Using Technology Acceptance Model (TAM) to Explain Teachers' Adoption of Digital Technology in Business Education

Nur Rahmi Akbarini[1]*   iD

[1] Sebelas Maret University, Surakarta, Indonesia
Corresponding author: nurrahmia@staff.uns.ac.id

Abstrak

Penggunaan teknologi dalam proses pengajaran dapat mempermudah proses belajar mengajar dan membuatnya efektif serta efisien. Sejauh ini penelitian mengenai penerimaan teknologi banyak dilakukan di perguruan tinggi, namun sedikit sekali penelitian yang menyoroti guru Sekolah Menengah Kejuruan khususnya bidang bisnis. Penelitian survei ini bertujuan untuk menganalisis pengaruh dari variabel-variabel technology acceptance yaitu: Perceived of usefulness (PU) dan Perceived of Easy-of-Use (PEU) terhadap variabel penerimaan teknologi yaitu: Behavioral intention (BI) dan Actual Use (AU) pada guru SMK bidang Bisnis dan Manajemen di Kota Surakarta. Populasi penelitian ini merupakan seluruh guru SMK bidang Bisnis dan Manajemen di Kota Surakarta. Pada akhir penelitian diperoleh jawaban lengkap dari 172 guru yang terlibat dalam pengajaran mata pelajaran bisnis di Sekolah Menengah Kejuruan. Pendekatan Partial Least Squares (PLS) terhadap pemodelan persamaan struktural (SEM) digunakan untuk menguji hipotesis penelitian. Hasil penelitian menunjukkan bahwa terdapat dampak yang sangat signifikan dalam penyelidikan empiris ini khususnya pada PEU dan PU, serta PEU dan PU terhadap BI, selanjutnya BI juga terkonfirmasi berpengaruh signifikan terhadap AU. Hasil penelitian ini diharapkan dapat memberikan wawasan yang lebih mendalam tentang faktor-faktor yang memengaruhi adopsi teknologi oleh guru dalam pendidikan bisnis. Implikasi dari temuan penelitian ini diharapkan dapat memberikan kontribusi bagi pengembangan pendidikan bisnis yang lebih efektif dan inovatif melalui pemanfaatan teknologi digital.

Kata Kunci: TAM, Adopsi Teknologi, Guru Pendidikan Bisnis.

Abstract

The use of technology eases and makes teaching learning process effective and efficient. Thus far, researches on technology acceptance in higher education has been widely conducted; however, only few has focused on vocational high school teachers, especially in the field of business. This survey research aims to analyze the influences of technology acceptance variables: Perceived of usefulness (PU) and Perceived of Ease of Use (PEU) towards two other acceptance variables: among vocational high school (SMK) teachers in the Business and Management field in Surakarta. The population of this research was all vocational high school teachers in the Business and Management field in Surakarta. At the end of the research, there were 172 responses obtained from the teachers involved. Partial Least Squares (PLS) on Structural Equation Modelling (SEM) was used to test the research hypotheses. The empirical findings show that there are significant influences; particularly on PEU and PU, as well as PEU and PU on BI. Furthermore, BI is also proven to have a significant influence on AU. The findings are expected to provide deeper insights into the factors influencing technology adoption by teachers in business education. Moreover, the implication is foreseen to contribute on the development of more effective and efficient business education through the use of digital technology.

Keywords: TAM, Adoption of Digital Technology, Business Education Teacher.

1. INTRODUCTION

The rapid digital technology development triggers a fundamental and comprehensive change in almost every aspect of life. This poses both threat and challenge to human survival. In contrast to earlier times, 21st-century learners are growing up in a digital world. Having digital resilience is important so that learners are not negatively impacted by the technology advancements. Previous research states that strengthening digital resilience is vital for 21st-century learners (Livingstone et al., 2023; Straker et al., 2018). Rapid and unpredictable development results in the difficulty to make sure the teaching and learning effectiveness both for teachers and learners (Rapanta et al., 2020, 2021). Teachers are encouraged to

develop technology-enhanced and learner-centered learning in order to meet the learners' current needs (Bakir, 2015; Hur et al., 2016). The success on the use of ICT by teachers are determined by motivation, knowledge, perspective, and attitude towards technology, thus understanding the factors influencing teachers' technology acceptance is significant to plan an effective strategy that will result in better instruction (Akbulut et al., 2019; Korucu, 2017; Scherer & Teo, 2019). The previous research findings show that teachers are aware that technology enhances instruction, hence, they are willing to adopt technology (Ndebele & Mbodila, 2022; Olasina, 2019). Many survey researches conducted in developed countries show that integrating technology does not simplify teaching and learning activities; instead, adopting computers in teaching is a complex and challenging innovation such as high levels of resistance to change among teachers. Furthermore, it involves new pedagogical-technological practices (Eksail & Afari, 2020; Granić & Marangunić, 2019).

