Improvement of Experts’ Weights Based on *Tat Twam Asi* in the *TOPSIS* Method as a Supporting Parameter for Optimization of *Blended Learning* Evaluation Results

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**Abstract.** The purpose of this research was to show the calculation process of the improvement of the experts’ weight values based on *Tat Twam Asi* in the *TOPSIS* method. This was conducted to obtain an equalization of experts’ weight values. The equivalent experts' weight values will support the evaluation results optimization of the blended learning implementation. The approach was used in this research was a quantitative approach by simulating the improvement calculation toward experts’ weight values in the *TOPSIS* method. There were four experts involved in giving weights to each evaluation indicator. Data collection tools of experts’ weight values using questionnaires. The analysis technique of the weighting results was carried out by comparing the fives’ scale effectiveness standards with the total percentage of the expert's assessment average toward the evaluation indicators. The research results showed that the experts’ weights on each evaluation indicator were categorized as very effective because the percentage of effectiveness obtained was 90.65%.

# Keywords: Experts’ Weights, *Tat Twam Asi*, *TOPSIS*, Blended Learning, Evaluation.

# INTRODUCTION

Blended learning is a learning model that very appropriate to use as an alternative to organizing the learning process during the Covid-19 pandemic. In general, this learning model is a combination of face-to-face learning in class with online learning using information technology assistance [1-4]. However, during the Covid-19 pandemic, all blended learning activities were carried out online mechanism. Face-to-face activities in blended learning that should be done face-to-face in class were replaced by face-to-face online meetings through facilities such as Zoom, Meet Google, Webex, etc. This was done to avoid crowds in the learning process, so that transmission of the Covid-19 was able to be minimized.

Although in general, the blended learning model is suitable for use during the Covid-19 pandemic, it is necessary to conduct an in-depth evaluation of its implementation. Optimization of the evaluation results of the blended learning implementation is very dependent on the method used to obtain the measuring results of the blended learning effectiveness. One method that can be used is TOPSIS.

This method is part of a decision support system so that it can function as a method for making decisions in evaluating. Decisions that can be taken by using TOPSIS, included: a) determining the dominant aspects that support the quality of computer learning [5], b) determining students’ achievement [6], c) determining the awarding of scholarships [7], etc.

Determination of decisions in the evaluation of blended learning using the TOPSIS method is inseparable from the value parameters of weighting given by experts or decision-makers. The weighted values greatly influence the calculation results in making decisions. The importance of giving weighted values from each expert sometimes creates problems in practice in the fields. Sometimes perceptions in the fields tend to blame and corner the experts if the decision results do not match the expectations of users or interested parties due to errors or injustices in assigning weight values.

The effort needed to overcome that problem was to improve the weight values of experts or decision-makers by prioritizing the concepts of justice and rights equality. One of the innovations that can be done to make it happen is optimizing the experts’ weight values by inserting the *Tat Twam Asi* concept in the weights improvement process. In general, *Tat Twam Asi* is a local wisdom concept in Bali that prioritizes rights equality or obligations and considers all to be equal, so that justice will be created [8-10]. Based on this innovation, the question of this research: how is the process of calculating the improvement in the experts' weight values based on Tat Twam Asi in the TOPSIS Method to obtain the optimal weight values?

Some of the studies that were base-lined this research were the research of Başaran and Haruna in 2017, research by Mohammed et al. in 2018, research by Turker et al. in 2019, and Alqahtani and Rajkhan research in 2020. The research of Başaran and Haruna [11] had also shown the priority weights of experts for each MLAM (Mobile Learning Applications for Mathematics) evaluation criteria. However, the limitation of Başaran and Haruna’s research was that it had not shown the process for obtaining those priority weight values. Research by Mohammed et al. [12] had shown the weight values assigned to each of the evaluation criteria in the e-learning implementation. However, the limitation of Mohammed et al.’s research was that it had not shown the calculation process of determining the weight values of each decision-maker. Research by Turker et al. [13] had shown the alternative weights assigned by decision-makers for each of the evaluation criteria. However, the research of Turker et al. had not shown the calculation process to determine the equivalent of these alternative weight values. Research by Alqahtani and Rajkhan [14] had shown the priority weight values given by experts to each of the e-learning evaluation criteria during the Covid-19 pandemic. However, the working method had not been shown to obtain the priority weight values and the equalization of experts’ weight values also had not been shown the fairness in weighting.

