RESEARCH ARTICLE

Pancasila Educational Games with Zone Proximal Development: An Analysis of Human-Computer Interaction Perception Based on Technology Acceptance Model

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Abstract

Educational games are becoming a learning trend for elementary school students today because of their fun nature and attractive appearance which makes students interested in trying them. Pancasila educational games are also designed to make learning more interesting. Testing of educational games and their compatibility with human-computer interaction needs to be done so that games are more optimal when implemented and distributed more widely. The purpose of this study was to determine the results of testing the acceptance of Pancasila educational games using the characteristics of the technology acceptance model. This study involved 300 respondents of early childhood, aged 5-6 years in 3 schools in East Java, Indonesia. Modelling and data analysis using SEM AMOS. The results showed that as many as 97.4% of students liked and were helped by this educational game. Another important factor is in terms of perceived ease of use game 99.8% of students like this aspect and from the aspect of perceived usefulness, 95% of students choose this aspect. Where both give good value to the Pancasila educational game. As for the development of educational games, they will be readjusted to the conditions of learning in each school.

Keywords: Educational Games, Zone Proximal Development, Human-Computer Interaction, Technology Acceptance Model, Behaviour Intention, SEM (AMOS).

Introduction

Pancasila is the basic philosophical foundation of Indonesia. Pancasila is stipulated in the Indonesian Constitution. It has been an unshakable foundation for Indonesia since its independence. Pancasila consists of five precepts, namely the first precept, which explains the democratic principles that underlie religious freedom which is tolerant of various religious beliefs and practices (Ihsan, 2017; Resmana & Dewi, 2021). Pancasila as a philosophical system animation all the concepts of citizenship teachings, which are systematically divided into three things, namely: Pancasila as the basis of the state, Pancasila as the nation's view, and Pancasila as the state ideology. These three things can only be distinguished, but not separated as a unit.

Teaching moral education in early childhood requires an appropriate learning approach (Nurmalisa et al., 2020; Rizky Agassy Sihombing & Pristi Suhendro Lukitoyo, 2021). Based on research, there are still many teachers who have not mastered and understood the implementation of appropriate and oriented learning approaches for early childhood students in East Java, Indonesia. The use of media in teaching and learning activities is very important because the presence of the media really helps students in understanding a certain concept. At an early age, students still think concretely and have not been able to think abstractly, for that the teacher should choose the right media according to the learning objectives. The teacher's inability to explain a material can be represented by the role of the media, so that learning objectives can be achieved as planned (Kuhfeld et al., 2020). Based on this

research, it can be concluded that many teachers are not optimal in implementing a learning approach (Agustina & Chandra, 2017; Kisno et al., 2021). This study develops moral behaviour in early childhood with an appropriate and student-oriented learning approach, namely the implementation of the Zone of Proximal Development approach.

One of the most famous experts in the cognitive education of children in the social field is Vygotsky (Lasmawan & Budiarta, 2020). Vygotsky created a theory of learning approach called the Zone of Proximal Development (Zone of Proximal Development), believed that children have difficulty solving problems alone, and then Vygotsky believed that it could be learned and solved by getting help from adults or friends. they. Vygotsky's learning theory emphasizes that

human development is something that cannot be separated from various types of social and cultural activities. He emphasized that all forms of mental, cognitive, affective, and psychomotor development of children are influenced by social or cultural discoveries that occur in society such as language, memory, and others. He also emphasized how the role of others can affect a child's development. Children themselves can discover mental functions, but it is simple. These higher mental functions or the so-called "cultural tools" are passed down from generation to generation to adults. With this Zone of Proximal Development approach, the author believes that by using it in moral learning from the start, children's success in having good morals will run smoothly. The zone of proximal development (Zone of Proximal Development) is the distance between students' ability to perform tasks under adult guidance and problem-solving independently according to students' abilities (Tinungki, 2019). The lowest limit of the Zone of Proximal Development is the level of skill that can be achieved by children by learning on their own, and the highest limit of the Zone of Proximal Development (ZPD) is the level of skill that can be achieved by children with the help of an instructor (Sari, 2018).

Through educational games combined with learning Pancasila for early childhood students, it makes a good choice in a variety of learning media. This educational game has been created and designed according to the rules and curriculum developed for students in schools (Lopes & Lopes, 2019). This game is closely related to Scaffolding theory. Scaffolding is support provided during the learning process that is tailored to the needs of students with the aim of helping students reach their potential, which gradually reduces student assistance so that they can develop learning strategies independently.

