

## **Development of ANEKA-Based Countenance Model Integrated with Tri Hita Karana-SAW in Evaluating Student's Character and Quality of Computer Learning in Bali**

Dewa Gede Hendra Divayana, I Putu Wisna Ariawan, Agus Adiarta, Desak Putu Parmiti,  
I Wayan Eka Mahendra and Ni Nyoman Parmithi  
Universitas Pendidikan Ganesha and IKIP PGRI Bali, Indonesia

**Abstract:** The primary purpose of this research was to get an illustration of the design of ANEKA-based countenance evaluation model integrated with Tri Hita Karana and SAW concept that can be used to evaluate computer learning process at vocational school of information technology in Bali Province to know the improvement of student's character and student's quality in computer learning process especially in the era of Industry Revolution 4.0. The of this research location at SMK TI Udayana as one of the vocational school of information technology in Bali Province. Subjects in this research as many as four experts include two informatics experts and two education evaluation experts involved to conduct early trials of evaluation model design. The tools used to collect data in this first year of research are questionnaires and documentation. The analytical technique used in analyzing the accumulated data is quantitative descriptive. The result obtained in this research was a design of countenance evaluation model that is modified using ANEKA, Tri Hita Karana and SAW concept to produce an effective and useful model for education evaluators in conducting evaluation activities related to the character and quality of computer learning in the vocational school of information technology in Bali Province.

**Key words:** ANEKA, countenance model, Tri Hita Karana, SAW, computer learning, accumulated, technology

### **INTRODUCTION**

Currently, we have entered the era of Industrial Revolution 4.0 and it is undeniable that the role of information and communication technology becomes very important in supporting every activity undertaken by society whether in the economic, social, cultural, political and others and also in education. Especially in the field of education, the role of information and communication technology has been felt, since, the appearance of e-Learning, e-Teaching, blended learning, augmented reality and virtual reality as a facility to support the learning process. In general, the use of information and communication technology in schools has a positive impact to support the smooth learning process, especially in providing convenience for teachers in transferring knowledge to students. For example when prior to the use of information technology in schools, the learning process was done conventionally through learning activities with interaction and face-to-face directly in class between teacher and students where teachers prepared teaching materials only based on sources from several books or just one book

they got and can imagine if the teacher at one time sick and cannot teach then the learning process would not be done. However with the use of computers and the internet to support learning process based on e-Learning or blended learning in schools, weaknesses in the conventional learning process can be overcome and of course also can lead to students will be more active, creative, independent in learning and honed its ability in using information technology.

Besides the existence of some positive impacts resulting from the utilization of information and communication technology in supporting the learning process in school but the facts in the field also shows that the use of information and communication technology in schools is still not optimally implementation. It has marked by the misuse of computer and internet facilities by most of the students for things that are inappropriate and not following school rules.

Some of the negative impacts that occur due to abuse of computer and internet use in schools conducted by students including early child sex behavior and promiscuity among students have started to appear

because of the ease of accessing pornographic videos through porn sites are available on the internet the appearance of extortion actions conducted by students to their fellow class or their below level, brawl between students, the emergence of motorcycle gangs that invite noise, wild races on public streets because of bad examples/information through the internet and social media are not responsible students are lazy to learn because they are too engrossed to play online games available on the internet and even other negative impacts to online gambling have also begun to be recognized by school-age children due to the free use of the internet without optimal supervision from school or student's family at home.

If this negative impact continues to be allowed to occur, it will undoubtedly lead to decreased student's character and the quality of student's learning will also decline. The decrease of student's character caused by the abuse of computer and internet usage has also happened in some high schools and vocational schools in Bali Province and in particular has even occurred in some vocational school of information technology which in fact is a very familiar school and often use the computer and internet facilities in the learning process every day, so, the student's tendency of the vocational school of information technology to be affected by adverse internet abuse more significant when compared with other public schools.

Based on this problem, it is necessary to find the recommendation of the solution, through an evaluation activity. In general, evaluation activity is an activity undertaken by the evaluators to obtain the appropriate recommendations used in taking a decision based on the results of measurement and assessment of the object under study. Those explanations about evaluation were generally the same as some of the evaluation explanations expressed in previous studies by Tsonkova (2013), Zumbach and Funke (2014), Belousova and Pishchik (2015), Ahmed and Bhatti (2015), Martinez *et al.* (2016), Galustyan (2017), Gagnon *et al.* (2017), Delibalt *et al.* (2017), Machaka (2017), Arnyana *et al.* (2017), Mapitsa and Khumalo (2018), Dahler-Larsen (2018), Tsai (2018), Son *et al.* (2018), Sarif *et al.* (2018), Gragasini *et al.* (2018), Santoso *et al.* (2017) and Fazillah *et al.* (2017).

Evaluation activities to solve the problem of student's character decline and student's quality of computer learning process that occurred in the vocational school of information technology in Bali Province, it needs to be done thoroughly, profoundly and systematically to the learning process that happens

concerning components that can measure the student's character and quality of student's learning, so, resulting in a conducive learning process and able to improve the positive student's character to realize the happening of the harmonious relationship between students with God, harmonious relationship between students with each other and harmonious relationship between students with the surrounding natural environment.

Some models can be used to evaluate the learning process in the school such as CIPP evaluation model, formative-summative evaluation model, goal-oriented evaluation model, goal-free evaluation model, countenance evaluation model, CSE-UCLA evaluation model, etc. But accurately, to evaluate the student's character and computer learning quality in the vocational school of information technology in Bali Province needs a new breakthrough that is a unique evaluation model which is a combination of one of the general evaluation model as mentioned above with the concept that can measure responsibility values, nationalism values, social ethics values in the general environment, commitment values to produce superior quality in learning, values of anti-fraudulent practices in the learning process, so that, later able to create a harmonious learning environment between students with each other, students with the surrounding natural environment and even harmonious relations students to God.

Based on the specific needs, so, the breakthrough evaluation model that is very appropriate and suitable to evaluate the student's character and student's quality of computer learning process in the vocational school of information technology in Bali Province is a countenance evaluation model based on ANEKA value integrated with Tri Hita Karana and SAW concept. Through, this model, the student's character and student's quality of learning process can be evaluated based on two matrixes namely description matrix and judgment matrix where description matrix consists of 3 measurement components based on the review of ANEKA values while the judgment matrix includes of 3 measurement standards were integrated with the values of Tri Hita Karana and SAW to know the student's character who needs to get more attention and determine the most dominant aspect as a determinant of the quality computer learning.

