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# Evaluating User Acceptance of Virtual Class on Bali Melajah Portal Using Technology Acceptance Model and Importance Performance Analysis

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**Abstract.**
**Purpose:** The purpose of this study was to evaluate the acceptance and performance of users of the Virtual Class application in the Bali Melajah Portal using the Technology Acceptance Model (TAM) and Importance-Performance Analysis (IPA). This study found the main components of adoption, evaluated performance disparities, and suggested ways to improve LMS adoption in secondary schools.
**Methods:** This study used a quantitative approach through an online survey conducted to collect data from teachers and students. Partial Least Squares Structural Equation Modeling (PLS-SEM) was used to evaluate the relationship between the variables in the research model. IPA was used to evaluate system performance and determine areas for improvement.
**Results:** The study showed that perceived ease of use significantly influenced perceived usefulness, which in turn affected attitudes and behavioral intentions. Meanwhile, behavioral intentions positively affected actual system use. Performance mismatch was found, with the lowest percentage of conformity of 97.76% for actual system use. Quadrant analysis highlighted that, although the system was perceived as useful and easy to use, involvement, accessibility, and institutional support were necessary for effective system use.
**Novelty:** This study offers a two-pronged assessment of LMS adoption in secondary schools by combining TAM and IPA. Unlike earlier studies that only evaluated user perceptions or system performance separately, this paper provides a complete approach to maximizing government-supported digital learning platforms. These findings give policymakers and application developers knowledge to improve the adoption of Virtual Classroom LMS.

**Keywords**: User acceptance, Learning management system (LMS), Technology acceptance model (TAM), Importance performance analysis, Bali Melajah portal
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## INTRODUCTION

Rapid technological developments have changed many things in human life, including in the field of education [1]. The education sector has taken advantage of digitalization, which has enabled distance learning, increased access to education, and brought innovation in learning approaches [2]. Learning Management Systems (LMS) are one example of the use of technology in education [3]. LMS handles various aspects of the learning process, such as content management, progress tracking, and providing administration services, thereby increasing the efficiency and effectiveness of learning [4].

In collaboration with the Department of Communication, Informatics, and Statistics of Bali Province, the UPTD Education Technology Development Center of Bali Province (BPTekDik) has developed the Virtual Class application, which is part of the Bali Melajah Portal program, which aims to utilize digital technology to facilitate digitalization in the education sector via LMS-based application. Virtual Class has various features, such as class management, attendance management, assignment management, online meeting management functionalities similar to Google Meet, as well as assessment and reporting tools. With these features, Virtual Class is expected to enhance interaction, flexibility, and learning quality for students and teachers in Bali.

However, although the development of Virtual Classes is still being refined, several issues require further review and analysis to ensure the success of its implementation. The first problem is the limited understanding of user acceptance, namely teachers and students [5]. Second, there is insufficient insight into user's perceptions, attitudes, intentions to use, and actual usage of the system [5], [6]. Having a better understanding of these aspects can facilitate the successful implementation of the application, which can then help to identify areas that need to be improved or fixed in the Virtual Class application [7], [8].

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Interviews with the Head of the UPTD BPTekDik of Bali Province revealed that they lacked a comprehensive understanding of the acceptance and usage of this system.

Various Learning Management System (LMS) adoption studies have already been conducted to identify the factors that affect users' acceptance of LMS. To determine user perception, attitude, and behavioral intentions regarding the implementation of the LMS, researchers employ the Technology Acceptance Model (TAM) [9]. Research by Unal et al. [6] examines how students adopt LMS using the necessary TAM model, indicating that user acceptance is an important element of educational technology success. Students demonstrate a positive attitude and behavior toward Edmodo, which results in significant mutual benefit. Similarly, Purwandani et al. [10] reviewed Google Classroom acceptance in higher education finding that all TAM elements including perceived ease of use and usefulness along with user attitude intention to use and actual system use reached acceptance levels above 74%. Research findings indicated that basic learning management systems such as Google Classroom experience greater adoption rates compared to more advanced platforms.