The influences on the use of technology in teaching learning process has been engaging discussion, numerous researches have revealed these. Technology makes knowledge transfer easy and comfortable (Al-Malah et al., 2020; Raja & Nagasubramani, 2018). From the learners' perspective, technology effectively helps them to learn, develop problem-solving skill, establish thinking framework, and understand process (Asad et al., 2020; Haleem et al., 2022). However, this influence can be positive or negative, as stated by several experts who state that the use of technology in education affects students' imagination and reduces their thinking abilities (Al-Malah et al., 2020; Raja & Nagasubramani, 2018). From teachers' perspective, technology is time consuming. Nevertheless, technology is essential that learners should be accustomed to in order that they are able to explore deeper knowledge. Technology-enhanced learning environment typically encourages learners interaction more consistently (Haswani, 2014; Sinha, 2022). It is found by similar research that there is positive proof regarding the technological proficiency of teachers as observed through learners' perspectives (Drajati & Putra, 2023; Septiyanti et al., 2020). These perceptions can significantly aid teachers in reflecting on their teaching methods and support them in enhancing their teaching skills.

In Indonesia, problems related to the use of technology in education still frequently occur. Based on the Service Delivery Indicator (SDI) done by Kemdikbud (Ministry of Education and Culture) and Kemenag (Ministry of Religious Affairs) in 2020, 67% teachers have difficulty in operating and using online learning platform (Hartono, R. et al., 2023; Hidayatullah et al., 2023). In vocational schools, technology plays an important role as the aim of the schools is to form a skilled and competitive workforce, especially in the field of information technology. Therefore, teachers who lack of technology expertise having a competitive disadvantage in the job market compared to those with experience in using technology. Technology plays a role to not only help learners to study but also assist teachers to utilize facilities that will enhance their instruction (Budiman, 2017; Zulfitria et al., 2020). Unfortunately, the ability to use technology cannot be instantly learned, while the current conditions force teachers to learn and master the technology. The support to use technology is not effortlessly accepted even though there are numerous researches revealing the benefits of integrating Information and Communication Technology into the teaching and learning processes (Ndebele & Mbodila, 2022; Olasina, 2019). Business teachers, in particular, are early adopters of technology, preparing learners to use office technology to complete business tasks (Fayolle et al., 2016; Loi et al., 2016). The novelty of this research focuses on the acceptance of technology in the teaching and learning process because teachers act as facilitators in planning learning. In line, affirms that a teacher plays a significant role in achieving the objectives of education (Hardianto et al., 2022; Tyaningsih et al., 2021). Countless literatures focus on teachers' adoption of technology. However, the most dominant model is Technology Acceptance Model (TAM) (Acarli & Sağlam, 2015; Antonietti et al.,

2022; Natasia et al., 2021). TAM consists of several variables explaining behavioral intention and the use of technology, both directly and indirectly (i.e., perceived usefulness, perceived ease of use, attitude towards technology). TAM is a powerful tool to illustrate teachers' adoption of digital technology compared to others (Ranellucci et al., 2020; Scherer et al., 2019). However, regardless its strength, some researches support the hypotheses of TAM influences, while some do not (Alassafi, 2022; Georgiou et al., 2023). This is strengthened by various significant relations of TAM and the whole research that therefore, systematic guidelines are necessary. Moreover, previous analyses cover numerous samples from different education level (Al Darayseh, 2023; Antonietti et al., 2022; Chiu & Lin, 2022; Opoku et al., 2023). There is a lack of a systematic review of TAM for vocational high school teachers in the context of business and management education. However, it is important to synthesize existing findings on the technology acceptance of vocational high school teachers in the field of business and management, as these findings provide further insights into the potential mechanisms behind technology acceptance and their professional development.

