Using Technology Acceptance Model to Evaluate the Utilization of Kolintang Instruments Application

Menggunakan Model Penerimaan Teknologi untuk Evaluasi Pemanfaatan Aplikasi Instrumen Kolintang

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Abstract – To preserve traditional Kolintang musical instruments, originating from Minahasa (North Sulawesi, Indonesia), Aplikasi Musik Kolintang was developed and can be run on web browsers and Android-based smartphones with several controllers to attract users' attention. This study aims to explore the acceptability and utilization of this application, especially the use of a webcam as a sensor for motion detections, and identify the modifications to make for better user experiences. Technology Acceptance Model (TAM) was adopted to determine user acceptance and behavioral intentions toward the application. The TAM variables used in this study were perceived usefulness, perceived ease of use, attitude towards usage, and behavioral intentions. External variables were also included, namely application design, application design, and expectancy. An online questionnaires-based survey was conducted to collect data from 177 people randomly selected at Universitas Katolik De La Salle Manado. The results suggested that all variables in the proposed framework either directly or indirectly have effects on the overall behavioral intention to use the application as they have statistically significant positive correlations. The respondent propensity to embrace and use the application was high leading to an increase in positive attitude toward usage, which consequently influenced the behavioral intention to use. Several modifications were indeed required to improve the quality of the application and enrich the user experience.

Keywords: technology adoption, Diffusion of Innovation, Kolintang, North Sulawesi

Abstrak *– Untuk melestarikan alat musik tradisional Kolintang yang berasal dari Minahasa (Sulawesi Utara, Indonesia) maka dibangun Aplikasi Musik Kolintang yang dapat dijalankan pada web browser dan ponsel Android disertai juga berbagai kontroler agar dapat menarik minat pengguna. Adapun, penelitian ini bertujuan untuk mengetahui penerimaan dan pemanfaatan alat musik Kolintang, khususnya penggunaan webcam sebagai sensor pendeteksi gerakan, dan mengidentifikasi modifikasi untuk meningkatkan pengalaman pengguna. Technology Acceptance Model (TAM) diadopsi untuk menentukan penerimaan pengguna dan niat perilaku terhadap aplikasi. Variabel inti TAM yang digunakan dalam penelitian ini adalah persepsi kegunaan, persepsi kemudahan penggunaan, sikap terhadap penggunaan, dan niat berperilaku. Variabel eksternal juga dimasukkan yaitu desain aplikasi, desain aplikasi, dan harapan. Survei berbasis kuesioner online dilakukan untuk mengumpulkan data dari 177 orang yang dipilih secara acak di Universitas Katolik De La Salle Manado. Hasil penelitian menunjukkan bahwa semua variabel dalam kerangka yang diusulkan baik secara langsung maupun tidak langsung memiliki efek pada niat perilaku secara keseluruhan untuk menggunakan aplikasi karena memiliki korelasi positif yang signifikan secara statistik. Kecenderungan responden untuk merangkul dan menggunakan aplikasi yang tinggi menyebabkan meningkatnya sikap positif terhadap penggunaan, yang akibatnya mempengaruhi niat perilaku untuk menggunakan. Beberapa modifikasi memang diperlukan untuk meningkatkan kualitas aplikasi dan memperkaya pengalaman pengguna.*

Kata Kunci: *adopsi teknologi, Difusi Inovasi, Kolintang, Sulawesi Utara*

INTRODUCTION

Kolintang (Indonesian's xylophones) is a traditional percussion musical instrument from Minahasa, North Sulawesi, that is played not only in ancestor worshipping rituals but also at dance performances, singing accompaniment, and musical performances. As an idiophonic instrument, the source of Kolintang's sound comes from its vibrating region (bar) when hit. Kolintang's name came from the sound: TING (high pitch note) and TANG (moderate pitch note), TONG

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(low pitch note). In the local language, the invitation "Let us do some TING TANG TONG" is: "Maimo Kumolintang" (Kaseke, 2013) that was known as Kolintang. Kolintang consists of five different instruments, namely bass, cello, tenor, alto, and melody that must be played together (Kaseke, 2013; Wikarsa et al., 2015).

