Inform : Jurnal Ilmiah Bidang Teknologi Informasi dan Komunikasi
Vol.8 No.2 July 2023, P-ISSN : 2502-3470, E-ISSN : 2581-0367

Blended Learning Vocationalogy Entrepreneurship Program: Analysis of Human-Computer Interaction Based on Technology Acceptance Model (TAM)

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Received: 2022-09-21; Accepted: 2022-11-22; Published: 2022-03-18

Abstract— Blended learning is needed as a learning medium that can be used online, offline, asynchronously, or synchronously. The use of blended learning in entrepreneurship programs in vocational schools is intended to prevent learning loss in learning during the pandemic and post-pandemic. This study evaluates the results of developing web-based vocational media used as blended learning using the Technology Acceptance Model (TAM) measurement criteria. The measurement criteria include aspects of Perceived Usefulness (TPU) and aspects of Perceived Ease of Use (TPE), each of which has indicators of functionality (TFL), accessibility (TAC), and Computer Playfulness (TCP), which are then accumulated in the Behaviour Intention aspect (TBI). This evaluation study was analyzed using SEM (AMOS) and SPSS. A total of 121 class, XI SMK students were involved in collecting data in this research. Data was taken using a questionnaire consisting of 19 questions. The estimation results show that every aspect of TAM contributes quite well regarding vocationalogy media users. The evaluation results showed that 86.85% of users felt helped, liked, and found it easy when learning to use the vocationalogy media.

Keywords— Blended Learning; Vocationalogy; Technology Acceptance Test, TAM, Behaviour Intention, Human-Computer Interaction, HCI.

I. INTRODUCTION

Various sectors of life have changed drastically or slowly with the emergence of the Covid-19 pandemic. This change has also colored the disruption in the world of education [1][2]. Technology has emerged as an alternative solution using various learning models, including online learning. However, learning through internet media does not make learning outcomes maximal. There are findings from sharing studies on learning loss [3]–[5]. In addition, some of the negative effects of blended learning, distance education, a study from home, or combined online and offline learning (blended learning) that are currently being carried out have not been able to provide optimal results, particularly in productive subject areas such as creating products, and entrepreneurship [4].

Based on a preliminary study conducted by researchers, students' hard skills in practicum during the covid pandemic are still very low[6]. They have not been able to directly apply the theory they have learned through textbooks/modules. Therefore, digital media is needed to collaborate with blended learning models to overcome practical learning loss in these subjects [2], [6]. Understanding learning loss is a new challenge for teachers because they must think of ways to increase student skills even without face-to-face learning.

The urgency of this research is very important to do because it refers to empirical studies on Distance education/Study from Home as well as learning pyramid theory and synchronous and asynchronous learning methods. Vocational students during the COVID-19 pandemic were demotivated and lost the opportunity to carry out entrepreneurship practicum activities according to subject learning achievements. The creative products entrepreneurship that is set. In fact, according to Dale's theory, the role of the implementation of practicum/practice on the absorption of material has a very large percentage, namely 75% [7]. However, in practice, teaching materials that should have a larger composition of practicum activities are only taught in virtual meetings and contain theories.

By combining digital vocationalogy media with the blended learning model, the percentage of practicum implementation on creative products entrepreneurship subjects during and after the pandemic is expected to increase due to the combination of digital and non-digital learning models that effectively produce complete learning. Learning like these demands implementing the government's independent learning curriculum following the 4.0 era.

II. RESEARCH METHODOLOGY

This is a type of HCI evaluation research on the results of vocationalogy website development. The impact of the use of technology applied to vocational students in the entrepreneurial program is then analyzed using structural equation modeling (SEM-AMOS) tools [12]–[15]. 121 datasets were tested in this research, including students of

DOI : https://doi.org/10.25139/inform.v8i2.5128

class XI SMK in the Multimedia Department. The Human-Computer Interaction (HCI) technology acceptance scheme uses the technology acceptance model (TAM) framework) [14][16]–[18] by taking some appropriate indicators of research needs. Figure 1 shows the relationship between the independent and dependent variables used in this research following the framework of the Technology Acceptance Model adopted from [8].