2. METHODS

This quantitative research employed Technology Acceptance Model (TAM) developed as a theoretical framework to explain determinant factors in the adoption of digital technology in learning teaching processes in vocational high schools (SMK). The proposed model consists of four variables, namely Perceived Ease of Use (PEU), Perceived Usefulness (PU), Behavioral Intent (BI), and Actual Use (AU) (Venkatesh & Davis, 1996). Compared to other TAM models, this model is more reliable as it was frequently and empirically tested for decades. Therefore, it becomes a fundamental and pivotal theory to understand the behavior of information technology use within a population group (Venkatesh & Davis, 1996). Focusing on PEU and PU, this model simply but comprehensively portrays the main factors influencing users' behavioral intentions in adopting technology because of its straightforward structure and concept that ease the users and the implementation in various contexts and sectors, one of them is in the vocational high school education context and sector. To measure each variable, there were 18 questionnaire statements where each item uses a 5-point Likert scale ranging from (1) "strongly disagree" to (5) "strongly agree." The questionnaire can be detailed in the following Table 1.

Table 1. Questionnaire

Perceived of ease of use (PEU) Variable	
I find it easy to do what I want with e-learning	
E-learning system is not flexible for interaction.	
Interacting with e-learning requires more efforts dealing with my mental state.	(Lah et al., 2020; Venkatesh, 2000)
I find it easy to understand e-learning.	
Overall, e-learning is easy to use.	
Perceived of usefulness (PU) Variable	
E-learning makes teaching more efficient and completes more work than expected.	
E-learning helps me to get beneficial information related to teaching learning process.	(Lah et al., 2020; Venkatesh, 2000)
E-learning enhances my teaching productivity.	
E-learning enhances my work quality.	
E-learning enhances my teaching skill.	

Behavioral intention (BI) Variable	
I want to adopt e-learning in my teaching inside or outside school. I want to adopt e-learning for my future teaching. I recommend others to use this platform. I prefer to adopt e-learning to traditional teaching.	(Venkatesh, 2000; T. Zhou et al., 2022)
Actual use (AU) Variable	
E-learning is frequently used to explain the learning material. E-learning is frequently used to assign task to the learners. I can monitor the learners' achievement through e-learning. I feel satisfied in adopting e-learning for the teaching learning process.	Self – develop

The pre-prepared questionnaire was validated by a panel of five experts, including one assessment expert, two language experts, one subject matter expert, and one practitioner. Aiken's V formula was utilized to measure the content validity of the items in the measurement instrument. When the Aiken's V value approached 1.00, it indicated that the item was highly efficient in portraying the measured construct and had a strong level of content validity. According to the content validity results, items 1 through 18 were all categorized as high, with a rating of 0.89 (see appendix 1). Additionally, there were qualitative remarks from experts that could be considered for minor adjustments before being distributed widely among teachers. The population of this research was all vocational teachers specializing in business and management. The sample was chosen through convenient sampling technique, a kind of non-probability sampling technique in which the researcher chose the participants by herself or the participants chose to be the sample by themselves (Stratton, 2021; Tyrer & Heyman, 2016). This technique was chosen as it involved selecting participants based on their availability and willingness to participate in the research. The questionnaire then was distributed through online media and voluntarily submitted by vocational teachers specializing in business and management. The participants were informed about the research objective and the confidentiality was guaranteed. At the end of the research, 172 completely responded the questionnaire. The method utilized for analyzing relationships between variables was Partial Least Squares Structural Equation Modeling (PLS-SEM). Over recent years, PLS-SEM has gained significant traction and has been widely applied across diverse fields, including the realm of education. A causal-predictive approach in SEM was required, emphasizing prediction by estimating a statistical model structured to provide causal explanations. By employing PLS-SEM, this research was able to test the proposed model and hypothesis with a high level of accuracy and validity as well as provided a deeper understanding on the interaction and the influence of each variable in the context of digital technology acceptance in the learning environment of vocational schools specializing in business and management.

3. RESULTS AND DISCUSSION

Result

This section presents the findings of the research, including respondent demographics, validity and reliability, as well as the structural model and hypothesis testing. The detailed research findings are as follows.

