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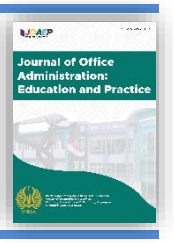

Influence of Enjoyment and Trust on the Use of Artificial Intelligence-based Voice Assistant in Vocational Students Using Technology Acceptance Model (TAM)

Agnes Christa Belliem Octavia[a], Jaka Nugraha[b]

[a,b]Universitas Negeri Surabaya, Surabaya, Indonesia

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Correspondence:

Agnes Christa Belliem Octavia, Office Administration Education, Faculty of Economics and Business, Universitas Negeri Surabaya, Surabaya, Indonesia.

Email: agneschrista.20026@mhs.unesa.ac.id

ABSTRACT

This study aims to analyze the effect of enjoyment and trust on using artificial intelligence-based voice assistants in vocational high school students using TAM. The subjects of this study were students of the Program of Office Management and Business Services (OMBS) at Buduran 2 Vocational High School. A sample of 140 students was selected from a population of 219 using the Krejcie and Morgan formula, with a significance level of 0.05. The study used Variance-Based Structural Equation Modeling (VB-SEM) with the GSCA pro software. The results showed that enjoyment and trust significantly influence perceived usefulness, perceived ease of use, behavioral intention, and actual use. In addition, this research model successfully explains the variability of the dependent variable with a FIT value of 0.522 and AFIT of 0.515, indicating that the model has a good fit. The findings emphasize the importance of enjoyment and trust factors in accepting new technologies in educational settings and provide insights for further advancing and integrating artificial intelligence technologies in vocational education.

INTRODUCTION

The development of information technology, particularly in the era of Society 5.0, including artificial intelligence (AI), Internet of Things (IoT), big data, and cloud computing,

is considered the gateway to civilization, significantly improving efficiency, productivity, and the quality of human life (Tavares et al., 2022). Technological innovations in education offer significant benefits through artificial intelligence and data analysis to personalize learning. Artificial intelligence, a form of nonhuman intelligence, can improve education by efficiently gathering, analyzing, and processing data (Africa, 2023). Artificial intelligence (AI) helps teachers and students improve learning by offering quick access to information when needed, adapting education to individual needs and pacing (Nuryadin, 2023). The growing presence of artificial intelligence (AI) in modern times enables people to engage and communicate with nonhuman entities like voice assistants and robots. McLean and Osei-Frimpong (2019) emphasize the growing interest in AI-driven voice assistants. Voice assistants such as Siri, Cortana, Alexa, Bixby, and Google Assistants are widely integrated into modern smartphones. Integrating AI-driven voice assistants into modern smartphones provides evidence of the advancement of artificial intelligence technology in education at Buduran 2 Vocational High School. This vocational high school in Sidoarjo uses voice assistants as innovative and relevant learning tools, especially within the Office Management and Business Services (OMBS) program.

The Technology Acceptance Model (TAM) is used to examine the acceptance and rejection of information technology, known for its simplicity and validity. The study uses TAM 1 as its research framework, consisting of five variables: perceived usefulness (PU), perceived ease of use (PEOU), behavioral intention to use (BI), actual use (AU), and external variables (Venkatesh & Davis, 1996). Based on research conducted by Febbyola et al. (2023) shows that enjoyment is crucial in motivating individuals to adopt a digital system, suggesting that users are more ready to use systems that offer a comfortable experience. Based on research by Syifa and Ratnasari (2020), trust in online systems fosters intention and desire to use these services, highlighting trust as crucial for building relationships. This study introduces scientific novelty by integrating enjoyment (ENJ) and trust (TR) as external variables in the TAM model to understand AI-based voice assistant technology acceptance among vocational students. It aims to provide insights into their interaction and influence on technology acceptance. Based on this description, the hypothesis can be concluded namely:

H1: ENJ influences PU to use voice assistant technology on vocational students

H2: ENJ influences PEOU to use voice assistant technology on vocational students

H3: TR influences PU to use voice assistant technology on vocational students

H4: TR influences PEOU to use voice assistant technology on vocational students

H5: PU influences BI to use voice assistant technology on vocational students

H6: PEOU influences BI to use voice assistant technology on vocational students

H7: BI influences AU to use voice assistant technology on vocational students

Thus, this study aims to ensure that vocational high school students can effectively use technology, especially artificial intelligence.