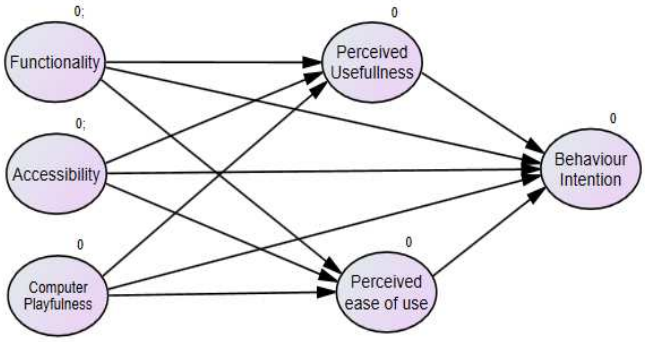

Figure 1. TAM Research Framework

Blended Learning-based vocationalogy media can be accessed at https://www.vocationalogy.com/. After the media is made, it is necessary to evaluate it so that the media created can be used optimally by users, both students and teachers in the field of study. This research will use the Technology Acceptance Model (TAM) to measure user acceptance. Similar research was also conducted by [9][10] regarding TAM testing on Logistics Information Systems and research conducted by [2][11] on the use of LMS during a pandemic.

Figure 2. Web LMS Vocationalogy on The Learning Material Layer

Figure 3. Web LMS Vocationalogy on The Practicum Layer

In Figures 2 and 3, part of the learning with LMS shows learning materials on entrepreneurship activities and practicum in school laboratories. This study involved five vocational schools in Malang City. LMS also has a discussion group forum managed by each school on the web.

The measurement criteria can be seen in Table I covering aspects of Perceived Usefulness (TPU) and aspects of Perceived Ease of Use (TPE), where each has indicators of functionality (TFL), accessibility (TAC), and Computer Playfulness (TCP), which are then accumulated in the aspect of Behaviour Intention (TBI). In Table I, there are variables used in this research. The TFL variable has four indicators, the TAC variable has three indicators, the TCP variable has three indicators, the TPU variable has three indicators, the TPE variable has three indicators, and the TBI variable has three indicators. Each indicator represents one question in this research.

TABLE I
TAM VARIABLE AND INDICATOR

Variable	Sym	Variables measured in questions
Functionality (TFL)	FL1	Blended learning responds fast
	FL2	Blended learning provides enough features that I need
	FL3	Blended learning allows me to access the content I need
	FL4	Overall, the Blended Learning feature allows me to achieve my learning goals
Accessibility (TAC)	A1	Blended learning enables quick access to information
	A2	Blended learning makes information very accessible
	A3	Blended learning makes information accessible
Computer Playfulness (TCP)	CP1	When I use Blended learning, I feel spontaneous
	CP2	When I use Blended learning, I feel creative
	CP3	When I use Blended learning, I feel fun
Perceived Usefulness (TPU)	PU1	Using Blended learning can improve my learning performance
	PU2	Using Blended Learning makes my learning more effective
	PU3	I found Blended learning useful for me
Perceived Ease of Use (TPE)	PE1	Learning how to use Blended learning is easy for me
	PE2	I find Blended learning easy to use
	PE3	It's easy to become skilled at using Blended learning
Behavioural Intention (TBI)	BI1	I intend to increase my use of Blended learning in the future
	BI2	I intend to use Blended learning in the future
	BI3	For future studies, I will use Blended learning

Source: [8]

The research steps were carried out using 6 stages, as shown in Figure 4. The research development stages is divided into six steps:

1) Literature Study: A review and summary of previous research will be carried out regarding the creation of LMS applications. In addition, the review will involve a critical

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analysis of the existing technology acceptance model to bring up the limitations and problems of the research.

2) Problem definition: The research will clearly define the research problem and how the research is planned to address this problem.

3) Development of Models and Hypotheses: This study will develop a new technology acceptance model to test student acceptance of the e-learning system (Website LMS). The methods and considerations for identifying external variables for the research model will be explained at this stage. In addition, research hypotheses will be proposed for each variable because it will regulate the relationship between external variables.

4) Data collection: Data was collected to test the research model through a questionnaire.

5) Analysis: the data will be processed using the SEM AMOS statistical application.

6) Model testing and evaluation: the analysis results will be used to test the developed model and evaluate if deficiencies in the LMS application system are created.

