

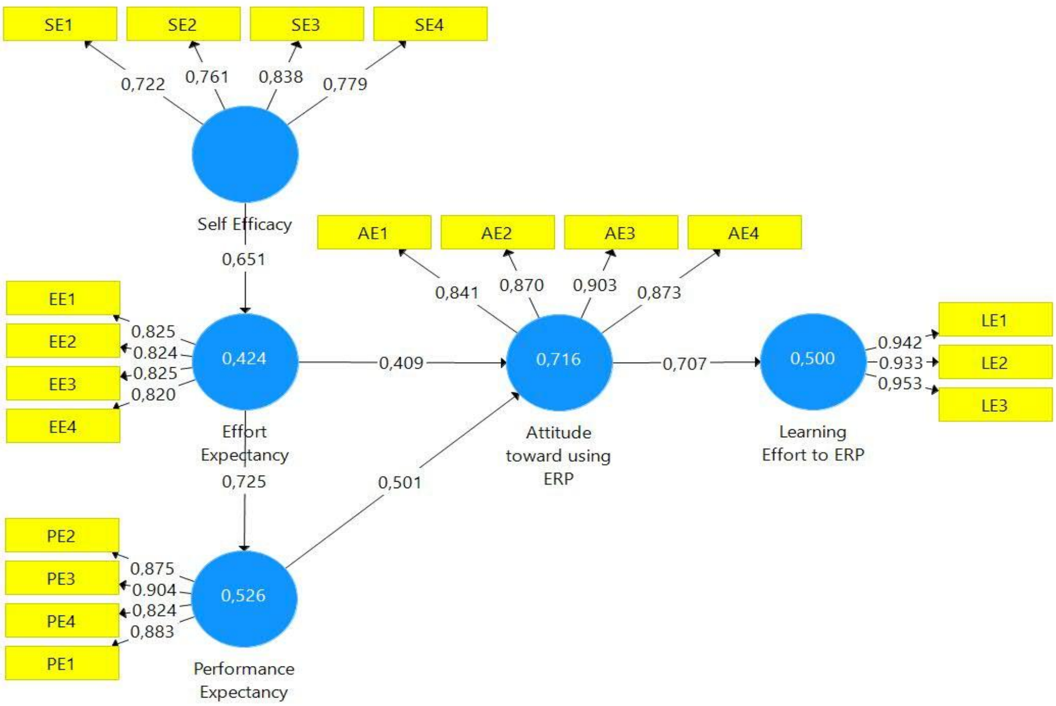

Figure 3. PLS Algorithm

Based on the data in Table 6 and Figure 3, it can be concluded that all hypotheses are supported. Hypothesis testing shows that attitude toward using ERP has an effect on learning effort to ERP. This result is supported by the finding that the perception of performance expectations and the perception of student effort expectations have a positive impact on attitudes in learning ERP software. In addition, the perception of student expectations has a positive impact on the perception of performance expectations, and self-efficacy has a positive impact on the perception of student expectations on ERP software.

Table 6. Hypothesis Test Results

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Attitude toward using ERP -> Learning Effort to ERP	0,707	0,704	0,048	14,795	0,000
Effort Expectancy -> Attitude toward using ERP	0,409	0,408	0,057	7,230	0,000
Effort Expectancy -> Performance Expectancy	0,725	0,720	0,045	16,140	0,000
Performance Expectancy -> Attitude toward using ERP	0,501	0,501	0,059	8,552	0,000
Self-Efficacy -> Effort Expectancy	0,651	0,651	0,048	13,655	0,000

DISCUSSION

The results show that students' perception of business expectations (ease of use of software) and performance expectations (usability) of ERP software significantly predicts student attitudes, which in turn has a significant impact on the level of student effort in learning ERP software. This shows that one of the most important aspects for students when evaluating the usefulness of learning ERP software depends on their career and course of study.