Referring to some of the things described in this study then the problems of this research include how the design of countenance evaluation model based on ANEKA values integrated with Tri Hita Karana and SAW used to measure the student's character and student's quality of computer learning process in the

vocational school of information technology in Bali Province. How preliminary test result on the design of countenance evaluation model based on ANEKA values integrated with Tri Hita Karana and SAW? Based on those problems, the purpose of this research is to know the design form and the preliminary test result on countenance evaluation model based on ANEKA values integrated with Tri Hita Karana.

This research is due to the background of the research roadmap that the researchers has done, since, 2016. In 2016 the researcher has researched the actualization design of fundamental values of lecturer profession in the Department of Information Technology Education in Universitas Pendidikan Ganesha where the results obtained from the research was the internalization level of ANEKA values performed by the lecturers in realizing their professionalism (Divayana and Sugiharni, 2016). Obstacles found by the researchers in research in 2016 was not able to show the existence of integration between the value of ANEKA that has been internalized by the lecturers in the implementation of learning activity in college with the Tri Hita Karana concept, so, it cannot realizing the harmonious relationship between lecturer with each other, harmonious relationship with the natural environment around the place of work and the harmonious relationship with God.

Research conducted by the researcher in 2017 about the development of evaluation model based on ANEKA values in improving the quality of computer learning at the vocational school of information technology in Badung regency. This research was one of development research that tries to insert or use the internalization concept of ANEKA values used by lecturers to realize their professionalism in performing their lecture in college into computer learning process in the vocational school of information technology. The results obtained in the research in 2017 was the discovery of appropriate evaluation model in the form of evaluation model based on the ANEKA values that can be used to measure the effectiveness of computer learning at the vocational school of information technology in Badung Regency through success parameter to internalize the ANEKA values in the learning process (20). Obstacles found in research conducted in 2017 that there was no integration of the ANEKA concept with Tri Hita Karana concept, so there was no precise balance between the quality of cognitive possessed by students with their character quality.

Based on several obstacles that remain to was found in research that has done in 2016 and 2017 then in the year 2018 the researchers is explicitly researching model development of countenance evaluation model

based on ANEKA values that are integrating with Tri Hita Karana and SAW concept, so that, later obtained a design the appropriate evaluation model is used to measure the student's character and student's quality of computer learning in the vocational school of information technology in Bali Province and of course also the model has been tested by the experts.

Besides those research roadmap there are also some relevant research which becomes the rationale for conducting this research such as research which has been done by Irawan (2016) about the evaluation of character education implementation at physics learning at MAN Yogyakarta 1 have equal with research that the researcher did regarding research studies on improving the student's character in following the learning process, it's just obstacles were encountered in research conducted by Irawan was not yet, thoroughly of the learning process to realize the character and quality of learning based on a harmonious relationship between students with God, students with each other and students with the surrounding natural environment. Differences of research conducted by Irawan with the researcher is the model used by Irawan in doing evaluation activity is CIPP while the model used by the author in this research is the modified countenance model with the ANEKA concept, Tri Hita Karana concept and SAW concept.

The research that has been done by Diayuningsih and Suyanto (2014) about the pattern of character development through the school culture in SMA Wachid Hasyim 2 Taman Sidoarjo has similarities with the research that the researcher did regarding the purpose of his research is about improving the education quality or learning quality while the difference lies in the model used to achieve the expected objectives in the research where Diayuningsih and Suyanto use the development model of student's character values and authors use the countenance evaluation model based on the ANEKA values integrated with Tri Hita Karana and SAW concept. Research conducted by Darmayanti and Wibowo (2014) on the evaluation of character education programs in Kulon Progo primary school has similarities with the researchers regarding research studies on character education but the difference lies in the subject was evaluated. Where Darmayanti and Wibowo evaluate students at the primary school level while the researchers evaluate students at the vocational school level. Obstacles found in research conducted by Darmayanti and Wibowo was the implementation of character education had not run optimally when the learning process occurs.

Research on the implementation of school cultural

values in creating a quality school conducted by Arifin (2012) has similarities with that done by the researchers regarding research objectives was about improving the learning quality while the difference lies in the efforts to achieve the goal which expected where Arifin seeks to implement the values of school culture in realizing quality learning process while the researcher implementation the ANEKA values integrated with Tri Hita Karana and SAW concept in the learning process.

Research conducted by Setiawan (2013) on the ability of teachers to assess in the learning through the internalization of the honesty values in civic education learning has similarities to that done by researchers regarding the research purpose was about improving the education quality while the difference lies in the use of appropriate strategies to achieve the expected goals where Setiawan only use the internalization of honesty values in the learning process while the researchers in this study using the internalization of ANEKA values that integrated with Tri Hita Karana and SAW concept in the learning process.

Based on the problems found, the research roadmap and the study of some relevant research that has been done by some previous researchers, the researchers are interested in conducting research that is about the development of countenance evaluation model based on ANEKA values integrated with Tri Hita Karana and SAW concept to improve the student's character and student's quality of computer learning process, especially at vocational school of information technology in Bali Province.

## **MATERIALS AND METHODS**

This research was conducted for three years using research and development method with Borg and Gall model design which has ten stages (Borg and Gall, 2008) where for research in the first year (2018) 5 stages of development are: research and field data collection, planning, development of model design, preliminary test and preliminary test revision. For research in the second year (2019) will be implemented two stages of development are: field trials and revision of field trial results. In the third year (2020) will be implemented three stages of development are: trial usage, final product revision and also, dissemination and implementation of the final product.