# Method

This research used a quantitative approach by simulating the calculation of experts’ weight improvement in the TOPSIS method. The calculation was focused on the stage of determining the improvement of the weight values given by the experts or decision-makers by inserting the Tat Twam Asi concept. The formula was used in determining the weights improvement to get the weight values equalization based on Tat Twam Asi was able to refer to the DIVAYANA formula. DIVAYANA formula can be seen completely in equation (1) [15,16].

 (1)

Notes:

$W\_{Yack}$ = Improvement of the weights’ average

$\overbar{x}$ = Weights’ average given by each decision-maker (experts and evaluators) through joint discussion

The numbers of experts involved in giving weights to each evaluation indicator of the blended learning were four experts, included: two evaluation experts and two informatics education experts. Data collection tools related to experts’ weight values using questionnaires consisting of 31 questions.

The analysis technique of the weighting results was carried out by comparing the total percentage of the assessment’s average from experts toward evaluation indicators with the five’s scale effectiveness standards. The formula for the effectiveness of experts’ judgment refers to equation (2) [17-19]. The five’s scale effectiveness standards can be seen in Table 1 [20-22].

 **Effectiveness Percentage = (f×N-1) ×100%** (2)

Where:

f = number of scores was obtained

N = maximum number of scores

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| --- |
| **TABLE 1.** Effectiveness standards based on five’s scale |
| **Classification of Effectiveness**  | **Range of Percentage** |
| Very Effective | 90 to 100 |
| Effective | 80 to 89 |
| Enough | 65 to 79 |
| Less | 55 to 64 |
| Ineffective | 1. to 54
 |

# Results and discussion

The answer scores given by four experts to 31 questions were used to determine the experts’ weight values in the blended learning evaluation process. The score for each expert's answer can be seen completely in Table 2.

|  |
| --- |
| **TABLE 2.** Answers’ score of each expert toward question items |
| **Items** | **Experts** | **Average** |
| **Expert-1** | **Expert-2** | **Expert-3** | **Expert-4** |
| I1 | 5 | 4 | 5 | 5 | 4.75 |
| I2 | 4 | 5 | 5 | 4 | 4.50 |
| I3 | 5 | 4 | 5 | 4 | 4.50 |
| I4 | 4 | 5 | 5 | 5 | 4.75 |
| I5 | 5 | 4 | 4 | 5 | 4.50 |
| I6 | 4 | 5 | 5 | 5 | 4.75 |
| I7 | 5 | 4 | 5 | 4 | 4.50 |
| I8 | 5 | 5 | 4 | 5 | 4.75 |
| I9 | 4 | 4 | 4 | 4 | 4.00 |
| I10 | 4 | 5 | 4 | 5 | 4.50 |
| I11 | 4 | 5 | 5 | 5 | 4.75 |
| I12 | 5 | 5 | 4 | 5 | 4.75 |
| I13 | 4 | 5 | 5 | 5 | 4.75 |
| I14 | 5 | 4 | 5 | 4 | 4.50 |
| I15 | 4 | 4 | 5 | 5 | 4.50 |
| I16 | 5 | 4 | 4 | 4 | 4.25 |
| I17 | 4 | 4 | 5 | 5 | 4.50 |
| I18 | 5 | 4 | 4 | 4 | 4.25 |
| I19 | 5 | 5 | 5 | 5 | 5.00 |
| I20 | 5 | 4 | 4 | 4 | 4.25 |
| I21 | 4 | 5 | 5 | 5 | 4.75 |
| I22 | 5 | 4 | 4 | 5 | 4.50 |
| I23 | 4 | 5 | 5 | 4 | 4.50 |
| I24 | 5 | 4 | 4 | 5 | 4.50 |
| I25 | 4 | 5 | 5 | 4 | 4.50 |
| I26 | 5 | 4 | 4 | 5 | 4.50 |
| I27 | 4 | 5 | 5 | 4 | 4.50 |
| I28 | 4 | 4 | 4 | 5 | 4.25 |
| I29 | 4 | 5 | 5 | 5 | 4.75 |
| I30 | 5 | 4 | 4 | 4 | 4.25 |
| I31 | 4 | 4 | 5 | 5 | 4.50 |
| Total | 140.50 |
| Percentage (%) | 90.65 |