Demographic Respondent

The respondents in this research were 172 vocational high school (SMK) teachers specializing in business and management fields in the ex-Residency of Surakarta. The

success in reaching the majority of the target respondents indicates the potential for achieving complete data and drawing strong conclusions at the end of the research. The demographic mapping of the respondents in this research shows that the sample is dominated by females at 76%. The respondents' teaching experience is mostly comprised of individuals who have been teaching for more than 20 years, with a percentage of 37%. State schools dominate the school status category, with a percentage of 84%. Urban schools dominate the school location category, with a percentage of 90%. Furthermore, in terms of teacher certification status, the majority of respondents are certified teachers, making up 81%. Table 2 shows the complete demographic data of the respondents.

Table 2. Demographic Respondent Characteristics

Gender		
Male	:	41 (24%)
Female	:	131 (76%)
Age		
20 – 30	:	32 (19%)
31 – 40	:	45 (26%)
41 – 50	:	32 (19%)
51 – 60	:	63 (36%)
Teaching Experience		
0 – 5	:	18 (10%)
6 – 10	:	44 (26%)
11 – 15	:	19 (11%)
16 – 20	:	28 (16%)
>20	:	63 (37%)
School Status		
State School	:	145 (84%)
Private School	:	27 (16%)
School Location		
Urban	:	155 (90%)
Rural	:	17 (10%)
Certification Status		
Certified	:	139 (81%)
Not Certified	:	33 (19%)

Validity and Reliability Test

This section presents the findings and discussion based on the field data. The researcher begins with the initial test to examine indicator loadings and internal consistency reliability. This is done to ensure the validity and reliability of the instruments. The results of the indicator loadings and internal consistency reliability tests can be seen in Table 3. The data show that all statement items for each variable have indicator loading values exceeding the minimum threshold of 0.708 (Table 3, Column II), indicating adequate instrument validity. Furthermore, the internal consistency reliability test, using the calculation of Cronbach's alpha (CA) and Composite Reliability (CR) values, was conducted to evaluate the internal consistency of each variable. The results show that the CA and CR values for all variables exceed the minimum threshold of 0.800 (Table 3, Columns III and IV), indicating a high level of instrument reliability. A coefficient threshold of 0.80 is considered to have high reliability. Consistent with, the higher the coefficient, the greater the reliability. These test results provide strong support for the quality and validity of the instruments used in this

research, as well as confidence in the accuracy of the data analysis conducted. Next, the proof of convergent validity was carried out by calculating the Average Variance Extracted (AVE) values. This validity proof was conducted to evaluate the extent to which the constructs being studied can measure the variability within them and to ensure that these constructs are adequate in representing the variables being examined. Based on Table 3, the calculation results show that the AVE values for each construct exceed the threshold of 0.500. This indicates that the existing constructs have adequate convergent validity, making them consistent and accurate tools for measuring the phenomena being studied. These results suggest that the research instruments used are reliable and capable of effectively reflecting the constructs in question.

Table 3. The Results of the Indicator Loadings and Internal Consistency Reliability Tests

Item	Item loadings	CA	CR	AVE
I	II	III	IV	V
BI1	0.889	0.862	0.794	0.701
BI2	0.712			
BI3	0.865			
BI4	0.812			
AU1	0.771	0.801	0.74	0.622
AU2	0.896			
AU3	0.814			
AU4	0.886			
PEU1	0.827	0.761	0.838	0.518
PEU2	0.848			
PEU3	0.898			
PEU4	0.967			
PEU5	0.886			
PU1	0.823	0.742	0.829	0.508
PU2	0.82			
PU3	0.817			
PU4	0.818			
PU5	0.778			

The next stage in this research is the proof of discriminant validity, conducted using two methods: the Fornell-Larcker test and HTMT (Heterotrait-Monotrait). Based on Table 4, the results of the discriminant validity proof using the Fornell-Larcker test show that the values obtained for each construct variable are greater than the values associated with them. This indicates that the constructs studied have adequate discriminant validity, suggesting that each construct can distinguish well between each other. Furthermore, Based on Table 5, the results of the HTMT test show that the obtained HTMT values are below the threshold of 0.900. This confirms that the constructs studied have strong discriminant validity, implying that the relationships between these constructs are stronger than the relationships between a construct and other variables in the model. The results of this discriminant validity proof provide confidence that the research instruments used have a high level of validity and are reliable in identifying and differentiating the interrelated variables in this research.