This Scaffolding theory can provide opportunities for students to learn and have the skills to observe and understand the social problems around them which will foster curiosity, discipline, teamwork, and environmental awareness when students know and try to find solutions to social problems (Kusmaryono et al., 2020; Retnodari et al., 2020).

The Pancasila educational game with ZPD that has been made is then tested to determine the level of student acceptance of the use of media with game technology. Human-computer interaction is important for the evaluation of technological products because technology is created to help humans carry out their activities (Lopes & Lopes, 2019; Retnoningsih & Alfian, 2020). The evaluation of the Pancasila educational game with ZPD will be carried out to find out the shortcomings of the system and make it possible to find out students' interest in the game which is expected to get a positive response so that this educational game can be accepted and distributed more widely. This Pancasila educational game will then be made to develop early childhood moral education at this time and increase moral values related to Pancasila moral education from an early age by using the Zone of Proximal Development (Zone of Proximal Development) approach. (Figure 1)

Literature Review

Learning through Pancasila Morals Approaching the Zone of Proximal Development.

The purpose of Pancasila moral education on the one hand is to foster moral feelings and attitudes, while on the other hand, it also aims to provide students with political, economic, social, religious, and cultural sciences related to Pancasila (Ihsan, 2017; Nurmalisa et al., 2020). Therefore, the teaching methods that

Fig. 1: Display of educational games with ZPD

are generally applied also need to vary, according to various aspects of this goal. In this section are the characteristics of the Pancasila moral learning method of education by analysing the Course Studies (GBPP) provided by the Ministry of Education and Culture. Zone of Proximal Development is an approach that has sociocultural elements in it, so it is very suitable to be implemented in teaching children. Learning theory with a sociocultural approach upholds the importance of the inseparable relationship between cultural and educational processes. Vygotsky emphasizes his belief in the Zone of Proximal Development in terms of social influences, especially the influence of instruction or teaching, on children's cognitive development (Sari, 2018; Tinungki, 2019).

The Zone of Proximal Development approach itself is the distance between the actual level of development shown by the ability to solve problems independently and the level of potential development shown through problem-solving with adult guidance, or with the collaboration of more capable peers. With the Zone of Proximal Development approach, it is believed that children who initially cannot master something alone, with the help of others will be able to master it and be able to practice it again at home alone.

Characteristics of classes that use the Zone of Proximal Development approach are Building collaborative communities, engaging in purposeful activities that involve all people actively forming identities, combining and unique activities, and using the curriculum as a means for learning, the benefits are not just the result.

Play is a learning method that is known to be very useful in relation to the Zone of Proximal Development. Many studies on the use of play methods in developmental psychology have been inspired by Vygotsky's (1978) theory. By using the theory of Zone of Proximal Development in early childhood moral development. Vygotsky believes that children's social interactions, especially with peers or adults, can improve their skills and advance more than themselves, so it is great for children's cognitive development. Therefore, education through Pancasila morals is by cultivating Pancasila values in the development of children's moral attitudes with the Zone of Proximal Development method, namely collaboration in problem-solving with adult guidance, or peers so that they can prepare early childhood when they enter the community directly later (Fani & Ghaemi, 2011; Lasmawan & Budiarta, 2020; Smagorinsky, 2011).

Understanding Pancasila Moral Behaviour for Early Childhood

According to the understanding of moral education experts, the purpose of moral education will lead a person to become moral, what is important is how a person can adapt to the goals of social life (Benu et al., 2022). Sociologist of morality states that moral education is part of the inheritance of values (Hanifa & Dewi, 2021; Nurmalisa et al., 2020). Therefore, Pancasila's moral behaviour in early childhood education means instilling Pancasila values into early childhood morals so that they can become a better generation when they enter society. Pancasila Moral Behaviour for early childhood is an effort to develop children's moral attitudes and behaviour based on Pancasila values. The success of implementing policies to strengthen Pancasila values and morals needs to be measured by indicators of achieving goals.

Technology Acceptance Model (TAM)

This model was originally proposed by Davis and has become the most widely used model to explain user acceptance of new technologies. TAM was developed from Theory of Reasoned Action and provides a basis for tracking how external variables influence beliefs, attitudes, and intentions to use new technologies (Baki et al., 2018; Lewis, 2019). This model has been used to predict acceptance of new IT and has proven reliable in explaining acceptance behaviour in several areas of information systems (Sayekti & Putarta, 2016).