Another study examines e-learning acceptance among Accounting and IT students, revealing that perceived usefulness dominated motivation in accounting students, while perceived ease of use was more influential for IT students [11]. Meanwhile, Hamid et al. [7] evaluate the factors influencing students's acceptance of LMS in Brunei. Their findings confirmed that perceived ease of use and perceived usefulness significantly influenced students' intention to use LMS platforms. Further evidence supporting TAM's validity was presented by Mulyani et al. [12], who analyzed LMS adoption at Institut Teknologi Garut (ITG), showing that perceived ease of use positively affected perceived usefulness, which in turn influenced students' behavioral intentions and actual LMS usage. Similarly, Legramante et al. [13] integrated TAM with the Information Systems Success Model (ISSM) to evaluate Moodle adoption in Brazilian universities, demonstrating that information quality positively influenced ease of use and user satisfaction, which subsequently impacted behavioral intention to use the system.

While TAM is widely used to assess user acceptance, Importance-Performance Analysis (IPA) has been employed to evaluate LMS performance and user expectations. Research by Bismala et al. [14] examined student satisfaction with e-learning during the COVID-19 pandemic, identifying important improvement areas in LMS, such as content quality, lecturer interaction, and platform facilities, which were mapped into the Concentrate Here quadrant. The study emphasized that LMS features like flexibility, grading systems, and time management tools should be maintained, while aspects like peer interaction and self-learning ability were categorized as low priority.

Despite the widespread application of TAM and IPA separately, there is limited research integrating these two methods to analyze LMS adoption comprehensively. Some studies have combined TAM and IPA for evaluating technology adoption in other domains, such as e-government services and mobile applications, but not specifically for LMS. For example, Zulkarnain et al. [14] used TAM and IPA to assess the adoption of E-Samsat mobile services, revealing that although users found E-Samsat beneficial and easy to use, several critical features required improvement based on the IPA quadrant analysis. Similarly, Winaya et al. [16] applied TAM and IPA to evaluate the Taring Dukcapil service in Denpasar, finding that 98% of users were satisfied but still identified system security and information completeness as priority areas for enhancement. Additionally, Lucia et al. [17] analyzed the Jamsostek Mobile (JMO) application, concluding that user satisfaction remained low, particularly regarding comfort, enjoyment, and information accuracy, highlighting the need for significant improvements.

Although these studies have evaluated LMS adoption using TAM and IPA separately, none have applied this combined approach to LMS evaluation. There is a lack of research that integrates these two approaches to comprehensively analyze both user acceptance of an LMS and performance gaps in an integrated model. Most previous studies have focused more on higher education institutions, where the adoption of LMS is often driven by established policy institutions and digital learning infrastructure. However, studies on LMS adoption at the secondary education level, especially on government-supported platforms such as Portal Bali Melajah, are still very limited. In addition, although some studies have examined the influence of perceived ease of use and usefulness on user behavior, they often do not consider the alignment between user expectations and actual system performance. This aspect is very important to increase user engagement and the desire for the system.

To bridge the existing research gaps, this study explains Virtual Classroom application adoption by users in the Bali Melajah Portal through an integration of TAM and IPA. This study measures Virtual Classroom adoption drivers using TAM to examine perceived usefulness, perceived ease of use, attitudes toward system use by the users, and behavioral intentions. The IPA approach measures how well system performance matches user expectations and determines areas of improvement to enhance the user experience. The combined methodology provides an overall picture of how users perceive and use the LMS system in secondary schools. This study will provide insightful information to education policymakers and system developers who wish to advance online education support by improving digital learning platforms.

## METHODS

This research uses a quantitative approach that is used to assess user perception and performance systems of the Virtual Class applications on the Bali Melajah Portal. This research was done in the Denpasar, Badung, Gianyar, and Tabanan (Sarbagita) regions in Bali, with the students and teachers of secondary education.

### Research model

The research model integrates TAM and IPA to give overall evaluations of the Virtual Classroom application. The Technology Acceptance Model (TAM) considers perceived ease of use, perceived usefulness, attitude towards use, behavioral intention, and actual system use [17]. IPA examines performance gaps and the priority areas for improvement [18]. The model of the research of this study is shown in Figure 1. The top part of the model displays the TAM which consists of five variables to measure user acceptance. It makes clear that ease of use affects perceived usefulness, which in turn influences user attitudes (TAM). Such attitudes will lead to users' intention to use the application and then to the actual use [18].