RESEARCH METHODS

This study used the explanatory method to identify cause-and-effect relationships and test hypotheses about how and why certain variables affect each other. (Morgan & Winship, 2015). The data were collected through questionnaires using the 5-Likert scale to simplify response complexity by providing five standardized responses (Sugiyono, 2013). This study was conducted in the Office Management and Business Services (OMBS) program at Buduran 2 Vocational High School, with a total population of 219 students. The study used a purposive sampling technique to select the sample. The study used purposive sampling to select relevant criteria and determine a sample-based research objective (Sugiyono, 2013). The criteria required in this study include students from the Office Management and Business Services (OMBS) program of Buduran 2 Vocational High School and voice assistant users such as Google Assistant, Siri, and Cortana. The determination of the sample size was based on the Krejcie formula, which had a significance level equivalent to 0.05, which resulted in a research sample size of 140.

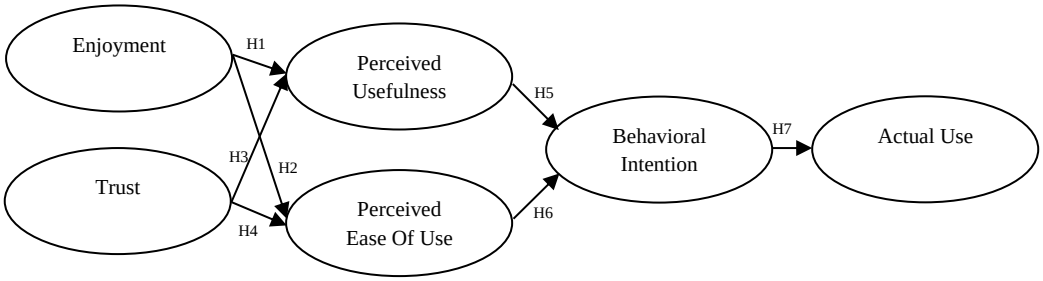

Figure 1. Research Design

Table 1. Questionnaire design

Construct	Indicators	Questioners	Code	Sources
***Actual Use* (AU)**	*Frequent use*	I frequently use voice assistant technology	AU1	Mayjeksen & Pibriana, (2020); Novianti et al., (2021); Al Shamsi et al., (2022); Alshurideh et al., (2020)
	User satisfaction	I prefer using voice assistant technology	AU2	
	Duration of use	I use voice assistant technology daily	AU3	
	Problem-Solving	I use voice assistant technology for various activities	AU4	