In addition, more importantly, this study provides evidence that the UTAUT and TAM models, are strong as a theoretical lens for examining the use of ERP software in education. Consistent with Venkatesh et al. (2003), the two UTAUT constructs (performance expectations and effort expectations) have a significant and positive impact on ERP software learning attitudes. Performance expectations were observed to have the strongest influence on attitudes towards learning among all determinants. This significant relationship is consistent with the literature on electronic learning (Lakhal et al., 2013; Nistor et al., 2013) and implies that if students consider studying ERP valuable for their careers. To improve student effort and thus maximize ERP learning, educators who use ERP software in the classroom, must ensure that student attitudes towards ERP are positive by highlighting its usefulness. Therefore, ERP vendors need to create awareness about the learning usability of ERP software, provide up-to-date learning content, and provide access to the latest technology when engaging students. Additionally, learning well-designed ERP software can help eliminate the perception of complexity and in turn can increase its acceptance. It is also important for universities to increase perceived performance expectations by highlighting the added value of ERP software learning to careers, rather than just projecting it as part of the curriculum. Colleges need to consider emphasizing the important nature of ERP in the industry and the benefits of learning it.

This study also found that one of the most important determinants of users' perception of business expectations is user self-efficacy, which leads to more attention to its impact in ERP learning. This belief is reflected in the moderate self-efficacy of students. Self-efficacy plays an important role in encouraging effort expectancy in ERP software learning. This implies that students who have confidence in their ability to learn ERP will achieve success. Meanwhile, the attitude formed by students towards ERP software is influenced by their perception of the usability and effort to use the software. This is supported by the results of the study which shows that there is a relationship between students' attitudes towards ERP learning efforts and the amount of effort they are willing to make to learn it.

CONCLUSION

The adoption of ERP software in business continues to grow in small and medium-sized companies as well as in large enterprises, therefore information systems academics should pay more attention to the factors that can support students' efforts to learn them. This study has shown that the application of the TAM and UTAUT models provides a good theoretical basis to test students' efforts in learning ERP software. Indeed, the results replicate the findings of previous examinations found in the information systems literature. We followed the advice of researchers who have adopted TAM and UTAUT in their studies and included additional antecedent factors of self-efficacy as a major factor influencing students' perceptions of effort expectations.

Thus, the findings of this study will provide insight into the key factors influencing the effort to study ERP systems, which can inform the development of ERP education strategies and curricula more effectively.

Recommendations

Based on the findings above, instructors need to remember the strong impact of attitudes, performance expectations, and effort expectations on students' efforts to learn ERP software. Therefore, more emphasis needs to be placed on creating a positive attitude, which can be achieved by making ERP learning more enjoyable and engaging. This in turn will have a more positive impact on students' efforts to learn ERP software. In the same way, instructors need to emphasize the ease of use and usability of the ERP system by, for example, communicating the short-term and long-term benefits of learning ERP software, providing clear instructions on how to use the system.

In addition, student self-efficacy is also an important factor even at a lower level. In order to improve students' overall attitude towards ERP systems, instructors can increase students' knowledge of ERP systems by developing interesting materials related to ERP. They can design clear learning goals and expectations and deliver the material in a way that is easy for students to understand. Managing the material in a smooth and logical way will affect students' perception of the ease of use of the ERP system. In addition, instructors need to build students' confidence in their ability to understand and apply the concepts they learn by emphasizing practical exercises.

To improve students' self-efficacy, instructors can integrate practical training sessions into the learning structure and assign lab assistants to help students better understand the concepts discussed. As found in this study, college students are career-oriented and will make an effort to learn ERP software if they believe it will help them succeed. To highlight the importance of ERP software learning for students, instructors can invite professionals to talk about the use of ERP in the industry, share the success stories of professionals who use ERP to their advantage, share abundant statistics on the level of ERP use in the industry, and invite professionals to the classroom to talk about career opportunities in the field.

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