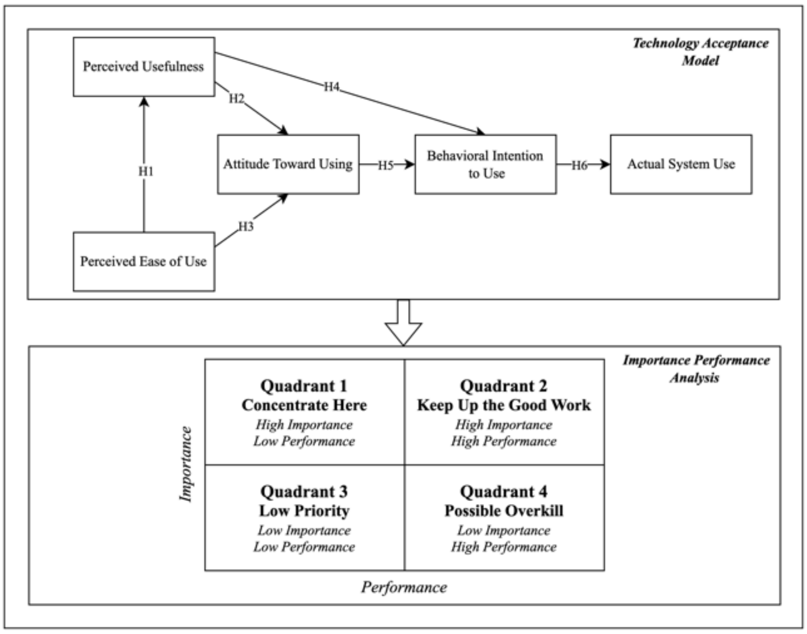


Figure 1. Research model

After the acceptance analysis, the study continued to Importance-Performance Analysis (IPA) to classify the application features into four quadrants [16]. Above and beyond this, Concentrate Here is what it really should be working on. Keep Up the Good Work highlighting things that need to be continued. Low Priority that doesn't with immediate need. Possible Overkill means features that should be re-evaluated for effectiveness.

### Data collection

Data in this study were collected through an online questionnaire distributed to teachers and students using Google Forms. The sampling method followed a three-level population approach based on Asiamah et al.

[19], involving a general population of 11,242 teachers and 186,868 students, a target population of 320 teachers and 574 students who actively used the Virtual Class application, and an accessible population consisting of participants available during the research period. The final sample size was determined using Slovin's formula with a 10% margin of error, resulting in 100 teachers and 100 students, though all collected responses exceeding this threshold were analyzed for broader insights [20].

**Research instruments**

The questionnaire was based on TAM indicators [9], [18] and IPA dimensions [16]. The items were rated on a five-point Likert scale, showing performance ranging from 1 (Very Poor) to 5 (Very Good), and importance ranging from 1 (Very Unimportant) to 5 (Very Important) [14], [16], [21]. Table 1 presents the research variable and their indicators.

Table 1. Research variable and indicator

| Variable | Indicator | Code | Reference |
|---|---|---|---|
| Perceived Usefulness | Work More Quickly | PU1 | [9], [22], [23] |
| | Job Performance | PU2 | |
| | Increase Productivity | PU3 | |
| | Effectiveness | PU4 | |
| | Make Job Easier | PU5 | |
| | Useful | PU6 | |
| Perceived Ease of Use | Easy to Learn | PEOU1 | [9], [22], [23] |
| | Controllable | PEOU2 | |
| | Clear and Understandable | PEOU3 | |
| | Flexible | PEOU4 | |
| | Ease to Become Skillful | PEOU5 | |
| | Easy to Use | PEOU6 | |
| Attitude Toward Using | Happy | ATU1 | [9], [22], [24], [25] |
| | Comfortable | ATU2 | |
| | Enjoy | ATU3 | |
| | Not Boring | ATU4 | |
| | Overall | ATU5 | |
| Behavioral Intention to Use | Intend to Use | BITU1 | [23], [26], [27] |
| | Recommend to Use | BITU2 | |
| Actual System Use | Frequency of Use | ASU1 | [23], [26], [27] |
| | Daily Usage | ASU2 | |

**Data analysis**

Through descriptive analysis, PLS-SEM, suitability analysis, gap analysis, and quadrant analysis, the data in this research were analyzed. This data focused on the indication of acceptance and performance of the Virtual Class application. Descriptive analysis is used to characterize respondents and the distribution of results for all study indicators [21], [28].