Construct	Indicators	Questioners	Code	Sources
	Frequency of use	I spend much time using voice assistant technology every week.	AU5	
***Behavioral Intention* (BI)**	*Future use*	I intend to use voice assistant technology in the future	BI1	Hidayat, (2020); Rohman et al., (2023); Al Shamsi et al., (2022); Elfeky & Elbyaly (2021)
	Recommended action	I recommend voice assistant technology to a friend who is not yet using it.	BI2	
	Performance Expectancy	I will continue to follow the development of voice assistant technology	BI3	
	Times of reuse	I intend to use voice assistant technology frequently.	BI4	
	Possibility of reuse	I intend to use voice assistant technology instead of other alternatives (writing with a keyboard).	BI5	
***Perceived Usefulness* (PU)**	*Improve productivity*	I think voice assistant technology can increase my productivity	PU1	Rohman et al., (2023); Mayjeksen & Pibriana, (2020); Al Shamsi et al., (2022); Al-Emran et al., (2020)
	Improving performance	Voice assistant technology can improve my learning performance.	PU2	
	Effectiveness	Voice assistant technology can encourage me to complete tasks quickly.	PU3	
	Facilitate learning	In my opinion, using voice assistant technology makes it easier for me to understand the subject better	PU4	
	Useful	Overall, using voice assistant technology is very useful	PU5	
***Perceived Ease of Use* (PEOU)**	*Easy to learn*	Learning how to use voice assistant technology was easy for me.	PEOU1	Riantini, (2020); Novianti et al., (2021); Al Shamsi et al., (2022); Al-Emran et al., (2020)
	Clear and understandable	My interactions with voice assistant technology are straightforward to understand.	PEOU2	
	Easy to apply	I find voice assistant technology easy to use	PEOU3	
	Flexible	Flexible voice assistant technology for interaction	PEOU4	
	Feature Clarity	Every feature and function in voice assistant technology is easy to understand.	PEOU5	
***Enjoyment* (ENJ)**	*Feels good*	I enjoy interacting with voice assistant technology	ENJ1	Singasatia et al.,

Construct	Indicators	Questioners	Code	Sources
	Feels interesting	Conversations with voice assistant technology are engaging	ENJ2	(2022); Hervilia et al., (2022); Al Shamsi et al., (2022); Al-Qaysi et al. (2023)
	Convenience	My creativity is stimulated when using voice assistant technology.	ENJ3	
	Feels interesting	Using voice assistant technology in learning activities will be interesting.	ENJ4	
	Enjoyable	Using voice assistant technology makes me feel entertained	ENJ5	
***Trust* (TR)**	*Belief*	Trustworthy voice assistant technology	TR1	Riantini, (2020); Legi et al., (2020) ; Al Shamsi et al., (2022); Fernandes & Oliveira, (2021)
	Reliable features	I find voice assistant technology reliable	TR2	
	Integrity	I believe that voice assistant technology is honest	TR3	
	Ability	Voice assistant technology provides accurate information.	TR4	
	Personal information safety	My personal information is safe and secure when using voice assistant technology.	TR5	

This study involves two latent variables: two exogenous variables that consist of enjoyment and trust and four endogenous variables that consist of perceived usefulness, perceived ease of use, behavioral intention, and actual use. The writers used SEM GSCA for analysis due to its suitability for testing structural models with latent variables (Jonathan, 2010). Generalized Structured Component Analysis (GSCA) simplifies modeling complex relationships and handles various data types, including incomplete data, without extensive imputation. Advances in software have made GSCA easier to apply, improving its ability to form strong models for predicting outcomes in data analysis (Ngatno, 2019). Before conducting further research, the instrument items were tested for validity using the Pearson product-moment technique and for reliability using Cronbach's alpha in SPSS. After confirming their accuracy and consistency, questionnaires were distributed to a predetermined sample. The collected data were analyzed using SEM GSCA with GSCA Pro software.

RESULT AND DISCUSSION

Respondent data from 140 participants was collected through online questionnaires distributed using Google Forms. The characteristics of the respondents were categorized by

gender, age, grade level, type of voice assistant, duration of voice assistant use, and method of using voice assistants. Data on respondent characteristics can be seen in Table 2.

Table 2. Profil Respondent

Characteristics	Respondents	Total	Percentage
VA Users	Yes	140	100%
	No	0	0%
Gender	Male	7	95%
	Female	133	5%
Class	X	32	22.9%
	XI	41	29.3%
	XII	67	47.8%
Age	< 18 years old	97	69.3%
	18 - 23 years old	43	30.7%
	> 23 years old	0	0%
VA Type	Siri	5	3.6%
	Google Assistant	133	95%
	Cortana	2	1.4%
Duration of VA Usage	3 - 6 Months	82	58.6%
	6 - 12 Months	27	19.3%
	> 12 Months	31	22.1%
VA Usage	Searching for information about lessons	124	88.6%
	Multitasking in doing work	9	6.4%
	Facilitate access to work	7	5%

Measurement Model Assessment

To know the loading indicators on components of each questionnaire, the validity test can be seen in Table 3.