In recent years, several innovative Kolintang musical instrument applications were built due to the development of the instruments and their playing techniques in hopes to ease the learning process, afford different user experiences, and also adapt to playing percussion instruments similar to Kolintang. These applications include Aplikasi Kolintang Berbasis Jaringan (Juana, 2012), Alat Musik Tradisional Kolintang (Adriono, 2014), Aplikasi Kolintang Virtual Berbasis Android (Sukma, 2014), Aplikasi Alat Musik Kolintang Menggunakan Augmented Reality Berbasis Android (Razjid, Sengkey, & Karouw, 2016), and more. Having said that, there are numerous factors to take into consideration when developing this type of application such as techniques, tools, and types of songs to play (Kaseke, 2013).

To enhance the user experience to play Kolintang, we developed an application, titled Alat Musik Kolintang, that can be run from web browsers and Android smartphones. This application provides multiple controllers to play the instruments with, such as a webcam, a keyboard, and a mouse. However, the special feature of this application is the use of a webcam as a sensor to detect motions while playing the instruments. The users can also modify the sound settings to suit their needs. Before playing, the user must select the type of instruments and the controller to use. Alongside this, this application provides information about Kolintang musical instruments such as history, and various types of Kolintang instruments, as well as presenting video Kolintang orchestra.

This application can be used by novice and advanced users by following the provided instructions. Unfortunately, the benefits gained by each user type are varied and therefore it is important to further explore the acceptance and utilization of this application. Hence, the technology acceptance model (TAM) is opted to get a better understanding of the user behavioral intention for using the Kolintang application. Surendran stated that TAM is mostly used in the field of information systems and information technology to explore and investigate the individual acceptance behavior for the targeted technology or system (Surendran, 2012). In support of this, TAM models have been applied in many context areas and fields that investigate user acceptance of information technology, such as multimedia (Portz, et al., 2019; Lau & Woods, 2008), education (Shroff, Deneen, & Ng, 2011), mobile banking (Lule, Omwansa, & Mwololo, 2012), electronic commerce (Garrity, Kim, Sanders, & Portz, 2005) and health services (Portz, et al., 2019).

In the TAM model, several variables that provide insights from the individual user perspectives are perceived usefulness (PUN), perceived ease of use (PEU), attitude towards usage (ATU), behavior intention to use (BIU), actual use (AU), and external variables (Alharbi & Drew, 2014; Lai, 2017). PUN refers to the degree to which one believes that his/her performance will improve by using the system (Alharbi & Drew, 2014; Surendran, 2012). These authors further defined PEU as the degree to which a person believes that it will effortless to use the system. Meanwhile, ATU shows “the user’s evaluation of the desirability of employing a particular information system application” (Surendran, 2012, p.176). Alharbi and Drew also revealed that ATU is directly influenced by PUN and PEU that is concerned with the user’s evaluation of the desirability of utilizing the technology. Meanwhile, BIU is directly affected by ATU and PUN to measure the likelihood of the user using the technology. Nonetheless, BIU is also indirectly affected by PEU. From the TAM model, it can be seen that PUN and PEU are determinants for the actual use of the system by which these two variables might be affected by external variables like social factors, cultural factors, political factors, and others (Surendran, 2012). In this study, the external variables to investigate are expectancy to PUN whilst application design and application interaction are particularly concerned with PEU. In summary, PUN and PEU mediate the effect of external variables on ATU, BIU, and eventually AU.

Using this TAM model, this research aims to explore the acceptability and utilization of Aplikasi Musik Kolintang, especially the use of a web camera (*webcam*) as a sensor for motion detections, as well as to identify the modifications to be made to the application to afford better user experiences.

This paper is organized in the following structures: research background as outlined in the introduction. Then, followed by the research methodology that provides pertinent information about the research

model, datasets, and more. Later, the results and discussion are presented before the research conclusion and future works.