Based on the objectives previously described in this study that are limited to the design of the model and the preliminary test results on the design of countenance evaluation model based on ANEKA value integrated with Tri Hita Karana and SAW concept, so, the stages of

development in this first year of research are limited to 5 stages development of Borg and Gall. In the first phase, conducted field research and data collection which is often also, mentioned as the preliminary study stage by searching the literature related to the problems studied in this research is about countenance evaluation model, ANEKA concept, Tri Hita Karana concept and SAW concept, so that, later can be used as a component the initial forming of evaluation model design developed. In the second phase, research planning is done to obtain the estimated number of personnel and the time required to complete the evaluation model design in this research. In the third stage, the design of the evaluation model was developed. In the fourth stage, an initial pilot activity involving expert assistance is conducted to test the design of evaluation model that has been established. In the fifth stage revision activities are made to the model design that was formed when there is a suggestion to make a revision given by the expert after a previous preliminary test.

In this 1st year of research, the place of research conducted on one of the existing vocational school of information technology in Badung Regency is SMK TI Udayana as a sample of research. The reason for choosing SMK TI Udayana is used as a place for the implementation of this first year of research because SMK TI Udayana is a vocational school that focuses its education in the field of computer and in general in this school discipline students well maintained and the learning process is also well done, so, later facilitate the researcher in determining the standard on the judgment matrix contained in the countenance evaluation model based on ANEKA values integrated with Tri Hita Karana and SAW concept. The time required specifically to complete the design of this evaluation model was 42 days from the determination of evaluation component until the implementation of preliminary test revision on the model design that has been made. Subjects involved in conducting the preliminary test on evaluation model design that has been formed are as many as four experts namely two informatics experts and two education evaluation experts.

The data collection instrument in this 1st year research used questionnaires and documentation. The questionnaire is used to obtain the expert response to the model design while the documentation is used to get the visualization view of the model design and the photo documentation of research implementation activity in this first year. The analysis technique used in this 1st year research is descriptive quantitative by using the calculation of percentage descriptive. The calculation of

**Table 1: Percentage of achievement rate conversion by five scales**

Level of achievement (%)	Category	Decision
90-100	Excellent	No revisions needed
80-89	Good	No revisions needed
65-79	Moderate	Revisions
55-64	Less	Revisions
0-54	Poor	Revisions

percentage descriptive yields percentage of assessment which is subsequently used to provide interpretation or assessment of the research results from the model developed.

The formula used to obtain the results of calculation of percentage descriptive is as follows (Subana and Sudrajat, 2001):

$$\text{Percentage} = \frac{\sum (\text{Answer} \times \text{Weight of each Choice})}{n \times \text{highest weight}} \times 100 \quad (1)$$

Where:

$\sum$  = Sum

n = Total number of questionnaire items

Next to calculate the percentage of the overall subject used is the following formula (Subana and Sudrajat, 2001):

$$\text{Percentage} = \frac{F}{N}$$

Where:

F = Total percentage of overall subject

N = Number of subjects

To be able to provide meaning and decision-making on the level of accuracy and effectiveness of achievement of evaluation model design after testing by experts, it can use the scale conversion of achievement level as in Table 1.

## RESULTS AND DISCUSSION

This 1st year of research focused on demonstrating the implementation results of the five stages of Borg and Gall development to produce a countenance evaluation model based on ANEKA values integrated with Tri Hita Karana and SAW concept. The implementation results of the 5 stages of Borg and Gall development referred to in this study can be fully demonstrated and explained as follows.

**The results of research and field data collection:** In this stage, we get the literary related to the countenance evaluation model, ANEKA concept, Tri Hita Karana concept and SAW concept as the initial component of the evaluation model design that developed.

**The concept of countenance evaluation model:** Sukardi (2008) explained that the countenance model has two main features covered in two matrix, namely the description and judgment matrix. In the description matrix contains data that will show the standard reference and the circumstances in which the objectives can be achieved. While the judgment matrix contains decision data obtained from the interpretation of the difference between the observed behavior in the field with the standard reference.

Arikunto and Jabar (2009), explained that countenance evaluation model was developed by Stake. This model emphasizes two main points: description, relating to two things that indicate the position of something, i.e. what is the purpose/objective expected by the program and observation/effect or what happened judgment which in this step refers to the standard.

From some of the above opinions can be concluded in general that the countenance evaluation model is an evaluation that emphasizes the description process and consideration process. The description process is an activity that shows the purpose/objectives and benefits expected by the program while the consideration process is an activity to determine whether there is a difference/ comparison between goals, absolute standards and facts that occur in the field to assess the benefits of a program.

**The concept of ANEKA:** The concept of ANEKA was initially introduced in education and training of group 3 for candidate civil servants in the Republic of Indonesia. This activity is an absolute requirement that must be taken by the candidate of civil servant to be appointed as civil servant. The hope after this activity completed is the fundamental ANEKA values can be actualized earnestly by the civil servants of the Republic of Indonesia at the place of their research.

The term ANEKA in ANEKA evaluation model is short for Akuntabilitas (in Indonesian) or Accountability (in English), Nasionalisme (in Indonesian) or Nationalism (in English), Etika Publik (in Indonesian) or Public Ethics (in English), Komitmen Mutu (in Indonesian) or Quality Commitment (in English), Anti Korupsi (in Indonesian) or Anti-Corruption (in English).

Accountability is an obligation that must be implemented by every individual or group of people to fulfill the responsibilities that be their mandated by showing report or record the process and the results of their research Divayana *et al.* (2017). The aspects that can be classified as accountability such as responsible, honest, clarity of target, consistent, neutral, participative and prioritizing the public interest.

Nationalism is the ability of every citizen to loving their country based on a strong awareness and passion for living together (Divayana *et al.*, 2017). The aspects that can be classified as nationalism such as tolerant, work ethic, transparent, confidence, mutual cooperation, deliberation, kinship, wise not greedy and mutual help. Public ethics is a standard that regulates good behavior that must be owned by public servants and bad behavior that should be avoided by public servants in providing services to the public, so can to create of optimal service to the public (Divayana *et al.*, 2017). The aspects that can be classified as public ethics such as respect, polite, obey on the laws and regulations, careful, obey on commands and high integrity.

Quality commitment is a firm attitude to maintain effectiveness, efficiency, innovation in order to realize the quality and superior product work (Divayana *et al.*, 2017). The aspects that can be classified as quality commitment such as effectiveness, efficiency, innovation and quality oriented.

Anti-corruption is an action that does not approve the efforts of a person or group of people by abusing their position or authority to seek their advantage (Divayana *et al.*, 2017). The aspects that can be classified as anti-corruption such as independent, discipline, fair, brave, hard work, care and simple.