Human-computer interaction

Human-computer interaction (HCI) is a multidisciplinary field of study focusing on the design of computer technology and the interaction between humans (the users) and computers. While initially concerned with computers, HCI has since expanded to cover almost all forms of information technology design. HCI is a method that can improve product design. Basically, HCI is a field of study that studies the design or use of computer technology. It can be said that HCI is a way to design a computer technology that can satisfy users. So, HCI is more focused on human and computer interfaces that are more interactive when used (Haryoko, 2012; Prihati et al., 2011; Retnoningsih & Alfian, 2020)untuk mendukung fungsinya tersebut Open Journal Systems (OJS).

Behavioural Intention

Gu et al. (2009) stated that behavioural intention to use reflects someone who is willing to try and is motivated to perform the behaviour. Intention is defined as the intention or intention. Intention can also be interpreted as something you want to happen and will be done. Meanwhile, behavioural intention is an indication of an individual's readiness to behave in a certain way (Weerasinghe & Hindagolla, 2017).

Behavioural intention can be interpreted as the behaviour of someone who is loyal or loyal to the agency so that he is willing to recommend to others because of the good service of the institution. Behavioural intention is a condition where a

person has the intention or attitude of being loyal to the brand, product and company and is willing to tell his superiority to other parties so that it can influence other parties to get services from these service providers. Behavioural intention greatly determines the possibility that someone will take certain actions in the future (Sivo et al., 2018).

METHODOLOGY

Research Design

This research model uses path analysis with a path diagram as shown in Figure 2. In Figure 2 the Pancasila educational game with ZPD will be tested with the results with parameters from TAM, namely Learning Goal Orientation, Functionality, accessibility, and User interface design which is an aspect of Perceived Usefulness and Perceived ease to use. While the dependent variable is the Behaviour intention of the users of the Pancasila Game.

Samples and Data Collection

The type of research used is quantitative research with descriptive narrative. Data were collected using a questionnaire given to early childhood students aged 5-6 years. This research was conducted at 7 institutions in the Klojen sub-district of Malang city that carried out Pancasila learning using the ZPD educational game. A total of 300 students were involved in this study which was determined by proportional random sampling technique. The research instrument as shown in Table 1 consists of 26 questions that must be answered by respondents using a Likert scale (Table 1).

Source: (Al-Aulamie, 2013)the technology allows to break the resurrection of time and place by enabling people to learn whenever and wherever they want. In information system research, learners' acceptance of e-learning can be predicted and explained using technology acceptance models. This research developed enhanced technology acceptance model to explain students' acceptance of learning management systems (LMSs and Researcher.
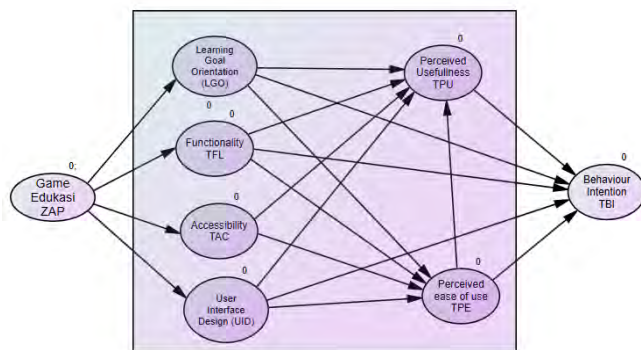