RESEARCH METHODOLOGY

The participants consisted of 57 females and 120 males who have different ages, technology competencies, Kolintang playing skills, and many more. The research participants were 177 people selected randomly from students, staff, and lecturers at Universitas Katolik De La Salle Manado. They were asked to fill in the online questioners using Google Form. The output of the questionnaires was in the form of a spreadsheet file that can be viewed and edited in Microsoft Excel for further data processing. Thus, this data was analyzed using Statistical Package for the Social Sciences (SPSS 20) as a statistical analysis tool.

Table 1 will define each variable used by this research in the TAM model for better understanding.

Table 1 Definition of TAM Variables

Variable	Definition
Perceived usefulness (PUN)	The degree to which one believes that his/her performance will improve by using the system.
Perceived ease of use (PEU)	The degree to which a person believes that it will effortless to use the system.
Attitude towards usage (ATU)	An evaluation of user interest in utilizing a specific application/system.
Behavior intention to use (BIU)	The motivational factors influence a certain behavior by which this behavior will be more likely performed where there is a strong intention to perform that behavior.
PU-Expectancy (PUE) (Kim, 2015; (Preece, Rogers, & Sharp, 2015)	Performance expectancy by the system user to attain a better and more efficient job performance due to the use of a system.
PEU-Application Design (Kim, 2015; (Preece, Rogers, & Sharp, 2015)	The degree to which one believes that the design of a particular application should not be complicated as well as must-have certain attributes like suitability, visualization, and consistency to enable the user to use the application effortlessly.
PEU-Application Interaction (Kim, 2015; (Preece, Rogers, & Sharp, 2015)	The degree to which one believes that interaction between the user and application is of importance by promoting a quick response time and clarity to access and comprehend the informational load on the application.

The three external variables used in this TAM model, such as PU-Expectancy (PUE), PEU-Application Design, PEU-Application Interaction, were particularly selected due to their effects on user behavior as well as it entailed a definition of the requirements of user's view for making Aplikasi Musik Kolintang. It was believed that these selected external variables have significant impacts on user behavior in the TAM model of this research.

Figure 1 constructs TAM variables used in this research.

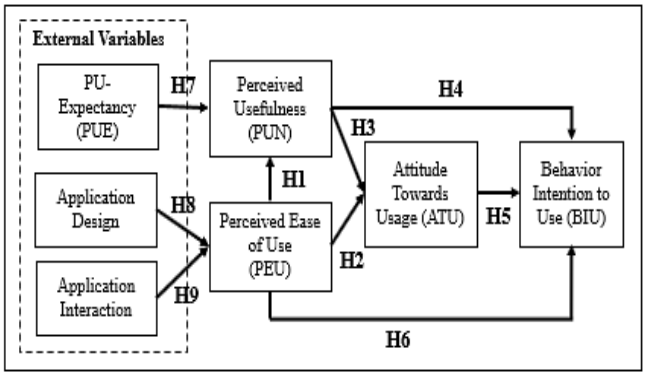

Figure 1 Hypotheses and TAM Variables

Perceived ease of use (PEU) of Aplikasi Musik Kolintang would demonstrate the degree to which using it would be effortless. This is due to ease of navigation, understandable and clear instruction, and flexibility provided in the application that enhances user interactions. PEU correlates with PUN as shown in many studies utilizing the TAM model (Portz, et al., 2019; Lai, 2017; Alharbi & Drew, 2014; Lule, Omwansa, & Mwololo, 2012). In this regard, these two hypotheses were proposed:

1. H1: PEU positively affects PUN to use Alat Musik Kolintang.
2. H2: PEU positively affects ATU to use Alat Musik Kolintang.

Perceived usefulness (PUN) of Aplikasi Musik Kolintang would reflect better control, higher performance, more effectiveness, and enhancement for the users to play the Kolintang instruments. Hence, it affected the attitude toward the usability of the application. In line with this, hypothesis 3 was presented.

3. H3: PUN positively affects ATU to use Alat Musik Kolintang.

In this research, PUN measures the likelihood of the users using the application to improve the skills of playing the Kolintang instruments. BIU is directly affected by PUN as the better the skills and experience of playing the Kolintang instruments the stronger the user's intention to use the application. Hall, Elliott, and Meng (2017) pointed out that the relationship between ATU and BIU has been "… well established in psychological theory. The Theory of Reasoned Action (TRA) [claims that] a person's behavioral intention is a function of their attitude toward the behavior and subjective norms …" (pp.6). Whilst, PEU has direct and indirect effects on intention to use the application. In this vein, three hypotheses are presented.