Table 4. Fornell-Larcker Test

	AU	BI	PEU	PU
AU	**0.649**			
BI	0.587	**0.708**		
PEU	0.535	0.606	**0.72**	
PU	0.556	0.589	0.681	**0.713**

Table 5. HTMT Test

	AU	BI	PEU
AU			
BI	0.76		
PEU	0.751	0.797	
PU	0.868	0.79	0.729

The empirical results of the hypothesis testing are shown in Table 6. Based on the analysis using PLS-SEM, the empirical analysis results indicate that PEU has a significant positive impact on PU. PEU refers to the extent to which users feel that it is not difficult or is easy to use a particular technology, while PU refers to the extent to which users believe that using a particular technology will help them improve their job performance. These results suggest that the higher the perceived ease of use of digital technology by the respondents for use in learning activities, the greater their perception of the benefits of the technology in supporting the teaching and learning process in the classroom. In other words, teachers' perceptions of the ease of use of digital technology can be an important factor in shaping their perceptions of the benefits of digital technology in the context of learning in the business and management fields. Teachers who find digital technology easy to use tend to have a more positive perception of the extent to which the technology can help them achieve learning objectives and improve teaching quality. These findings have also been confirmed in several previous studies (Kusumadewi et al., 2021; L. Zhou et al., 2022).

Table 6. Hypothesis Testing Result

Hypothesis	Path	Coefficient	Std. Deviation	P Values	Result
Hypothesis 1	PEU -> PU	0.681	0.068	0	Confirmed
Hypothesis 2	PEU -> BI	0.382	0.133	0.004	Confirmed
Hypothesis 3	PU -> BI	0.329	0.141	0.02	Confirmed
Hypothesis 4	BI -> AU	0.587	0.067	0	Confirmed

Discussions

The research findings indicate that PEU has a significant positive impact on PU, and these findings have significant implications for efforts to adopt and integrate digital technology in vocational high school education in the business and management fields. Developing and implementing digital technology that prioritizes ease of use has the potential to enhance teachers' perceptions of the benefits of technology and encourage wider adoption of technology in teaching practices. These results also support previous research showing that PEU has a positive influence on PU. (Mailizar et al., 2021; Suryani & Murniyasih2, 2021). The previous research show that teachers' perceptions of usefulness are also significantly influenced by their perceptions of ease of use (Wong, 2015; Zogheib et al., 2015). In facing the challenges and complexities of the digital era, increasing teachers' confidence in the benefits of digital technology can be a crucial driver in achieving more interactive, creative, and relevant learning in vocational high schools in the business and management fields. Teacher readiness will encourage them to perform their best in online learning (Hanafi, 2021; Kusumadewi et al., 2021).

The empirical testing results show that PEU has a significant positive impact on BI. This means that the higher the perceived ease of use of digital technology by the respondents, the higher their behavioural intention to adopt and use digital technology in learning activities. According to similar resarch, perceived ease of use is the extent to which a person believes that using a particular system will be free of effort (Lah et al., 2020; Lewis et al., 2015). Previous research also mention that perceived ease of use significantly affects perceived usefulness, and ultimately behavioural intention is influenced by attitudes towards computer use (Wong, 2015; Zogheib et al., 2015). These results indicate that teachers' perceptions of the ease of use of digital technology play a crucial role in shaping their behavioural intentions to adopt and use technology in teaching practices in the business and management fields. Effective technology integration is a complex process that requires careful consideration of various factors, one of which is teachers' beliefs (Koç et al., 2021; Önalan & Kurt, 2020). The more teachers feel that using digital technology is easy and can be done smoothly, the higher their motivation to incorporate the technology into their teaching. The implication of these results is the importance of ensuring that the development and implementation of digital technology in vocational high school (SMK) education in the business and management fields must consider aspects of ease of use. Efforts to simplify user interfaces, provide adequate training and technical support, and identify and overcome barriers to using digital technology can enhance teachers' perceptions of the ease of use of technology. Teachers' competence in technology can be strengthened through webinars and workshops that provide hands-on experience. Additionally, school management strategies that hinder teachers from exploring innovative technologies, approaches, and techniques should be reconsidered (Koç et al., 2021; Önalan & Kurt, 2020). This, in turn, can increase teachers' behavioral intentions to adopt and use digital technology as an effective teaching aid, supporting the improvement of the quality of education in SMK business and management fields.