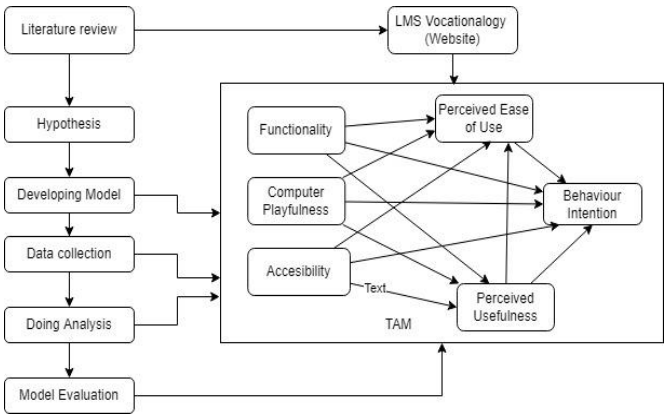

Figure 4. Stages of Research Development

III. Result and Discussion

This study has hypotheses: 1) Does perceived ease of use affect the behaviour intention of vocational LMS users? and 2) Is there an effect of perceived usefulness on the behaviour intention of vocational LMS users? The research model development is modelled in SEM (IBM-AMOS) [12][19]. The research data obtained are then recapitulated and included in the SPSS according to the names of the variables and indicators developed. After the data is stored in SPSS, then the data is embedded into AMOS for calculations.

Figure 5 is a modelling design using the AMOS application, which describes all the variables involved in the research. Figure 6 is the process of embedding data from SPSS into AMOS. There are 121 data obtained. At this stage, the data obtained from the questionnaire collection has been entered into the SPSS. The calculation results produce standardized values, as shown in Figure 7.

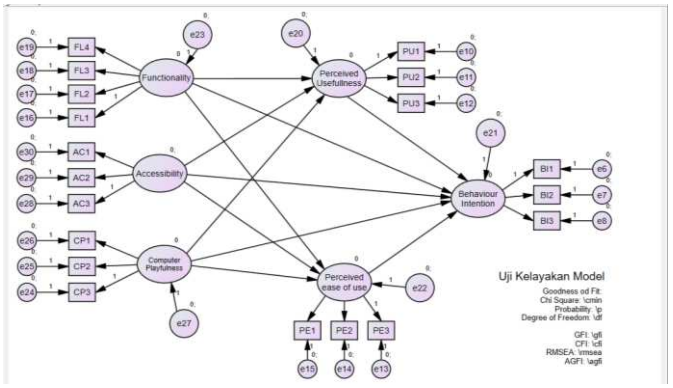

Figure 5. Modeling using the AMOS application

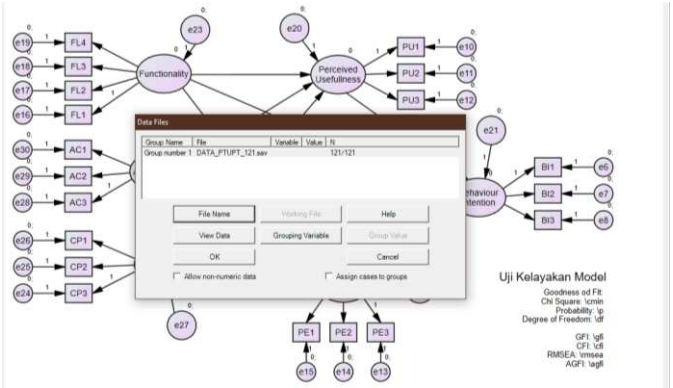

Figure 6. Embed Data from SPSS to AMOS

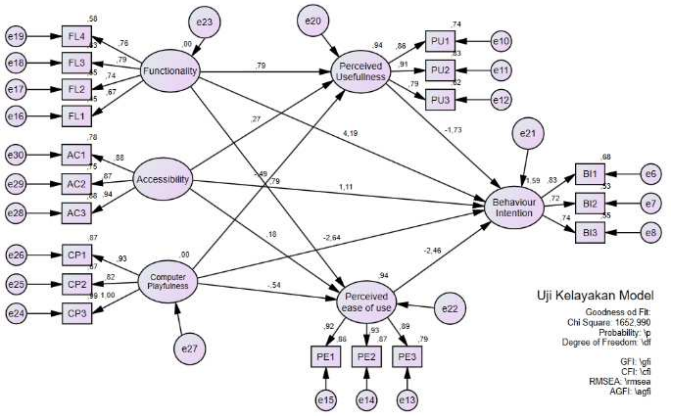

Figure 7. Model Calculation Results

Based on Figure 7, the standard coefficient value of the model is obtained, which displays the amount of the estimated number. The estimation results from Figure 5 can be seen in Table II. It should be noted that the coefficient value of P must be below 0.05 or <0.05 so that the model can be said to be Fit/Valid.