4. H4: PUN positively affects BIU to use Alat Musik Kolintang.
5. H5: ATU positively affects BIU to use Alat Musik Kolintang.
6. H6: PEU indirectly affects BIU to use Alat Musik Kolintang.

Application design and application interaction directly influence PEU while expectancy is directly affected by PUN. Using the variables and indicators in the table above, the following hypotheses are derived:

7. H7: PUE positively affects PUN to use Alat Musik Kolintang.
8. H8: Application design positively affects PEU to use Alat Musik Kolintang.
9. H9: Application interaction positively affects PEU to use Alat Musik Kolintang.

A 5-point Likert scale was used to measure the opinions of the participants with each of 24 questions in the questionnaire. This research also used Cronbach's Alpha to determine the internal consistency of the instrument by identifying the closeness or inter-correlation among the items in a group (Metzner & Nino, 2014; Warrens, 2012) as shown in the formula below.

$$\alpha = \frac{N\bar{c}}{\bar{v}+(N-1)\bar{c}} \quad (1)$$

Note:
α: alpha
N: the number of items
$\bar{c}$: the average inter-item covariance among the items
$\bar{v}$: the average variance

Table 2 shows the range values of Cronbach's Alpha for this research (Ma, Mak, & Wong, 2020).

Table 2 Range Values of Cronbach's Alpha

Cronbach's Alpha	Strength of Association
$a \geq 0.9$	Excellent
$0.7 \leq a < 0.9$	Good
$0.6 \leq a < 0.7$	Acceptable
$0.5 \leq a < 0.6$	Poor
< 0.5	Unacceptable

The following steps helped identify and sort out the collected data for analysis in this research.

1. Data requirement specification

It defined questions, measurement parameters, and units of measurements that can be found in the *Research Instrument* above.

2. Data collection

Data were collected from the selected sources using online questionnaires that were distributed on Google Form. These questionnaires were filled in by 177 participants from Universitas Katolik De La Salle Manado. Construct validity of the research instrument was done by a panel of experts, consisted of the faculty members of the Informatics Engineering study program at Universitas Katolik De La Salle Manado, to examine each item in the research instrument and thus determine what the specific item was intended to measure. On the contrary, the reliability of the research instrument was tested using Cronbach's Alpha with values range between 0-1.0. A value above 6.0 is accepted whilst question(s) will be removed when the value obtained is lower than 6.0.

3. Data processing

It organized data, converted the data using the scale of measurement defined earlier. Also, it excluded irrelevant or incomplete data. The output of questionnaires from Google Form was in the form of a spreadsheet file, Microsoft Excel. The irrelevant or incomplete data was removed. A modification to the data was made by calculating and adding the mean of each categorized variable into the dataset.

4. Data analysis

Once the collected data was sorted, filtered, and cleaned, it thus identifies correlations using SPSS 20. Correlation analysis was used to modeling the relationship between the independent variables and dependent variables. Hypothesis evaluation was done by performing a test statistic. A two-tailed test was used where the alternative hypothesis is not equal to the null hypothesis. The nine hypotheses were tested to measure the significance of statistics tested at a 95% confidence level by which the acceptability level of significance for the hypothesis test was 0.05.

5. Interpret research findings

It uses data visualization techniques to present the results in the form of tables. The research findings are correlated with the literature for relevance. It also requires interpretation by assigning a meaning to the information analyzed and determines the significance and implications of the research findings.

Technology Used for Developing Aplikasi Musik Kolintang

Supporting software for this application is as Table 3 shows.

Table 3. Software for Application Development

Programming	Adobe Flash Professional CS6, Java
Image Editing	Adobe Photoshop Professional CS3
Animation	Adobe Flash Professional CS
Modeling	Microsoft Office Visio 2007

Implementation of Aplikasi Musik Kolintang

The following provides the implementation of Aplikasi Kolintang interfaces.