Fig. 2: Framework Research

Tabel 1. Variable Dan Instrument

Variabel	Sym	Variables measured in questions
Functionality (TFL)	FL1	The Pancasila educational game responds quite quickly
FL2		The Pancasila educational game provides enough features that I need
	FL3	Pancasila educational game allows me to access the content I need
	FL4	Overall, the Pancasila educational game feature allows me to achieve my learning goals
Accessibility (TAC)	A1	Pancasila educational game allows quick access to information
	A2	The Pancasila educational game makes information very accessible
	A3	Pancasila educational games make information easily accessible
Learning Goal Orientation (TLGO)	LGO1	I am willing to take on more challenging study assignments where I can learn more.
	LGO2	I often look for opportunities to develop new skills and knowledge
	LGO3	I enjoy challenging and difficult study assignments
	LGO4	For me, developing my learning ability is important enough to take risks
	LGO5	I am willing to take on more challenging study assignments where I can learn more.
User Interface Design (UID)	UID1	Pancasila educational game interface design is easy to use
	UID2	The instructions given by the Pancasila Game are clear
	UID3	The Pancasila Game Design is good
	UID4	Overall, the educational game interface design is satisfactory
Perceived Usefulness (TPU)	PU1	Using Pancasila educational games can improve my learning performance
	PU2	Using Pancasila educational games makes my learning more effective
	PU3	I found Pancasila educational game useful for me
Perceived Ease of Use (TPE)	PE1	Learning how to use the Pancasila educational game is easy for me
	PE2	I found the Pancasila educational game easy to use
	PE3	It is very easy to become skilled in using Pancasila educational Game
Behavioural Intention (TBI)	BI1	I intend to increase the use of my educational Games in the future
	BI2	I intend to use Pancasila educational games in the future
	BI3	For future studies I will use the Pancasila educational game application

Analysing of Data

Modelling and data analysis in this study used IBM-SPSS and SEM (IBM-AMOS version 22. The analysis prerequisite test used a significance level of 0.05 (5%). SPSS was used as a data storage area before being calculated using the AMOS model (Agustina et al., 2020; Chou et al., 2019)mediated by the variables of trust, self-efficacy, and work involvement. This study uses path analysis with modeling using SEM (AMOS.

Findings / Results

After modelling using AMOS, the data obtained is entered into SPSS and then connected to the model on AMOS according to predetermined variables. After calculating the resulting figure 3, which is a representation of the coefficient of the relationship value of each path (Figure 1).

From the calculation of Figure 3, the estimation results of significance are obtained as stated in table 2. In Table 2, in column P some values are > 0.05. Because the significance value is still high, the model cannot be said to be fit. The model must be changed first by eliminating the existing relationship lines between variables that do not fit (Table 2).

After several times testing the relation and calculating the model, the model in Figure 4 was obtained. With the significance value stated in table 3. In Table 3, it is known that there is still 1 value that is not significant, namely the relationship between TBI <-TAC, which is 0.166> 0.05. Then the relationship will be removed to get a fit model.

After eliminating the TBI<-TAC relation in the figure, a new model is obtained as shown in Figure 5. When viewed from Table 4, the relationship between all variables is fit or <0.05. So, it can be said that the model is fit and can be analysed.
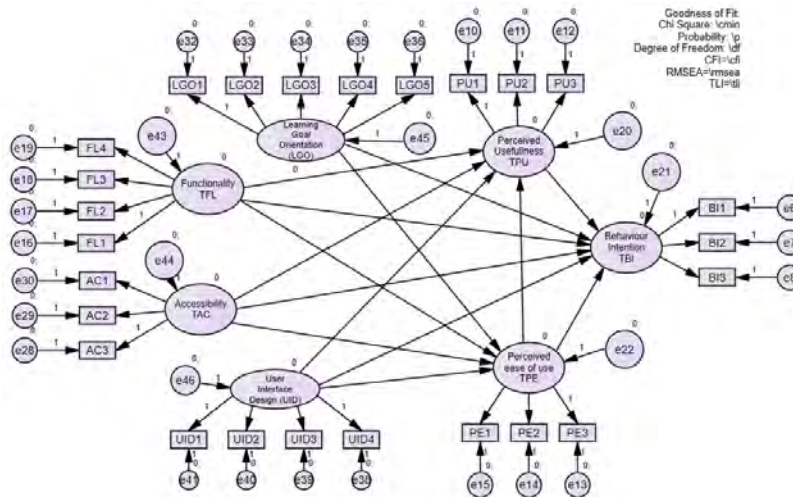

Fig. 3: Calculation Model 1.