**The concept of Tri Hita Karana:** Indigenous peoples of Bali as a social society in civilization also has the concept of norms that regulate life in civilization, since, the time of known about culture that famous with the cosmology concept, i.e., Tri Hita Karana and is a philosophy of life that survives until now despite being in concepts of social change that always dynamic as one of the characteristics or character of civilization (Subagia, 2016). The philosophy of Tri Hita Karana has a concept that can preserve cultural and environmental diversity amidst the blow of globalization and homogenization. Tri Hita Karana, formed from the word of 'Tri' which means three, 'Hita' means happiness and 'Karana' which means cause, so that, Tri Hita Karana can be interpreted as three causes of happiness. Basically, the nature of Tri Hita Karana's teachings according to Wiana (2007) emphasizes the three human relationships in life in this world. These three relationships include relationships with fellow human beings, relationships with the natural surroundings and relationships with God that are interconnected with one another. Each relationship has a living guideline of respecting each other's surroundings. Based on some of these opinions then Tri Hita Karana is a concept that emphasizes the three human relationships such as good relationships that occur between people with God, good relationships that occur between humans with each other

and good relationships that occur between humans with the surrounding natural environment in their life, so that, people can live in serenity and peace.

**SAW (Simple Additive Weighting):** The word SAW is an acronym of simple additive weighting is one of the decision support system methods that require the process of normalizing the decision matrix to a scale that can be compared with all the extant alternative ratings (Eniyati, 2011) The formula used to calculate the normalization as follows (Jampel *et al.*, 2017):

$$r_{ij} = \begin{cases} \frac{x_{ij}}{\max_i x_{ij}} & \text{if } j \text{ is benefit attribute} \\ \frac{\min_i x_{ij}}{x_{ij}} & \text{if } j \text{ is cost attribute} \end{cases} \quad (3)$$

where,  $r_{ij}$  is the normalized performance rating of the alternative  $A_i$  on the attribute  $C_j$ ;  $I = 1, 2, \dots, m$  and  $j = 1, 2, \dots, n$ . The formula used to calculate the preference values in each alternative ( $V_i$ ) is as follows (Belousova and Pishchik, 2015): the chosen alternative is  $A_i$  because the value of  $V_i$  is the highest.

**The results of research planning:** In this stage, an estimate of the number of personnel required in making the model design up to preliminary test revision of design of countenance evaluation model based on ANEKA values integrated with Tri Hita Karana and SAW concept can be seen in Table 2.

In this research planning stage also, produced the time planning needed to complete the evaluation model design until the preliminary test revision phase of model design that can be seen in Table 3.

Table 2: Personnel requirements in making evaluation model design up to preliminary test revision stages

Activity	No. of personnel
Determination of evaluation components	3
Create of model design	3
Preparation of the preliminary test instrument	3
Preliminary test	4
Preliminary test revision	3
Total	16

Table 3: Time requirements in making evaluation model design up to preliminary test revision stages

Activity	Time (days)
Determination of evaluation components	6
Create of model design	7
Preparation of the preliminary test instrument	7
Preliminary test	10
Preliminary test revision	12
Total	42

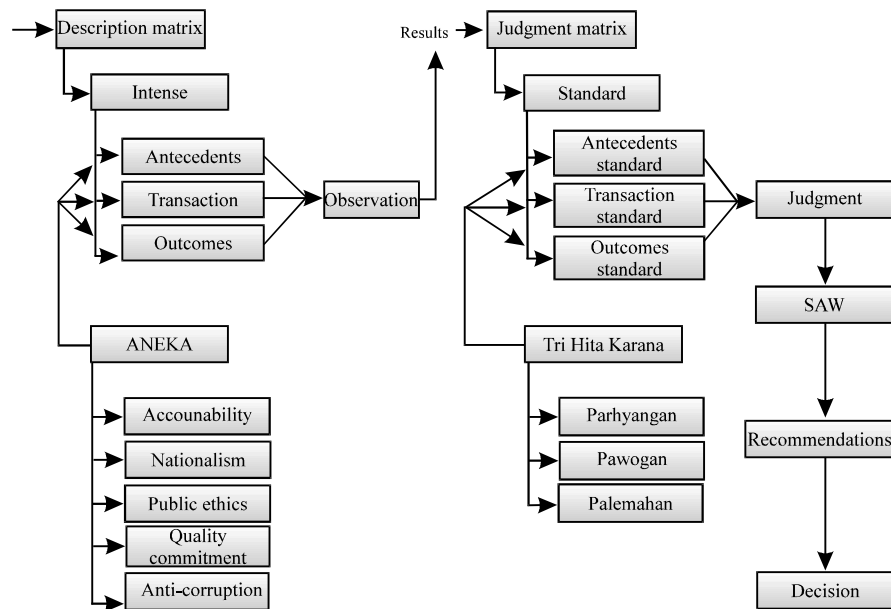


Fig. 1: Design of countenance evaluation model based on ANEKA integrated with Tri Hita Karana-SAW in computer learning

**The results of model design development:** In this stage, produced the design of countenance evaluation model based on ANEKA values integrated with Tri Hita Karana concept that can be seen in Fig. 1.

Figure 1 shows that, the countenance evaluation model based on ANEKA integrated with Tri Hita Karana concept in computer learning consists of two main stages of evaluation in matrix form there are: description matrix and judgment matrix. In the description matrix there are two components namely intense and observation. The intense component indicates the existence of the expected goal occurs based on three important things namely antecedents, transactions and outcomes. Antecedents are the expected context in a program, a transaction is a process that is expected to occur in a program and outcomes are the results and effects expected of a program. These three important things must be based on ANEKA concept which consists of accountability, nationalism, public ethics, quality commitment and anti-corruption. The observational component is used to observe the objectives that have been achieved in the intense component. The results of these observations are then taken to the judgment matrix stage. In the judgment matrix there are two components namely standard and judgment. The standard component is used as the basic reference in assessing the observed results that have been made previously on the observation component located at the description matrix stage. The standards in the judgment matrix consist of three parts such as

antecedents standard, transaction standard and outcomes standard. All standards must be based on the values that exist in the Tri Hita Karana concept which consists of Parahyangan, Palemahan and Pawongan. The judgment component is used to provide an appropriate recommendation based on the SAW calculation, observation and comparative analysis of the rational facts that have been previously entered into the intense component (located in the description matrix) with the minimum standard on the standard component (located in the judgment matrix), so that, it will be easier in making a decision.