Figure 2 Home

Figure 3 Mode Selection

Figure 4 Instrument Selection

Figure 5 Controller Selection

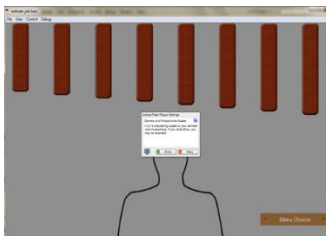

Figure 6 Screen Play

Figure 7 Motion Detection

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.923	.928	7

Figure 8 Reliability Test Result

After loading the application, the player needs to do the following:

1. Select the player mode that consists of beginner and expert modes.
2. Select the type of Kolintang instruments to play by which there are 5 options provided, such as bass, cello, tenor, alto, and melody.
3. Select the controller to use such as a web camera, touch screen, and keyboard.
4. When using the web camera to play the selected instrument, the distance between the player and the web camera is ideally 3 meters to have better light sensitivity.
5. This application allows the player to play with others online by selecting the desired instrument. This player can also view the plays of others and hear the sounds produced by others from his/her device.
6. There are several features included in this application such as record and play, chatting, video demo, lyrics, introduction to Kolintang, and more.

RESULTS AND DISCUSSION

Demographic Characteristics of Research Samples

This section addresses the demographic characteristics of the research samples based on the results gathered from the online questionnaires to 177 participants.

Table 4 Demographic Characteristics of Research Sample

Variable	Classification of Variables	Frequency	Percentage
Gender	**Male**	**120**	**67.8**
	Female	57	32.2
	Total	**177**	**100.0**
Age	< 20 years old	63	35.6
	20-29 years old	**84**	**47.5**
	30-39 years old	18	10.2
	40-50 years old	12	6.8
	Total	**177**	**100.0**
Duration of technology use	< 1 year	5	2.8
	Between 1-5 years	**89**	**50.3**
	Between 5-10 years	73	41.2
	> 10 years	10	5.6
	Total	**177**	**100.0**
Skills for playing Kolintang instruments	**No**	**106**	**59.9**
	Yes	71	40.1
	Total	**177**	**100.0**

In terms of gender, most of the participants (67.8%) are male while the age of the samples with the highest responses are between 20-29 years old (47.5%), and only 12 participants (6.8%) from the age group between 40-50 years old. In terms of the duration of technology use, the majority of participants have between 1-5 years, and only 2.8% of the participants have less than a year of technology use. Eventually, 59% of the participants revealed that they have the necessary skills when it comes to playing Kolintang instruments.

Reliability and Validity of The Instruments

Cronbach's Alpha was used to assess the consistency results of the instruments used in this research with a score of 0.923 which is considered excellent. Alongside this, a construct validity test was also performed to produce the following results using df=n-2 as shown in Figure 9.

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Behaviour Intention to Use	27.0434	5.403	.651	.484	.925
Attitude Towards Usage	27.1112	5.544	.767	.657	.910
Perceived Usefulness	27.0570	5.500	.861	.804	.902
Perceived Ease of Use	26.9460	5.573	.840	.927	.905
PEU-Application Design	27.0170	5.509	.820	.840	.906
PEU-Application Interaction	26.9163	5.596	.693	.863	.918
PU-Expectancy	27.2204	5.319	.750	.799	.913

Figure 9 Validity Test Results

From the validity test results in Figure 9, it is apparent that the value of r exceeds the r-tabulated which means the items in the constructs are valid and reliable to pursue this research.

Test of Hypotheses for TAM Variables

There are 9 hypotheses presented in this section to analyze the correlation between the TAM variables as shown in the following figure. N=177.

Table 5 Hypotheses for TAM Variables

	Correlations	r-value	p-value	Result
H1	PEU and PUN	.721**	.000	Accepted
H2	PEU and ATU	.595**	.000	Accepted
H3	PUN and ATU	.748**	.000	Accepted
H4	PUN and BIU	.588**	.000	Accepted
H5	ATU and BIU	.618**	.000	Accepted
H6	PEU and BIU	.454**	.000	Accepted
H7	PUE and PUN	.766**	.000	Accepted
H8	Application design and PEU	.809**	.000	Accepted
H9	Application interaction and PEU	.80**	.000	Accepted

The results in Figure 10 revealed that there is a significant positive relationship between two TAM variables for each hypothesis. The r-value for each hypothesis is bigger than the r-tabulated. Therefore, each hypothesis is accepted.