There were 31 questions shown in Table 2, Question-I1 about regulations from the government regarding the need for a blended learning model during the Covid-19 pandemic. Question-I2 about school regulations that support the blended learning implementation during the Covid-19 pandemic. Question-I3 about the approval of the headmaster regarding the blended learning implementation during the Covid-19 pandemic. Question-I4 about the support of development teams. Question-I5 about teachers' enthusiasm in implementing the blended learning model during the Covid-19 pandemic. Question-I6 about students' enthusiasm in following the learning process based on blended learning during the Covid-19 pandemic. Question-I7 regarding the support of the supervisory board or school committee in implementing blended learning during the Covid-19 pandemic. Question-I8 about the support of students’ parents for the blended learning implementation during the Covid-19 pandemic. Question-I9 about the suitability of academic and scientific qualifications owned by the blended learning management teams during the Covid-19 pandemic. Question-I10 about the competency of the management teams in realizing blended learning during the Covid-19 pandemic. Questions-11 about the availability of hardware with sufficient specifications to realize blended learning in the covid-19 pandemic. Question-I12 about the availability of software or platforms to support the needs of implementing blended learning during the Covid-19 pandemic. Question-I13 about the availability of adequate internet access in the blended learning implementation during the Covid-19 pandemic. Question-I14 about the availability of physical infrastructure to support blended learning which suitable for use. Question-I15 about the teacher's ability to operate computers and the internet which were needed to support the smooth implementation of blended learning. Question-I16 about the ability of teachers to prepare digital teaching materials for supporting the smooth implementation of blended learning during the Covid-19 pandemic. Question-I17 about the expertise of students in operating computers and the internet which was needed to support the smooth implementation of blended learning. Question-I18 about the existence of outreach for teachers about the procedures for making digital teaching materials needed in the blended learning implementation during the Covid-19 pandemic. Question-I19 about the socialization of the use of blended learning for teachers and students. Question-I20 about the timing of the blended learning according to the time agreed upon by the students and teachers so that the learning process was not boring. Question-I21 about the quality of the material transferred by the teacher through blended learning was able to be easily accepted and understood by students. Question-I22 about the condition of virtual classrooms used to support the blended learning implementation during the Covid-19 pandemic. Question-I23 about the condition of digital teaching materials used in the blended learning-based learning process during the Covid-19 pandemic. Question-I24 about the speed in accessing the platform used to support the implementation of blended learning during the Covid-19 pandemic. Question-I25 about the users’ ease to operate the platforms for supporting blended learning during the Covid-19 pandemic. Question-I26 about the speed of the platform in responding to the data manipulation process (input, edit, and delete) of digital teaching materials used in the blended learning implementation. Question-I27 about the speed of response given by the teacher when discussing with students through the supporting platform for the implementation of blended learning. Question-I28 about the safety guarantee of the test questions entered by the teacher into the blended learning platform. Question-I29 about the safety guarantee of each assignment that was deposited by students through the blended learning platform. Question-I30 about the availability of facilities in the blended learning platform to input suggestions/complaints from students regarding the blended learning implementation. Question-I31 about the availability of facilities in the blended learning platform to input feedback provided by the teacher as a response to students’ suggestions.

The answer score given by the experts refers to a Likert scale, which consists of five choices of assessment scores, included: score of 1 (poor category), a score of 2 (less category), a score of 3 (enough category), a score of 4 (good category), and a score of 5 (excellent category) [23-25].

Based on the data in Table 2 and referring to equation (1), it was possible to calculate the weights’ improvement to get the equalization weight values based on *Tat Twam Asi*. The calculation process completely can be seen as follows.