**The results of preliminary test:** In this stage, the results of the preliminary test were obtained through the completion of questionnaires conducted by two informatics experts and two education evaluation experts on the countenance evaluation model based on ANEKA values integrated with Tri Hita Karana and SAW concept that can be in Table 4.

Based on the results shown in Table 4, the average of effectiveness percentage is 88% if compared to the percentage table of achievement rate conversion by scale five, so those model design included in the good qualification.

Besides conducting preliminary test through questionnaires, experiments conducted by experts on the design of this evaluation model also by performing the simulations of SAW method calculation using the data shown in Table 5.

Table 4: The results of preliminary test that conducted by experts

Respondents	Items										$\Sigma$	Effectiveness percentage
	1	2	3	4	5	6	7	8	9	10		
Informatics expert-1	5	4	4	5	5	4	4	4	4	4	43	86
Informatics expert-2	5	4	4	4	4	4	5	4	4	4	42	84
Education evaluation expert-1	5	4	4	5	5	5	4	4	4	5	45	90
Education evaluation expert-2	5	5	5	4	4	4	4	5	5	5	46	92
Average												88

Table 5: Data Input by expert for simulation of SAW method calculation

Tri Hita Karana aspects	ANEKA components				
	Accountability	Nationalism	Public Ethics	Quality commitment	Anti-corruption
<b>Parahyangan (A):</b>					
Maintaining a culture of diligent prayer (A1)	4.75	4.50	4.50	5.00	4.75
Tolerance of prayer procedures among students of different religions (A2)	4.75	4.75	4.50	4.75	4.50
<b>Pawongan (B):</b>					
Mutual respect (B1)	4.50	4.25	4.75	4.75	4.25
Mutual maintaining the orderly and the comfort of the learning process (B2)	4.75	4.50	4.75	5.00	4.50
Understand the character of others (B3)	4.50	4.25	4.50	4.75	4.50
Work together (B4)	4.50	4.25	4.25	4.50	4.25
<b>Palemahan (C):</b>					
Keeping cleanliness of the school's environment (C1)	4.75	4.75	4.50	4.50	4.25
Keeping cleanliness and wholeness of the school's facilities (C2)	4.25	4.75	4.50	4.75	4.50

Based on Table 5 and considering that the ANEKA component is a benefit attribute then next can be done the calculation process of normalization and ranking. The normalization process can be calculated as follows:

$$r_{11} = \frac{4.75}{\max\{4.75; 4.75; 4.50; 4.75; 4.50; 4.50; 4.75; 4.25\}} = \frac{4.75}{4.75} = 1.000$$

$$r_{21} = \frac{4.75}{\max\{4.75; 4.75; 4.50; 4.75; 4.50; 4.50; 4.75; 4.25\}} = \frac{4.75}{4.75} = 1.000$$

$$r_{31} = \frac{4.50}{\max\{4.75; 4.75; 4.50; 4.75; 4.50; 4.50; 4.75; 4.25\}} = \frac{4.50}{4.75} = 0.947$$

$$r_{41} = \frac{4.75}{\max\{4.75; 4.75; 4.50; 4.75; 4.50; 4.50; 4.75; 4.25\}} = \frac{4.75}{4.75} = 1.000$$

$$r_{51} = \frac{4.50}{\max\{4.75; 4.75; 4.50; 4.75; 4.50; 4.50; 4.75; 4.25\}} = \frac{4.50}{4.75} = 0.947$$

$$r_{61} = \frac{4.50}{\max\{4.75; 4.75; 4.50; 4.75; 4.50; 4.50; 4.75; 4.25\}} = \frac{4.50}{4.75} = 0.947$$

$$r_{71} = \frac{4.75}{\max\{4.75; 4.75; 4.50; 4.75; 4.50; 4.50; 4.75; 4.25\}} = \frac{4.75}{4.75} = 1.000$$

$$r_{81} = \frac{4.25}{\max\{4.75; 4.75; 4.50; 4.75; 4.50; 4.50; 4.75; 4.25\}} = \frac{4.25}{4.75} = 0.895$$

$$r_{12} = \frac{4.50}{\max\{4.50; 4.75; 4.25; 4.50; 4.25; 4.25; 4.75; 4.75\}} = \frac{4.50}{4.75} = 0.947$$

$$r_{22} = \frac{4.75}{\max\{4.50; 4.75; 4.25; 4.50; 4.25; 4.25; 4.75; 4.75\}} = \frac{4.75}{4.75} = 1.000$$

$$r_{32} = \frac{4.25}{\max\{4.50; 4.75; 4.25; 4.50; 4.25; 4.25; 4.75; 4.75\}} = \frac{4.25}{4.75} = 0.895$$



$$r_{42} = \frac{4.50}{\max\{4.50; 4.75; 4.25; 4.50; 4.25; 4.25; 4.75; 4.75\}} = \frac{4.50}{4.75} = 0.947$$

$$r_{52} = \frac{4.25}{\max\{4.50; 4.75; 4.25; 4.50; 4.25; 4.25; 4.75; 4.75\}} = \frac{4.25}{4.75} = 0.895$$

$$r_{62} = \frac{4.25}{\max\{4.50; 4.75; 4.25; 4.50; 4.25; 4.25; 4.75; 4.75\}} = \frac{4.25}{4.75} = 0.895$$

$$r_{72} = \frac{4.75}{\max\{4.50; 4.75; 4.25; 4.50; 4.25; 4.25; 4.75; 4.75\}} = \frac{4.75}{4.26} = 0.958$$

$$r_{82} = \frac{4.75}{\max\{4.50; 4.75; 4.25; 4.50; 4.25; 4.25; 4.75; 4.75\}} = \frac{4.75}{4.75} = 1.000$$

$$r_{13} = \frac{4.50}{\max\{4.50; 4.50; 4.75; 4.75; 4.50; 4.25; 4.50; 4.50\}} = \frac{4.50}{4.75} = 0.947$$