Figure 10 provides a more comprehensive understanding of the correlations between TAM variables used in this study. All TAM-related hypotheses within this research were shown to have statistically significant positive correlations. These results are in agreement with the theory of the TAM model and consistent with the findings of previous studies on TAM.

When the users perceived Aplikasi Musik Kolintang as easy to use (PEU), understandable, and flexible to accommodate their needs that differ in skills and technology use, thus the perceived usefulness (PUN) increased accordingly. In line with this, 50.3% of the participants only use technology for about 3-5 years and 59.9% of them also do not have the skills to play the Kolintang instruments. Despite that, the participants can use all the features in the applications without putting in too much effort and just follow the provided instructions. As a result, the participants seemingly fostered a positive attitude towards (ATU) using this application as they believe that this application can help them improve not only their playing skills but also enhance their technical ability while having a good experience play the Kolintang musical instruments. These results were consistent with the research findings by Hall, Elliott, & Meng (2017) and Lule, Omwansa, & Mwololo (2012). This application can preserve the livelihood of the traditional musical instruments for future generations which are considered as a positive influence. In taking this further, this application can help enhance the knowledge about the Kolintang instruments as well as improve the ability and confidence to play the instruments for users. Equally important, PUN increased the degree of positive ATU, which in turn consequently affected BIU. The positive PUN of the application comes from the easy control, improved performance, effectiveness of information sharing, and knowledge and skill enhancement to play the instruments provided in the application. About BIU, the participants revealed that they plan to use this application in the future should they have access to it.

The participants' propensity to embrace and use the application is considered high as they found that the application contents are understandable and timely whilst the provided controllers are easy to use. The contents can be viewed on web browsers and Android smartphones. Meanwhile, to play the Kolintang instruments, the users can use a mouse, keyboard, and touch screen, and webcam. The use of a webcam as a sensor for motion detections is one of the unique features introduced in this application. Furthermore, most participants highly liked the presentation of the Kolintang related information in the application which is important to take note of. In this regard, Kim (2015, pp.75) and Preece, Rogers, & Sharp (2015) argued that "The way information is displayed can also greatly influence how easy or difficult it is to attend to appropriate pieces of information".

Correlations

			Behaviour Intention to Use	Attitude Towards Usage	Perceived Usefulness	Perceived Ease of Use	PEU-Application Design	PEU-Application Interaction	PU-Expectation
Spearman's rho	Behaviour Intention to Use	Correlation Coefficient	1.000	.618**	.588**	.454**	.536**	.327**	.613**
		Sig. (2-tailed)	.	.000	.000	.000	.000	.000	.000
		N	177	177	177	177	177	177	177
	Attitude Towards Usage	Correlation Coefficient	.618**	1.000	.748**	.595**	.539**	.502**	.664**
		Sig. (2-tailed)	.000	.	.000	.000	.000	.000	.000
		N	177	177	177	177	177	177	177
	Perceived Usefulness	Correlation Coefficient	.588**	.748**	1.000	.721**	.622**	.602**	.766**
		Sig. (2-tailed)	.000	.000	.	.000	.000	.000	.000
		N	177	177	177	177	177	177	177
	Perceived Ease of Use	Correlation Coefficient	.454**	.595**	.721**	1.000	.809**	.871**	.522**
		Sig. (2-tailed)	.000	.000	.000	.	.000	.000	.000
		N	177	177	177	177	177	177	177
	PEU-Application Design	Correlation Coefficient	.536**	.539**	.622**	.809**	1.000	.643**	.674**
		Sig. (2-tailed)	.000	.000	.000	.000	.	.000	.000
		N	177	177	177	177	177	177	177
	PEU-Application Interaction	Correlation Coefficient	.327**	.502**	.602**	.871**	.643**	1.000	.316**
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.	.000
		N	177	177	177	177	177	177	177
	PU-Expectation	Correlation Coefficient	.613**	.664**	.766**	.522**	.674**	.316**	1.000
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.
		N	177	177	177	177	177	177	177