The empirical analysis results show that PU has a significant positive impact on BI. According to similar research, perceived usefulness is the extent to which an individual believes that using a particular system will enhance their job performance (Lah et al., 2020; Lewis et al., 2015). This indicates that the greater the teachers' perception of the benefits or usefulness of digital technology in the context of learning, the higher their behavioural intention to adopt and use digital technology in the learning process. Previous research found that the perceived usefulness of computers can influence attitudes toward computers, and the level of confidence a teacher has in using computers can affect their implementation in the classroom (Gibson et al., 2014; Scherer et al., 2020). These findings support previous research showing a positive and strong relationship between perceived usefulness and behavioural intention (Eksail & Afari, 2020; Kusumadewi et al., 2021). In this context, teachers who consider digital technology beneficial and capable of making a positive contribution to supporting the teaching and learning process are likely to feel motivated to use the technology in their teaching practices. The perception of the benefits of digital technology will give teachers the confidence that the technology can enhance teaching effectiveness, provide broader access to learning resources, and increase learners' participation and engagement in the learning process. These results affirm that teachers' perceptions of the benefits of digital technology play a crucial role in shaping their behavioural intentions to adopt and use the technology in teaching practices in the business and management fields. The implication of these results is the importance of providing clear understanding and information about the benefits and potential of digital technology in the context of learning in vocational high schools in the business and management fields. Efforts to provide appropriate training and support for teachers in effectively using digital technology can enhance their perceptions of the benefits of technology and encourage

broader adoption of technology in learning. Additionally, support should be given to introducing and integrating digital technology into the curriculum and teaching methods so that teachers can concretely see how the technology can improve the quality of learning and support the achievement of learning objectives in SMK business and management fields.

Finally, the empirical analysis results show that BI has a significant positive impact on AU. This means that the higher the teachers' behavioural intention to adopt and use digital technology in learning, the higher their actual use of the technology in classroom teaching practices. One of the main implications of the findings by similar research is the existence of a gap between teachers' intention to use technology and their actual usage (Koç et al., 2021; Önalan & Kurt, 2020). These results reflect that teachers' behavioural intention to adopt and use digital technology is directly related to the level of adoption and use of the technology in teaching practices in vocational high schools (SMK) in the business and management fields. Teachers who have a strong intention to use digital technology as a teaching aid tend to be more active in applying the technology in interactions with learners and in delivering course material. The relationship between behavioural intention and actual use is an important aspect of technology usage behaviour (Maruping et al., 2017; Venkatesh et al., 2023). Several studies have confirmed the influence of users' behavioural intention on actual usage (Ferdira et al., 2018; Pibriana, 2020). The implication of these findings is the importance of enhancing teachers' behavioural intentions to adopt digital technology through appropriate support and facilitation. Increasing awareness about the benefits and potential of digital technology in supporting learning in vocational high schools in the business and management fields can boost teachers' motivation to integrate this technology into their teaching. Providing quality training and access to digital technology support resources will help teachers overcome barriers and difficulties in using technology in their teaching practices. Support from schools and policymakers in creating a conducive environment that encourages the adoption of digital technology in SMK settings can also enhance teachers' intentions and readiness to implement digital technology in their teaching practices more actively and effectively.

4. CONCLUSION

This research provides significant results to understand the extent of technology acceptance among business teachers. However, the researcher acknowledges several limitations in conducting the research. The limitations include the restricted research area (Surakarta), which means that the findings cannot represent the conditions of all business teachers in Indonesia. The research also did not measure other factors that may limit the use of technology, as the research was conducted under ideal conditions to ensure that respondents' responses to technology acceptance were not influenced by other variables, such as internet connectivity issues or the availability of laptops or internet data packages for learning. Therefore, it is hoped that these limitations will be considered in comprehensive TAM research that includes variables not measured in this research, providing better and broader insights. Additionally, future research should cover a wider area to provide more extensive insights into technology acceptance among business teachers.

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