Table 3. Indicators of Loading on Components

Indicators	ENJ	TR	PU	PEOU	BI	AU
AU1	0.493	0.453	0.518	0.395	0.445	**0.629**
AU2	0.576	0.481	0.585	0.519	0.477	**0.722**
AU3	0.417	0.442	0.508	0.374	0.445	**0.717**
AU4	0.542	0.503	0.543	0.484	0.581	**0.739**
AU5	0.505	0.484	0.499	0.310	0.483	**0.721**
BI1	0.495	0.546	0.541	0.576	**0.806**	0.558
BI2	0.513	0.603	0.586	0.540	**0.789**	0.528
BI5	0.570	0.530	0.581	0.498	**0.804**	0.576
PU1	0.527	0.491	**0.705**	0.407	0.521	0.490
PU2	0.511	0.435	**0.715**	0.356	0.452	0.568
PU3	0.556	0.552	**0.737**	0.521	0.584	0.598
PU4	0.536	0.503	**0.670**	0.398	0.378	0.469
PU5	0.583	0.573	**0.729**	0.576	0.575	0.545
PEOU1	0.508	0.485	0.492	**0.751**	0.507	0.411
PEOU2	0.569	0.546	0.470	**0.746**	0.531	0.421
PEOU3	0.427	0.440	0.423	**0.686**	0.451	0.409
PEOU4	0.529	0.532	0.494	**0.750**	0.512	0.472
PEOU5	0.439	0.466	0.467	**0.722**	0.449	0.455

Indicators	ENJ	TR	PU	PEOU	BI	AU
ENJ1	**0.782**	0.571	0.537	0.574	0.502	0.513
ENJ2	**0.798**	0.675	0.594	0.620	0.532	0.542
ENJ3	**0.776**	0.595	0.626	0.493	0.539	0.619
ENJ4	**0.716**	0.533	0.623	0.464	0.469	0.559
ENJ5	**0.663**	0.501	0.466	0.375	0.408	0.445
TR1	0.594	**0.808**	0.564	0.549	0.570	0.529
TR2	0.556	**0.764**	0.494	0.552	0.517	0.444
TR3	0.656	**0.811**	0.626	0.521	0.540	0.579
TR4	0.607	**0.788**	0.616	0.511	0.587	0.546
TR5	0.628	**0.773**	0.544	0.546	0.543	0.545

Table 3 shows the loading indicators on components. Hair et al. (2014) suggested a criterion of ≥ 0.7, while Chin (1998), with values ≥ 0.6, says this model meets the requirement. For behavioral intention, BI1 has the highest (0.806) and BI2 the lowest (0.789), with BI3 and BI4 excluded due to inadequate cross-loading. Gefen & Straub (2005) emphasized the importance of removing indicators with low cross-loadings because they can reduce the clarity of the analysis.

Table 4. Construct Quality Measures

	ENJ	TR	PU	PEOU	BI	AU
PVE	0.561	0.623	0.507	0.535	0.640	0.500
Alpha	0.803	0.848	0.757	0.783	0.718	0.749
rho	0.864	0.892	0.837	0.852	0.842	0.832
Dimensionality	1.0	1.0	1.0	1.0	1.0	1.0

Table 4 shows that the PVE scores for ENJ, TR, PU, PEOU, BI, and AU are all ≥ 0.50, and their Alpha and Rho values are above 0.70. Thus, all variables in the research model meet the required criteria.

Table 5. R Square

ENJ	TR	PU	PEOU	BI	AU
0.0	0.0	0.627	0.522	0.586	0.481

Table 5 shows that the study's independent variables influence the PU variable by 62.7%, PEOU by 52.2%, BI by 58.6%, and AU by 48.1%. The remaining influence on these variables comes from external factors. The study model has demonstrated reliability and validity, allowing for further evaluation of the structural model.