Tabel 2: Regression Weights Model 1

			Estimate	S.E.	C.R.	P	Label
TPE	<---	TLGO.	,499	,131	3,816	***	par_19
TPE	<---	UID.	7,686	,416	18,479	***	par_24
TPE	<---	TFL	-9,286	,794	-11,699	***	par_25
TPE	<---	TAC	,193	,048	4,036	***	par_26
TPU	<---	TAC	,187	,037	5,066	***	par_10
TPU	<---	TPE	,507	,013	40,353	***	par_20
TPU	<---	UID.	,264	,081	3,263	,001	par_29
TPU	<---	TFL	,042	,104	,403	,687	par_30
TBI	<---	TPU	-,076	,343	-,223	,824	par_13
TBI	<---	TLGO.	-,177	,235	-,753	,451	par_18
TBI	<---	UID.	-2,061	,318	-6,476	***	par_23
TBI	<---	TPE	1,941	,173	11,218	***	par_27
TBI	<---	TAC	-,280	,118	-2,364	,018	par_28
TBI	<---	TFL	1,536	,377	4,075	***	par_31
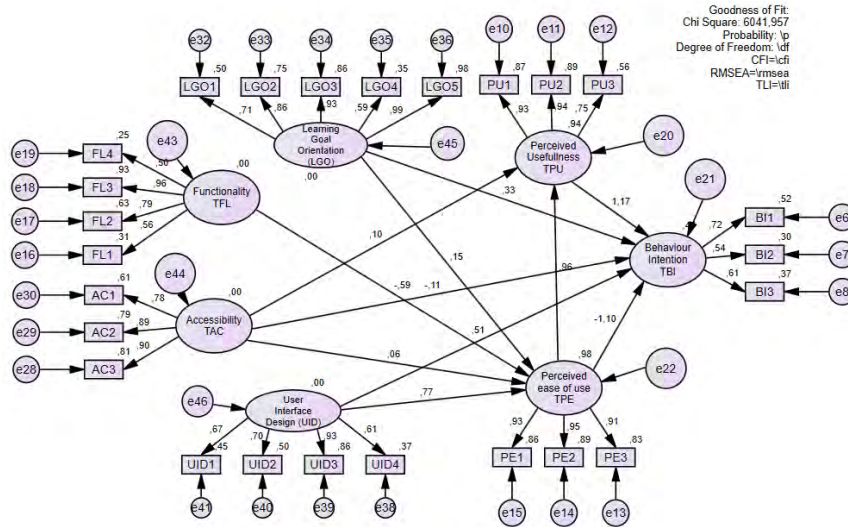
Fig. 4: Revision model

Table 3: Regression Weights: Model Revisi

			Estimate	S.E.	C.R.	P	Label
TPE	<---	TLGO.	,264	,040	6,537	***	par_11
TPE	<---	UID.	1,959	,091	21,426	***	par_15
TPE	<---	TFL	-1,947	,149	-13,100	***	par_16
TPE	<---	TAC	,123	,049	2,495	,013	par_17
TPU	<---	TAC	,174	,043	4,078	***	par_6
TPU	<---	TPE	,805	,025	32,013	***	par_12
TBI	<---	UID.	,441	,092	4,810	***	par_14
TBI	<---	TPE	-,375	,149	-2,520	,012	par_18
TBI	<---	TPU	,477	,177	2,688	,007	par_19
TBI	<---	TLGO.	,201	,039	5,185	***	par_20
TBI	<---	TAC	-,077	,056	-1,386	,166	par_21
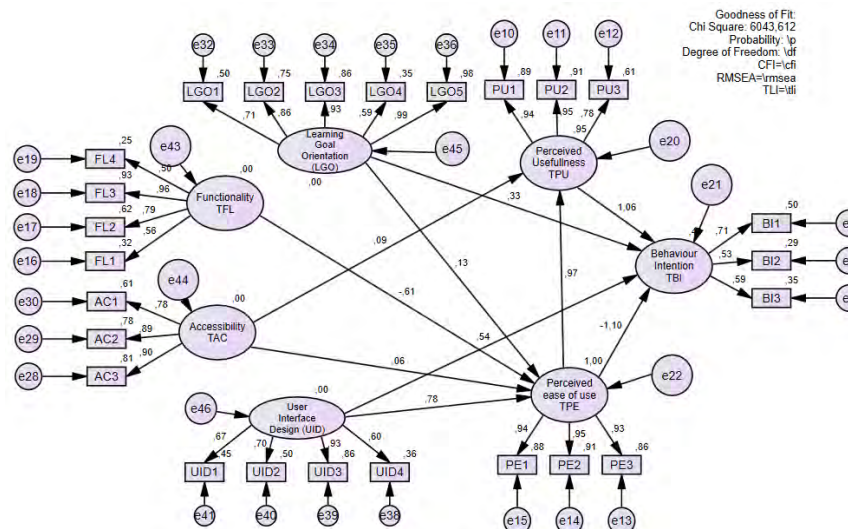
Fig. 5: Model Fit