$$r_{23} = \frac{4.50}{\max\{4.50; 4.50; 4.75; 4.75; 4.50; 4.25; 4.50; 4.50\}} = \frac{4.50}{4.75} = 0.947$$

$$r_{33} = \frac{4.75}{\max\{4.50; 4.50; 4.75; 4.75; 4.50; 4.25; 4.50; 4.50\}} = \frac{4.75}{4.75} = 1.000$$

$$r_{43} = \frac{4.75}{\max\{4.50; 4.50; 4.75; 4.75; 4.50; 4.25; 4.50; 4.50\}} = \frac{4.75}{4.75} = 1.000$$

$$r_{53} = \frac{4.50}{\max\{4.50; 4.50; 4.75; 4.75; 4.50; 4.25; 4.50; 4.50\}} = \frac{4.50}{4.75} = 0.947$$

$$r_{63} = \frac{4.25}{\max\{4.50; 4.50; 4.75; 4.75; 4.50; 4.25; 4.50; 4.50\}} = \frac{4.25}{4.75} = 0.895$$

$$r_{73} = \frac{4.50}{\max\{4.50; 4.50; 4.75; 4.75; 4.50; 4.25; 4.50; 4.50\}} = \frac{4.50}{4.75} = 0.947$$

$$r_{83} = \frac{4.50}{\max\{4.50; 4.50; 4.75; 4.75; 4.50; 4.25; 4.50; 4.50\}} = \frac{4.50}{4.75} = 0.947$$

$$r_{14} = \frac{5.00}{\max\{5.00; 4.75; 4.75; 5.00; 4.75; 4.50; 4.50; 4.75\}} = \frac{5.00}{5.00} = 1.000$$

$$r_{24} = \frac{4.75}{\max\{5.00; 4.75; 4.75; 5.00; 4.75; 4.50; 4.50; 4.75\}} = \frac{4.75}{5.00} = 0.950$$

$$r_{34} = \frac{4.75}{\max\{5.00; 4.75; 4.75; 5.00; 4.75; 4.50; 4.50; 4.75\}} = \frac{4.75}{5.00} = 0.950$$

$$r_{44} = \frac{5.00}{\max\{5.00; 4.75; 4.75; 5.00; 4.75; 4.50; 4.50; 4.75\}} = \frac{5.00}{5.00} = 1.000$$

$$r_{54} = \frac{4.75}{\max\{5.00; 4.75; 4.75; 5.00; 4.75; 4.50; 4.50; 4.75\}} = \frac{4.75}{5.00} = 0.950$$

$$r_{64} = \frac{4.75}{\max\{5.00; 4.75; 4.75; 5.00; 4.75; 4.50; 4.50; 4.75\}} = \frac{4.50}{5.00} = 0.900$$

$$r_{74} = \frac{4.75}{\max\{5.00; 4.75; 4.75; 5.00; 4.75; 4.50; 4.50; 4.75\}} = \frac{4.50}{5.00} = 0.900$$

$$r_{84} = \frac{4.75}{\max\{5.00; 4.75; 4.75; 5.00; 4.75; 4.50; 4.50; 4.75\}} = \frac{4.75}{5.00} = 0.950$$

$$r_{15} = \frac{4.75}{\max\{4.75; 4.50; 4.25; 4.50; 4.50; 4.25; 4.25; 4.50\}} = \frac{4.75}{4.75} = 1.000$$

$$r_{25} = \frac{4.50}{\max\{4.75; 4.50; 4.25; 4.50; 4.50; 4.25; 4.25; 4.50\}} = \frac{4.50}{4.75} = 0.947$$

$$r_{35} = \frac{4.25}{\max\{4.75; 4.50; 4.25; 4.50; 4.50; 4.25; 4.25; 4.50\}} = \frac{4.25}{4.75} = 0.895$$

$$r_{45} = \frac{4.50}{\max\{4.75; 4.50; 4.25; 4.50; 4.50; 4.25; 4.25; 4.50\}} = \frac{4.50}{4.75} = 0.947$$

$$r_{55} = \frac{4.50}{\max\{4.75; 4.50; 4.25; 4.50; 4.50; 4.25; 4.25; 4.50\}} = \frac{4.50}{4.75} = 0.947$$

$$r_{65} = \frac{4.25}{\max\{4.75; 4.50; 4.25; 4.50; 4.50; 4.25; 4.25; 4.50\}} = \frac{4.25}{4.75} = 0.895$$

$$r_{75} = \frac{4.25}{\max\{4.75; 4.50; 4.25; 4.50; 4.50; 4.25; 4.25; 4.50\}} = \frac{4.25}{4.75} = 0.895$$

$$r_{85} = \frac{4.50}{\max\{4.75; 4.50; 4.25; 4.50; 4.50; 4.25; 4.25; 4.50\}} = \frac{4.50}{4.75} = 0.947$$

Those normalization calculation results then converted into the following matrix:

$$R = \begin{pmatrix} 1.000 & 0.947 & 0.947 & 1.000 & 1.000 \\ 1.000 & 1.000 & 0.947 & 0.950 & 0.947 \\ 0.947 & 0.895 & 1.000 & 0.950 & 0.895 \\ 1.000 & 0.947 & 1.000 & 1.000 & 0.947 \\ 0.947 & 0.895 & 0.947 & 0.950 & 0.947 \\ 0.947 & 0.895 & 0.895 & 0.900 & 0.895 \\ 1.000 & 1.000 & 0.947 & 0.900 & 0.895 \\ 0.895 & 1.000 & 0.947 & 0.950 & 0.947 \end{pmatrix}$$