Based on Table II, it is known that the significant value in column (P) has one relation value whose magnitude is more than 0.05, namely TBI <-TPU (0.119> 0.05). This indicates that the model is still unfit or cannot be analyzed. The model

DOI : https://doi.org/10.25139/inform.v8i2.5128

must be changed by removing the relation line between TBI<-TPU. So that the model changes, as shown in Figure 8.

TABLE II
REGRESSION WEIGHTS

	Estimate	S.E.	C.R.	P	Label
TPU<-TAC	0,311	0,062	4,997	***	par_10
TPU<-TFL	1,71	0,213	8,033	***	par_11
TPE<-TFL	2,241	0,269	8,338	***	par_12
TPE<-TCP	-0,793	0,077	-10,36	***	par_19
TPE<-TAC	0,265	0,072	3,683	***	par_22
TPU<-TCP	-0,551	0,063	-8,688	***	par_23
TBI<-TFL	7,733	2,601	2,974	0,003	par_13
TBI<-TAC	1,082	0,401	2,697	0,007	par_18
TBI<-TCP	-2,542	0,827	-3,075	0,002	par_20
TBI<-TPE	-1,6	0,813	-1,969	0,049	par_21
TBI<-TPU	-1,474	0,946	-1,558	0,119	par_24

The model in Figure 8 is then calculated and produces an estimate, as shown in Table III. Based on the estimation results in Table III, a significant value in the column (P) for each variable and indicator is below 0.05. So, it can be said that the relationship between the five variables is fit and valid to meet the requirements for interpretation. The *** sign means the significance value is 0.00 or has been fit.

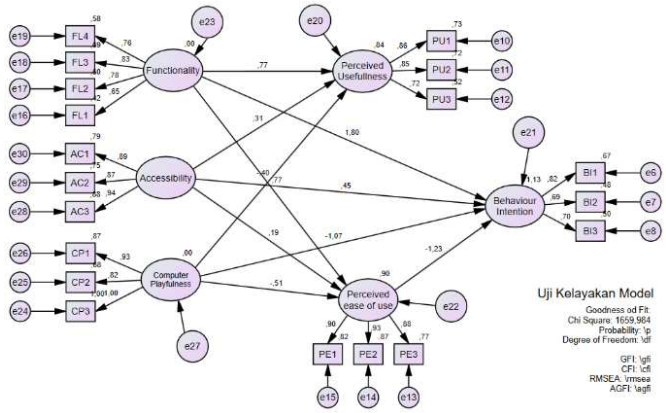

Figure 8. Revision Model

TABLE III
REGRESSION WEIGHTS MODEL REVISION

	Estimate	S.E.	C.R.	P	Label
TPE<-TFL	2,11	0,279	7,549	***	par_12
TPE<-TCP	-0,693	0,075	-9,216	***	par_19
TPE<-TAC	0,266	0,073	3,645	***	par_22
TPU<-TAC	0,326	0,068	4,82	***	par_10
TPU<-TFL	1,56	0,216	7,226	***	par_11
TBI<-TFL	3,289	0,829	3,966	***	par_13
TBI<-TAC	0,422	0,121	3,5	***	par_18
TBI<-TCP	-0,974	0,243	-4,007	***	par_20
TBI<-TPE	-0,824	0,325	-2,539	0,011	par_21
TPU<-TCP	-0,403	0,064	-6,247	***	par_23

After knowing that the model is fit/valid, the influence of the relationship between each variable/role of each variable can be seen. The extent of the effect can be evaluated by looking at the estimated squared multiple correlations. These correlations provide a percentage representation of the degree to which each variable contributed to the overall effect. The amount of this percentage indicates the influence of the variables and their indicators on the dependent variable, namely behaviour intention / behavioural intention of users of technology products.