(WYack)1 = 4.75/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.034

(WYack)2 = 4.50/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.032

(WYack)3 = 4.50/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.032

(WYack)4 = 4.75/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.034

(WYack)5 = 4.50/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.032

(WYack)6 = 4.75/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.034

(WYack)7 = 4.50/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.032

(WYack)8 = 4.75/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.034

(WYack)9 = 4.00/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.028

(WYack)10 = 4.50/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.032

(WYack)11 = 4.75/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.034

(WYack)12 = 4.75/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.034

(WYack)13 = 4.75/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.034

(WYack)14 = 4.50/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.032

(WYack)15 = 4.50/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.032

(WYack)16 = 4.25/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.030

(WYack)17 = 4.50/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.032

(WYack)18 = 4.25/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.030

(WYack)19 = 5.00/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.036

(WYack)20 = 4.25/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.030

(WYack)21 = 4.75/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.034

(WYack)22 = 4.50/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.032

(WYack)23 = 4.50/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.032

(WYack)24 = 4.50/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.032

(WYack)25 = 4.50/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.032

(WYack)26 = 4.50/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.032

(WYack)27 = 4.50/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.032

(WYack)28 = 4.25/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.030

(WYack)29 = 4.75/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.034

(WYack)30 = 4.25/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.030

(WYack)31 = 4.50/(4.75 + 4.50 + 4.50 + 4.75 + 4.50 + 4.75 + 4.50 + 4.75 + 4.00 + 4.50 + 4.75 + 4.75 + 4.75 + 4.50 + 4.50 + 4.25 + 4.50 + 4.25 + 5.00 + 4.25 + 4.75 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.50 + 4.25 + 4.75 + 4.25 + 4.50) = 0.032

Those results of the weights improvement were recapitulated into the equalization of experts’ weights based on *Tat Twam Asi*. The complete recapitulation results can be seen in Table 3.

|  |
| --- |
| **TABLE 3.** Recapitulation of experts’ weight values equation based on *tat twam asi* |
| **Items** | **Equalization of Experts’ Weight Values Based on *Tat Twam Asi*** |
| I1 | 0.034 |
| I2 | 0.032 |
| I3 | 0.032 |
| I4 | 0.034 |
| I5 | 0.032 |
| I6 | 0.034 |
| I7 | 0.032 |
| I8 | 0.034 |
| I9 | 0.028 |
| I10 | 0.032 |
| I11 | 0.034 |
| I12 | 0.034 |
| I13 | 0.034 |
| I14 | 0.032 |
| I15 | 0.032 |
| I16 | 0.030 |
| I17 | 0.032 |
| I18 | 0.030 |
| I19 | 0.036 |
| I20 | 0.030 |
| I21 | 0.034 |
| I22 | 0.032 |
| I23 | 0.032 |
| I24 | 0.032 |
| I25 | 0.032 |
| I26 | 0.032 |
| I27 | 0.032 |
| I28 | 0.030 |
| I29 | 0.034 |
| I30 | 0.030 |
| I31 | 0.032 |
| Σ | **1.000** |

Table 3 showed the equalization of experts' weight values. The values’ equalization was carried out by prioritizing the Tat Twam Asi concept so that the weighted values given to each question item had the same meaning of fairness from its functionality to support the evaluation results optimization of blended learning. The fairness value was shown from all the weight values for each question item when added together to produce a total score of 1.000. This indicates that all the weighted scores on each question item had the same contribution to realizing the total score.

This research had been able to answer the limitations of the research conducted by Turker et al. [13] and research by Alqahtani and Rajkhan [14] by showing the calculation process to determine the equalization of the weight values given by experts to each evaluation indicator toward the blended learning implementation.

This research had also been able to answer the limitations of the research of Nanayakkara et al. [26], research by Akram et al. [27], and research by Durmuşoğlu and Durmuşoğlu [28], by showing the process of calculating experts' weight improvement in the TOPSIS method to produce an equivalent and normalized weight values.

Even though it had been able to answer the limitations of several previous studies, there were obstacles in this research. The obstacles to this research are the experts' weight values have not been shown the most dominant value as a determinant of the optimally of blended learning implementation.

# Conclusions

In general, the results of this research had been able to show well the process of calculating the improvement of the experts' weight values based on *Tat Twam Asi* in the *TOPSIS* Method to obtain an equalization of experts’ weight values. This certainly can support the optimization of the evaluation results of the blended learning implementation. The research results also showed the effectiveness of giving weights by experts to each evaluation indicator. This was shown from the results of the effectiveness percentage was 90.65% so that it was included in the very effective category when viewed from the five's scale of effectiveness standards. Future work that can be done to overcome the obstacles in this research is to integrate the TOPSIS method with other artificial intelligence methods to be able to make improvements in determining experts’ weighting.

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