After the matrix R was formed, the next process can be done the ranking calculation by using the weighting process given by the experts namely:  $w = \{0.20 \ 0.20 \ 0.20 \ 0.20 \ 0.20 \ 0.20, 0.20\}$  so, the ranking calculation results are as follows:

$$V_1 = (0.20)(1.000) + (0.20)(0.947) + (0.20)(0.947) + (0.20)(1.000) + (0.20)(1.000) = 0.9789$$

$$V_2 = (0.20)(1.000) + (0.20)(1.000) + (0.20)(0.947) + (0.20)(0.950) + (0.20)(0.947) = 0.689$$

$$V_3 = (0.20)(0.947) + (0.20)(0.895) + (0.20)(1.000) + (0.20)(0.950) + (0.20)(0.895) = 0.9374$$

$$V_4 = (0.20)(1.000) + (0.20)(0.947) + (0.20)(1.000) + (0.20)(1.000) + (0.20)(0.947) = 0.9789$$

$$V_5 = (0.20)(0.947) + (0.20)(0.895) + (0.20)(0.947) + (0.20)(0.950) + (0.20)(0.947) = 0.9379$$

$$V_6 = (0.20)(0.947) + (0.20)(0.895) + (0.20)(0.895) + (0.20)(0.900) + (0.20)(0.895) = 0.9063$$

$$V_7 = (0.20)(1.000) + (0.20)(1.000) + (0.20)(0.947) + (0.20)(0.900) + (0.20)(0.895) = 0.9484$$

$$V_8 = (0.20)(0.895) + (0.20)(1.000) + (0.20)(0.947) + (0.20)(0.950) + (0.20)(0.947) = 0.9479$$

Based on the results of those calculations, it can be determined aspects are the most dominant as a determinant of learning quality, i.e., "Maintaining a culture of diligent prayer" (V1) and "mutual maintaining the orderly and the comfort of the learning process" (V4) because both these aspects scored the highest preference, i.e, 0.9789. Through, the calculation results can also be determined each aspect of each section on the

Table 6: Experts suggestion

Expert	Suggestion
Informatics expert-1	You need to fully explain the aspects of ANEKA in the design
Informatics expert-2	-
Education evaluation expert-1	-
Education evaluation expert-2	You need to fully explain the aspects of Tri Hita Karana in the design

concept of Tri Hita Karana that can be used to determine the character of students who need to get more optimal attention, so that, the character of students can be more increased. The aspects that need to be improved on the concept of Parahyangan is "tolerance of prayer procedures among students of different religions" (V2) because this aspect scored the lowest value (0.9689) when compared with the other aspects contained in the Parahyangan concept. Aspects that need to be improved on the concept Pawongan is "mutual respect" (V3) and "understand the character of others" (V5) because both of these aspects scored the lowest value (0.9374) when compared with the other aspects contained in the Pawongan concept. Aspects that need to be improved on the concept Palemahan is "keeping cleanliness and wholeness of the school's facilities" (V8) because this aspect scored the lowest value (0.9479) when compared with the other aspects contained in the Palemahan concept.

Based on the simulation result of SAW method, it is clear that's method can accurately perform the calculation in determining aspects of Tri Hita Karana that need to be optimized its implementation and determine the dominant aspect as a determinant of computer learning quality.

**The results of preliminary test revision:** In this stage, a suggestion/input from the experts for the improvement of the model design after the preliminary test. In general from the preliminary test results conducted by four experts obtained the decision that the design model has been included in the good qualification, so, of course there is no need for major revisions to the model design. Although there is no revision of model design that has been made, experts provide some suggestions for the improvement of this evaluation model design that can be seen in Table 6.

This research is very appropriate and has answered the special obstacle about the inability of research results conducted by Divayana in showing the integration of ANEKA values with Tri Hita Karana concept in his research road map from 2016 until 2017 which the research of 2018 has been successful to show the existence of integration the ANEKA values with Tri Hita Karana and SAW concept, so, it seems clear the balance between the attitudes quality and cognitive quality of students

in following the computer learning process in the vocational school of information technology in Bali Province.

Obstacles that are still found in this research include: not optimally of determination Tri Hita Karana aspects that used as evaluation standard) unavailability of an accurate evaluation calculation that provides information in sequence from the highest down to the lowest category in every ANEKA evaluation aspect that influences the improvement of student's character and student's quality of computer learning.

## CONCLUSION

The design of countenance evaluation model based on ANEKA values integrated with Tri Hita Karana concept is a design that describes an effective model that can be used to evaluate the student's character and student's quality of computer learning in the vocational school of information technology in Bali Province.

To overcome the obstacles found in this study there are several things that can be done including) looking for experts in the field of Hinduism who understand the concept of Tri Hita Karana, so, can be found optimally of information and studies in depth about the determination to aspects that can be used as evaluation standards) finding the right method of calculation using the decision support system concept that is part of the artificial intelligence into the evaluation model that has been designed.

## ACKNOWLEDGEMENTS

The researcher would like to thank for Directorate of Research and Community Service, the Ministry of Research, Technology and Higher Education of the Republic of Indonesia who have given funding in this research. The researcher also thanks a lot to all parties and academic community of Universitas Pendidikan Ganesha who has provided assistance and support in completing this research. All the results of this research dedicated to the Republic of Indonesia and Universitas Pendidikan Ganesha.

## REFERENCES

- Ahmed, I. and A. Bhatti, 2015. Design and implementation of performance metrics for evaluation of assessments data. *Intl. J. Eval. Res. Educ.*, 5: 235-245.
- Arifin, 2012. [Implementation of school cultural values in realizing quality schools (In Indonesian)]. *Pedagogika J. Ilmu Pendidikan*, 3: 49-57.