Table 4: Regression Weights Model Fit

			Estimate	S.E.	C.R.	P	Label
TPE	<---	TLGO.	,255	,040	6,358	***	par_11
TPE	<---	UID.	2,188	,098	22,417	***	par_15
TPE	<---	TFL	-2,220	,163	-13,600	***	par_16
TPE	<---	TAC	,133	,048	2,768	,006	par_17
TPU	<---	TAC	,161	,042	3,848	***	par_6
TPU	<---	TPE	,807	,023	35,541	***	par_12
TBI	<---	UID.	,450	,091	4,967	***	par_14
TBI	<---	TPE	-,326	,122	-2,683	,007	par_18
TBI	<---	TPU	,378	,142	2,657	,008	par_19
TBI	<---	TLGO.	,194	,039	5,024	***	par_20

Tabel 5: Standardized Regression Weights

			Estimate
TPE	<---	TLGO.	,129
TPE	<---	UID.	,778
TPE	<---	TFL	-,610
TPE	<---	TAC	,060
TPU	<---	TAC	,087
TPU	<---	TPE	,966
TBI	<---	UID.	,538
TBI	<---	TPE	-1,098
TBI	<---	TPU	1,064
TBI	<---	TLGO.	,330

Tabel 6: Squared Multiple Correlations

	Estimate
TPE	,998
TPU	,950
AVG	,974

From the output results in Table 5, it can be seen that 1) When the TLGO increases by 1 standard deviation, the TPE decreases by 0.129 standard deviation, this means that if the learning goal orientation increases, the perceived easy to use will also increase by 0.129; 2) When the UID increases by 1 standard deviation, the TPE increases by 0.778 standard deviations, this means that if the user interface design increases, the perceived easy to use will also increase by 0.778; 3) When TFL increases by 1 standard deviation, then TPE decreases by 0.61 standard deviation. This means that if functionality increases, perceived easy to use decreases by 0.61; 4) When TAC increases by 1 standard deviation, then TPE increases by 0.06 standard deviation, this means that if accessibility increases, perceived easy to use will also increase by 0.06. ; 5) When the TAC increases by 1 standard deviation, the TPU increases by 0.087 standard deviation, this means that if the accessibility increases, the perceived usefulness will also increase by 0.087; 6) When the TPE increases by 1 standard deviation, the TPU increases by 0.966 standard deviations, this means that if the perceived easy to use increases, the perceived usefulness will also increase by 0.966; 7) When the UID increases by 1 standard deviation, the TBI increases by 0.538 standard deviations, this means that if the user interface design increases, behaviour intention will

also increase by 0.538; 8) When TPE increases by 1 standard deviation, then TBI decreases by 1.098 standard deviation, this can be interpreted that if perceived easy to use increases then behaviour intention will decrease by 1.098; 9) When TPU increases by 1 standard deviation, TBI increases by 1,064 standard deviations, this means that if perceived usefulness increases, behaviour intention will also increase by 1.064 and 10) When TLGO increases by 1 standard deviation, TBI increases by 0.330 standard deviation , it can be interpreted that if learning goal orientation increases, behaviour intention will also increase by 0.330.

Square Multiple correlations in Table 6 show the effective contribution of the dependent variable to the independent variable. If we look at the output in SPSS this value is indicated by the value of R Square. From the output above, it can be seen that the TPE predictor explains 99.8 percent of the variance. In other words, the TPE error variance is approximately 0.20 percent of the TPE variance itself. While the TPU predictor explains 95.0 percent of the variance. In other words, the TPU error variance is approximately 0.50 percent of the TPU variance itself.

The other outputs are shown in Table 7, The standard direct (without intermediary) effect of UID on TPE is .778. when the UID goes up 1 standard deviation, the TPE goes up by 0.778 standard deviation. The standard direct (without intermediary) effect of UID on TBI was .538. when UID goes up 1 standard deviation, TPE goes up by 0.538 standard deviation

While the indirect effect can be seen in Table 8. There is no direct relationship between UID and TPU, but UID has an indirect relationship to TPU through TPE (See Figure 4).