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 10 Correlations Between TAM Variables

Hence, it can be concluded that PU-Expectancy (PUN) positively affects PUN to use the application. In terms of suitability, visualization, and consistency of the application design, the participants mostly agreed that the application has successfully achieved it. This indicates that PEU-application design indeed has a positive effect on PEU. On the other hand, PEU-application interaction providing clear instruction on how to play Kolintang as well as acceptable response time to real-time auditory feedback, which increased the degree of positivity toward PEU.

Gender and age did not significantly correlate with other criteria (variables) and indicators in this study. They just showed the demographics of the research samples. However, the duration of technology use played an important part here as it differentiated the ability of users to use the application. Alongside this, users with prior knowledge and skills of playing traditional Kolintang instruments would find this application to be easy to use due to the numerous controllers to select from, presentable application contents, clear visualization, and other flexibilities provided in this application for user comfort and better playing experience.

Based on the findings, modifications must be made to the application to improve the usefulness and easiness for users in hopes to increase the positive behavioral intention towards the application. The modifications included additional Kolintang instruments, faster response time, improved control functions, and others.

This research offers an important theoretical contribution to explain behavior in intention to use of users in learning, experiencing, and advancing skills and knowledge of the traditional Kolintang Musical Instruments that must be carefully preserved for future generations.

CONCLUSIONS

TAM was used to explore the acceptability and utilization of Alat Musik Kolintang, especially the use of a webcam as a sensor for motion detections, as well as to identify the modifications which must be made to the application to make it more acceptable to users and afford better user experiences the variables in original TAM adopted in this study, including perceived usefulness, perceived ease of use, attitude towards usage, and behavior intention to use. In addition to this, external variables were added to the model to meet the needs of this study such as application design, application interaction, and expectancy. Application design and application interaction were correlated with perceived ease of use (PEU) whilst expectancy was correlated with perceived usefulness (PUN).

The findings revealed that all TAM-related hypotheses within this study were shown to have statistically significant positive correlations. This indicated that this application is easy to use and able to help users not only to learn but also to advance the skills and knowledge of playing Kolintang instruments by their time and pace. The application content was presented in an understandable, consistent, and

systematic manner. As expected, the participants showed a high degree of a positive attitude toward using the application and subsequently influenced the behavioral intention to use.

Although this study did provide insights into the technology acceptability and utilization of the application to ease the learning process and afford different user experiences as well as preserve the cultural heritage of the Kolintang instruments, these research findings were however obtained from a single study only. As a result, caution must be exerted by not generalizing the findings to a broader spectrum of the population and therefore further research is required. Also, this study requires more sophisticated statistical tests on the relationships among the TAM variables to get a better picture of the behavioral intentions that frequently manifest themselves in the actual behavior of the application users. One of the statistical tests to use is Structural Equation Modeling (SEM) that has abilities to build and test statistical models that are usually deep forms of causal models.

There are several recommendations provided for this study. Firstly, there is a need to conduct further studies with a larger sample size to get a wider spectrum of the targeted users for this application. Secondly, modifications to this application are highly urged to improve the quality of the application as well as enrich the user experience. The modifications required are such as additional Kolintang instruments, faster response time, improved control functions, and many more. Thirdly, this application should be introduced to schools with elective courses that teach students to play Kolintang instruments. This application can also be used by the Ministry of Tourism and Creative Economy that often holds traditional performance abroad to promote Indonesian tourism. Nevertheless, anyone who is interested in Kolintang instruments can use this application to meet their needs. Lastly, other statistical tests can be performed to confirm the validity of the variables such as factor analysis, item response theory models, and regressions.

SEM can be used as it considers interaction modeling, nonlinearity, correlated independent variables 2 independents), measurement error, interruption of correlated errors (correlated error terms), multiple latent independent variables.

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