Assessment of Structural Model

Table 6. Structural Model Fit Measure

FIT	AFIT	FITs	FITm	GFI	SRMR	OPE	OPEs	OPEm
0.522	0.515	0.369	0.555	0.982	0.057	0.484	0.648	0.449

Table 6 shows that the Goodness of Fit Index (GFI) and Standardized Root Mean Square Residual (SRMR) values are 0.982 and 0.057, respectively, indicating that both values meet the requirements for model fit.

Table 7. Path Coefficient

	Estimate	SE	95%CI(L)	95%CI(U)	Decision
ENJ->PU	0.512	0.0745	0.318	0.626	Accepted H1
TR->PU	0.326	0.0728	0.218	0.512	Accepted H2
ENJ->PEOU	0.390	0.115	0.181	0.612	Accepted H3
TR->PEOU	0.378	0.123	0.132	0.588	Accepted H4
PU->BI	0.476	0.0746	0.314	0.612	Accepted H5
PEOU->BI	0.367	0.0780	0.235	0.530	Accepted H6
BI->AU	0.693	0.0355	0.637	0.781	Accepted H7

According to Hwang et al. (2021), path coefficients are deemed statistically significant at 0.05 if their confidence intervals lie within the 95% interval, suggesting positive or nonnegative values. Table 7 shows that all hypotheses are accepted, indicating a positive influence as hypothesized.

Influence of Enjoyment on Perceived Usefulness

This study shows that vocational high school students who enjoy using voice assistants such as Google Assistant, Siri, or Cortana perceive these technologies as more valuable and relevant due to their interactive and friendly response features of voice assistants, characterized by pleasant language, natural voice intonation, and the provision of praise or help. For example, Google Assistant and Siri use voices that are not monotone and include polite expressions such as "thank you" and "please," and can give praise after tasks are completed. Students who feel comfortable interacting with voice assistants are more likely to find them valuable and helpful, so they are more engaged and regularly use them, increasing their perceived benefits. These findings support previous research by Al-Qaysi et al. (2023), Liu et al. (2023), and Chu (2019), who also found a significant positive effect of enjoyment on the perceived usefulness of voice assistants among vocational high school students.

Influence of Trust on Perceived Usefulness

This study shows that users who trust voice assistants like Google Assistant, Siri, or Cortana perceive them as more practical. The trusted source selection feature, presenting information from verified sources, builds vocational high school students' confidence in the reliability of these assistants. As a result, their perception of the usefulness of voice assistants in supporting learning and skill development increases. Voice assistants serve not only as information tools but also as trusted reference sources. This study supports the findings of Alharithi (2019), Chu (2019), Zeng (2020), and Roloff and Lang (2023), all of which show that trust has a significant positive effect on perceived usefulness.

Influence of Enjoyment on Perceived Ease of Use

This study shows that when vocational high school students enjoy using voice assistants like Google Assistant, Siri, or Cortana, they perceive these technologies as easy to use. The multimodal interaction features of these assistants, including voice, text, and images, create an engaging learning experience. For instance, students can listen to verbal explanations while viewing illustrations or diagrams, improving enjoyment and ease of use. With the flexibility to interact according to their preferences, students feel supported in their learning, reinforcing their perception that voice assistants are suitable and easy to use for vocational learning needs. This finding supports the research of Al-Qaysi et al. (2023), Jo & Baek (2023), and Chu (2019), which show that enjoyment has a significant favorable influence on the perceived ease of use of voice assistants among vocational students.

Influence of Trust on Perceived Ease of Use

The study shows that vocational high school students' trust in voice assistants such as Google Assistant, Siri, or Cortana can make using these technologies easier and seamless. It is due to the security and privacy features in all three voice assistants, which assure that student data will be secured and not misused. This feature creates a sense of confidence and comfort for students when using artificial intelligence. With personal data control and transparency, students feel they have complete control over their information, reducing concerns about security risks or data misuse. It reduces psychological barriers to using voice assistants and strengthens students' perceptions of the tool's ease of use. The trust established through security and privacy features makes students more likely to perceive voice assistants as easy to use, as they are confident their data is well secured. This study supports the findings from Alharithi (2019), (Pitardi & Marriott (2021), Chu (2019), and Zeng (2020), all of which show that trust has a significant positive effect on perceived ease of use.