Tabel 7. Standardized Direct Effects

	UID.	TLGO.	TAC	TFL	TPE	TPU	TBI
TPE	,778	,129	,060	-,610	,000	,000	,000
TPU	,000	,000	,087	,000	,966	,000	,000
TBI	,538	,330	,000	,000	-1,098	1,064	,000

Tabel 8: Standardized Indirect Effects

	UID.	TLGO.	TAC	TFL	TPE	TPU	TBI
TPE	,000	,000	,000	,000	,000	,000	,000
TPU	,751	,124	,058	-,589	,000	,000	,000
TBI	-,054	-,009	,088	,043	1,028	,000	,000

The magnitude of the indirect relationship between UID <-TPU in Table 8 is known to be 0.751. Because the indirect effect is greater than the direct effect, it can be said that there is a mediating role in this model, or in other words TPE is a mediator of the relationship between UID and TPU. Likewise with other variables in this research.

Discussion

This study tries to explain the results of the evaluation of the Pancasila educational game in terms of users of human computer interaction technology based on the technology acceptance model, where 7 variables and 26 indicators are used here in the questionnaire. The calculation results show that each indicator in this study has a significant impact on students' acceptance of technology. The Pancasila educational game has given a new colour in learning this can be seen from the average effective contribution of 97.4% on behaviour intention or behavioural intention when using technology. It can also be interpreted that users of educational games really like learning using the Pancasila educational game with ZPD (Agustina & Barkah, 2017b, 2017a; Agustina & Chandra, 2017).The perceived usefulness aspect contributed 95% to the acceptance of the Pancasila educational game. This shows that the games designed have met the element that using a technology will improve the performance of work/educational performance (Agustina et al., 2021; Wongvilaisakul & Lekcharoen, 2015).

The perceived usefulness aspect contributed 95% to the acceptance of the Pancasila educational game. This shows that the games designed have met the element that using a technology will improve the performance of work/educational performance (Agustina et al., 2021; Wongvilaisakul & Lekcharoen, 2015).

The aspect of perceived ease of use contributes to the role of 99.8% which means that individual belief in using information technology systems will not be troublesome or require great effort when used (free of effort).

User/student acceptance of the Pancasila educational game with ZAP gives quite good results. This educational game turned out to be liked and considered fun and increased the quality of their learning. This can be shown by the participation of learning goal orientation which is shown by students that when learning goal orientation increases, behaviour intention will also increase by 0.330. This increase, of course, is not instantaneous, but because this game can be used as a means

for students to play and learn at the same time so that their study goals are achieved (Dewi & Putri, 2016).

In the aspect of Functionality, there is a decrease in perceived easy to use by 0.61, this means that if some functions are not improved, other users will have a little difficulty using the game. Therefore, students still cannot give good grades because there are several functions that still need to be addressed in educational games. This provides a correction for the improvement of educational games before they are widely circulated (Agustina & Suprianto, 2018; Tileng, 2015).

In the aspect of accessibility, users/students give a good score so that if the accessibility increases, the perceived easy to use will also increase by 0.06. This also happens if the accessibility increases, the perceived usefulness will also increase by 0.087. This aspect makes it easy for users to be able to access and run educational games properly without significant obstacles (Wong et al., 2012)it appeared that only limited studies had developed models to explain statistically the chain of influence of computer teaching efficacy and gender on the intention of student teachers to use computers. A total of 302 student-teachers completed the questionnaire measuring their responses to computer teaching efficacy (CTE.

The user interface design aspect also has a good influence on educational games, the resulting design is user friendly and makes it easier for users to understand the meaning of the menu or criteria contained in educational games. The calculation results mean that if the user interface design increases, the behaviour intention will also increase by 0.538, this shows that the user interface design aspect contributes quite a lot to user acceptance of the Pancasila educational game (Retnoningsih & Alfian, 2020)untuk mendukung fungsinya tersebut Open Journal Systems (OJS.

Conclusion [12-bold]

The results of the acceptance of technology in the human computer interaction scheme based on the technology acceptance model are quite good and can be accepted by users/students. Even though there is a correction on the functionality side, it can be improved. Based on the perceived easy to use and perceived usefulness, this educational game is quite feasible to be implemented and used according to the character's age and form of learning. The results of the analysis show that student acceptance of the use of game-based technology media has helped students understand learning content, students are more enthusiastic in learning, students find it easy and

happy to access educational games, students feel interested in accessing games as learning media and the most important thing is that the learning goal orientation is achieved. A total of 300 students who were involved in this research 97.4% stated that this educational game is feasible to be used and developed again.

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