- Arikunto, S. and C.S.A. Jabar, 2009. [Educational Program Evaluation Practical Theoretical Guidelines for Second Edition Education Students and Practitioners]. Bumi Aksara Publisher, Yogyakarta, Indonesia, (In Indonesian).
- Arnyana, I.B.P., I.W. Sadia, I.K. Suma and D.G.H. Divayana, 2017. Determination of effectiveness of evaluation results on school culture and character of junior high school students using character assessment instruments with the local wisdom of Bali based on mobile phone. *J. Theor. Appl. Inf. Technol.*, 95: 5348-5359.
- Belousova, A. and V. Pishchik, 2015. Technique of thinking style evaluating. *Intl. J. Cognit. Res. Sci. Eng. Educ.*, 3: 1-8.
- Borg, W.R. and M.D. Gall, 2008. *Educational Research: An Introduction*. 5th Edn., Longman, New York, USA.,.
- Dahler-Larsen, P., 2018. Theory-based evaluation meets ambiguity: The role of JANUS variables. *Am. J. Eval.*, 39: 6-23.
- Darmayanti, S.E. and U.B. Wibowo, 2014. [Evaluation of character education programs in elementary schools in Kulon Progo Regency (In Indonesian)]. *J. Prima Edukasia*, 2: 223-234.
- Delibalt, V.V., A.V. Degtyaryov, E.G. Dozortseva, R.V. Chirkina and N.V. Dvoryanchikov *et al.*, 2017. Evaluation of cognitive functions, personality and regulatory sphere in minors with deviant and delinquent behavior within the authority of the psychological, medical and educational committee. *Intl. J. Cognit. Res. Sci. Eng. Educ.*, 5: 107-117.
- Diayuningsih, I. and T. Suyanto, 2014. [The pattern of developing character values through school culture in Wachid Hasyim 2 high school, Taman Sidoarjo (In Indonesian)]. *Kajian Moral Kewarganegaraan*, 1: 31-45.
- Divayana, D.G.H. and G.A.D. Sugiharni, 2016. [Expert System and Decision Support System (Textbook of Informatics Engineering Education)]. Undiksha Publisher, Singaraja, Indonesia, (In Indonesian).
- Divayana, D.G.H., A.A.G. Agung, B.I. Sappaile, W. Simatupang and Y. Sastrawijaya *et al.*, 2017. Utilization of open source technology in determining of validity and reliability of evaluation model instruments based on Aneka values in order to evaluate the quality of computer learning. *J. Theor. Appl. Inf. Technol.*, 95: 5517-5534.
- Eniyati, S., 2011. [Designing support system for decision making for acceptance of scholarships with the SAW method (simple additive weighting) (In Indonesian)]. *Dinamik J. Teknol. Inf.*, 16: 171-177.
- Fazillah, A., E. Toriman, H. Juahir, A. Izwan and N. Mohamad *et al.*, 2017. Evaluation of socioeconomic status on drug addicts. *Intl. J. Adv. Sci. Eng. Inf. Technol.*, 7: 2122-2130.
- Gagnon, D.J., E.L. Hall and S. Marion, 2017. Teacher evaluation and local control in the US: An investigation into the degree of local control afforded to districts in defining evaluation procedures for teachers in non-tested subjects and grades. *Assess. Educ. Principles Policy Pract.*, 24: 489-505.
- Galustyan, O.V., 2017. Some methodological aspects of the evaluation of students' educational achievements at university. *Intl. J. Cognit. Res. Sci. Eng. Educ.*, 5: 43-48.
- Gragasin, M.A., I.V. Salapare, J.P. Illustrisimo and R.C. Martinez, 2018. Design, testing and evaluation of mobile corn mill for village-level operation in the Philippines. *Intl. J. Adv. Sci. Eng. Inf. Technol.*, 8: 604-609.
- Irawan, S., 2016. [Evaluation of the implementation of character education in Physics learning in man Yogyakarta I (In Indonesian)]. *J. Pendidikan Karakter*, 6: 74-85.
- Jampel, I.N., I.W. Lasmawan, I. Ardana, I. Ariawan and I. Sugiarta *et al.*, 2017. Evaluation of learning programs and computer certification at course institute in Bali using cse-ucla based on saw simulation model. *J. Theor. Appl. Inf. Technol.*, 95: 6934-6943.
- Machaka, R.K., 2017. The method, rights and resources model for evaluation of the effectiveness of environmental impact assessment systems. *Afr. Eval. J.*, 5: 1-8.
- Mapitsa, C.B. and L. Khumalo, 2018. Diagnosing monitoring and evaluation capacity in Africa. *Afr. Eval. J.*, 6: 1-10.
- Martinez, J.F., J. Schweig and P. Goldschmidt, 2016. Approaches for combining multiple measures of teacher performance: Reliability, validity and implications for evaluation policy. *Educ. Eval. Policy Anal.*, 38: 738-756.
- Santoso, H.B., A.K. Nisa and R. Fitriansyah, 2017. Usability evaluation of the hospital management information system: Case study of an emergency installation application of a regional public hospital. *Intl. J. Adv. Sci. Eng. Inf. Technol.*, 7: 2294-2301.
- Sarif, S., S. Kurauchi and T. Yoshii, 2018. An analysis of traveler's evaluation frame toward public transport focusing on dynamic nature of reference point. *Intl. J. Adv. Sci. Eng. Inf. Technol.*, 8: 205-211.

- Setiawan, F., 2013. [The ability of the teacher to make an assessment in learning through the internalization of the value of honesty in civic education learning (In Indonesian)]. *J. Pendidikan Sci. Sosial*, 5: 73-81.
- Son, L., M. Marshal and M. Bur, 2018. Empirical evaluation of variation of orifice blocking ratio in a tuned liquid column damper using frequency response function measurement. *Intl. J. Adv. Sci. Eng. Inf. Technol.*, 8: 489-494.
- Subagia, N.K.W., 2016. [Community perception against the concept of Tri Hita Karana as implementation of natural law in bali culture in village 10 bedeng districts trimurjo kab central Lampung Upaten]. Master Thesis, Lampung University, Bandar Lampung, Indonesia. (In Indonesian).
- Subana, M. and Sudrajat, 2001. [Basics of Scientific Research]. Pustaka Pelajar, Yogyakarta, Indonesia, (In Indonesian).
- Sukardi, H.M., 2008. [Principles and Operational Education Evaluation]. Bumi Aksara Publisher, Yogyakarta, Indonesia, (In Indonesian).
- Tsai, K.C., 2018. An empirical examination of the relationships among creativity, the evaluation of creative products and cognitive style among Chinese undergraduates. *Intl. J. Cognit. Res. Sci. Eng. Educ.*, 6: 53-60.
- Tsonkova, D.G., 2013. Study of sports teachers students'skills for self-assessment of their professional qualities. *Intl. J. Cognit. Res. Sci. Eng. Educ.*, 1: 16-20.
- Wiana, I.K., 2007. [Tri Hita Karana According to the Hindu Concept]. Paramita Publisher, Surabaya, Indonesia, (In Indonesian).
- Zumbach, J. and J. Funke, 2014. Influences of mood on academic course evaluations. *Pract. Assess. Res. Eval.*, 19: 1-12.