Influence of Perceived Usefulness on Behavioral Intention

This study shows that the more benefits students get from voice assistants, the higher their desire to use them, such as Google Assistant, Siri, or Cortana. For example, the schedule and deadline reminder feature offered by Google Assistant helps students organize time and tasks more efficiently, reducing stress and increasing productivity. The accessibility and user-friendliness of these features make voice assistants a practical solution for vocational high school students, creating a positive perception of their usefulness in their lives. The study

shows that perceived usefulness significantly influences vocational high school students' intention to use AI-based voice assistants. This result is in line with previous studies by Pal & Arpnikanondt (2021), Chai et al. (2020), and Elfeky & Elbyaly (2021), who also found a positive relationship between perceived usefulness and intention to use voice assistants in vocational students.

Influence of Perceived Ease of Use on Behavioral Intention

The study shows that the more accessible AI-based voice assistants are, the more vocational high school students intend to use them. The voice recognition features of Google Assistant, Siri, and Cortana allow direct interaction through voice without requiring typing or additional steps. This makes the technology more intuitive for vocational students with varying levels of technical skills. By reducing technical barriers and increasing active engagement, these features encourage students to adopt and use voice assistants in their learning and work. The results show that perceived ease of use significantly influences the intention to use artificial intelligence-based voice assistants in vocational students. This finding is in line with previous research by Song (2019), Sorensen (2019), and Moriuchi (2019), who also found a positive relationship between perceived ease of use and intention to use voice assistants in vocational students.

Influence of Behavioral Intention on Actual Use

This study shows that students' intentions are crucial for using voice assistants. Natural Language Understanding (NLU) increases students' interactions with Google Assistant, Siri, and Cortana, making them more fluid and efficient. When students find NLU responses relevant, they use the platform more, reinforcing their intention to continue using voice assistants in vocational learning.

This study shows the critical role of students' intentions in determining whether or not they will use a voice assistant. Natural Language Understanding (NLU) features strengthen interactions between students and voice assistants such as Google Assistant, Siri, and Cortana, making them more fluid and efficient. When students find NLU responses relevant, they use the platform more, reinforcing their intention to continue using voice assistants in vocational learning. The NLU feature helps students plan their use of the voice assistant and encourages them to turn their intentions into action. The student's intention level significantly influences the actual use of voice assistants in vocational learning. It aligns with prior research by (Afonso,

2019) (Mohammadi, 2015; Al Shamsi et al., 2022), who found a positive relationship between intention and actual use of voice assistants in vocational students.

CONCLUSIONS

This study shows that enjoyment and trust are critical factors in improving the perceived usefulness and ease of use of voice assistant technology. These findings support the hypothesis that enjoyment and trust can positively influence users' perceptions, thus influencing their behavioral intention to use and actual use of the technology. As a result, the study has successfully achieved its objective of understanding the adoption factors among vocational high school students. However, this study has some limitations. First, the population and samples are limited to office management and business services (OMBS) students. Future research should include students from other majors, such as accounting, banking, multimedia, software engineering, online business, and marketing. Second, the intention to use voice assistants among vocational high school students may be influenced by additional variables not addressed in this study, such as intrinsic motivation, user characteristics like security and facilitating conditions, and attitude towards usage. Third, while TAM is used to measure the adoption of AI technology, future research could explore other models like IDT or FIT. Fourth, future research is recommended to broaden the range of independent variables examined. Fifth, this study lacks the incorporation of mediating or intervening variables to examine the phenomena within the research object. Therefore, future research could include such mediating variables.

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