Table IV estimates the magnitude of the influence of the independent variable on the dependent variable. This can be interpreted that: 1) The Perceived Ease of Use (TPE) variable and its supporting variables contribute 89.5% to Behavioural Intentions. In other words, the TPU error variance is about 10.5 percent of the TPU variance itself; 2) The Perceived Usefulness (TPU) variable and other accompanying variables contributed 84.2% to the behavioural intention variable separately. In other words, the TPU error variance is about 15.8 percent of the TPU variance itself.

TABLE IV
ESTIMATE SQUARED MULTIPLE CORRELATIONS

Variable	Estimate	Average
TPE	0,895	0,8685
TPU	0,842	
AC1	0,786	0,8040
AC2	0,751	
AC3	0,875	
CP1	0,867	0,8477
CP2	0,675	
CP3	1,001	
FL4	0,581	0,5748
FL3	0,691	
FL2	0,603	
FL1	0,424	

Based on the analysis results, an evaluation was then carried out. Based on the interpretation of the analysis results, it can be said that the level of acceptance of vocational media users is quite good in terms of the TPE and TPU variables. Although the relationship between TPU and TBI is not established directly, other supporting variables create the relationship by themselves. In other words, the average user acceptance of behaviour intention / behavioural intention of Blended Learning vocational media users is quite good, which is 86.85%.

IV. CONCLUSION

The use of Blended Learning Vocational School in the entrepreneurship program for class XI SMK gives good results. Viewed from the functional side (Functionality) this variable contributes 57% to the user's behavioural intention which is quite good in supporting learning. In terms of accessibility, this variable contributes 80% to the behavioural

DOI : https://doi.org/10.25139/inform.v8i2.5128

intention to use Blended learning vocational in everyday learning.

The variable Computer Playfulness/providing pleasure in learning gives a role of 84.7%. User acceptance based on the Technology Acceptance Model with 3 supporting variables shows a positive value. So that this media can be used and its content developed again according to educational needs. While the total user acceptance of vocational education media created as blended learning media is 86.85%, this shows that the learning needs to avoid learning loss can be accommodated by Blended learning, especially entrepreneurship programs in the vocational/vocational environment.

In response to the hypothesis, there is an influence of perceived ease of use on the behaviour intention of LMS vocational users. This effect accounts for 89.5% of the variance in Behavioural Intention. There is an effect of perceived usefulness on the behaviour intention of vocational LMS users, which is 84.2% on the behavioural intention variable alone. Put that another way, the TPU error variance accounts for around 10.5% of the TPU variation. To put it another way, the TPU error variance accounts for approximately 15.8 percent of the total TPU variation.

The results of this evaluation are needed as material for consideration in the development of further vocational media. The suggestion for developing blended learning is to use it more widely by adding more interactive discussions between students and teachers. Integrating other domains into the system is another viable development method. The findings of his research, which are consistent with this research, suggest that the desire of students to utilize LMS has a positive influence while the Covid-19 pandemic is ongoing. The impact on learning as sustainability engagement makes students feel a different atmosphere, peer references, and ease of access to learning as well as the freedom to access learning media in LMS, ultimately affecting students' intention to use LMS during student learning during the pandemic.

The online learning method is here to change the conventional teaching style, which will indirectly impact the professionalism of the teacher's work and become more efficient in evaluating student learning progress. The structured face-to-face learning equips students to master the expected skill competencies. To provide an adequate response to the unfavorable evaluation made by the community, namely that schools serving as vocational schools during the epidemic do not have the necessary skills, Blended learning is an alternative solution to overcome students' low skills because of purely online learning. According to the recommended SOP, the school has received permission to carry out limited face-to-face learning with a health protocol. Schools apply blended learning, especially vocational subjects, which are expected to overcome students' low skills. For learning theory, students use online to master cognitive abilities. For practical skills, they must use limited face-to-face so that students have adequate skill competencies and graduates can meet the employment needs expected by companies in need.

ACKNOWLEDGMENT

We want to thank the Ministry of Education, Culture, Research, and Technology for the opportunity to conduct Higher Education Applied Research (PTUPT) 2022.

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