Partial Least Squares-Structural Equation Modelling (PLS-SEM) is an analytical method employed in this research to test the relationship of latent variables [29]. PLS-SEM requires two important steps in measuring the structural model, where relationships between variables are assessed, and the measurement model, where the validity and reliability are evaluated [29], [30]. This citation on the factor of adoption in carrying out virtual classrooms is tested by statistical results based on path coefficients to test whether the hypothesis is valid.

The study utilizes Importance Performance Analysis (IPA), which involves conformity analysis, gap analysis, and quadrant analysis [16], [31]. Conformity analysis integrates user expectations and system performance, while gap analysis highlights differences between importance ratings and application performance, targeting attributes to be improved [16]. Quadrant analysis categorizes systems into different groups based on factors to target improvements [21].

## RESULTS AND DISCUSSIONS

Research data was collected between January 6 and January 20, 2025, through a questionnaire distributed via Google Forms. The respondents comprised teachers and students from schools located in the Sarbagita area. From the predetermined target population, the number of respondents who participated in this study included 229 teachers out of 320 targeted teachers (71.56%) and 422 students out of 574 targeted students (73.52%). The overall participation rate in this study reached 72.82%.

### Descriptive analysis

To understand participant demographics and response distributions, the study employed descriptive analysis. Tables 2 and 3 present the breakdown of participants' gender distribution and their schools' geographical locations across districts and cities.

Table 2. Gender distribution

| Gender | Teacher (n=229) | Student (n=422) | Total (n=651) |
|---|---|---|---|
| Male | 86 (37.55%) | 182 (43.13%) | 268 (41.17%) |
| Female | 143 (62.45%) | 240 (56.87%) | 383 (58.83%) |

Table 3. School location distribution

| Regency/City | Teacher (n=229) | Student (n=422) | Total (n=651) |
|---|---|---|---|
| Denpasar | 81 (35.37%) | 232 (54.98%) | 313 (48.08%) |
| Badung | 50 (21.83%) | 75 (17.77%) | 125 (19.20%) |
| Gianyar | 50 (21.83%) | 84 (19.91%) | 134 (20.58%) |
| Tabanan | 48 (20.96%) | 31 (7.35%) | 79 (12.14%) |

Further descriptive analysis was conducted to describe the respondent's perceptions of each indicator in this study, considering both importance and performance. Each indicator in the TAM variable was measured using minimum, maximum, mean, and standard deviation values shown in Table 4.

Table 4. Indicator descriptive analysis

| Variable | Indicator | Importance | | | | Performance | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Min | Max | Mean | Std. Deviation | Min | Max | Mean | Std. Deviation |
| PU | PU1 | 1.00 | 5.00 | 3.9201 | 0.69487 | 1.00 | 5.00 | 3.9800 | 0.65250 |
| | PU2 | 3.00 | 5.00 | 3.9293 | 0.66651 | 1.00 | 5.00 | 3.9770 | 0.63325 |
| | PU3 | 3.00 | 5.00 | 3.9140 | 0.66931 | 2.00 | 5.00 | 3.9631 | 0.61408 |
| | PU4 | 1.00 | 5.00 | 3.9140 | 0.66701 | 3.00 | 5.00 | 3.9969 | 0.59742 |
| | PU5 | 2.00 | 5.00 | 3.9493 | 0.67633 | 2.00 | 5.00 | 4.0445 | 0.62721 |
| | PU6 | 3.00 | 5.00 | 3.9401 | 0.67330 | 3.00 | 5.00 | 4.0108 | 0.61884 |
| PEOU | PEOU1 | 1.00 | 5.00 | 3.9048 | 0.68399 | 1.00 | 5.00 | 3.9616 | 0.63007 |
| | PEOU2 | 2.00 | 5.00 | 3.8495 | 0.67624 | 2.00 | 5.00 | 3.8894 | 0.62762 |
| | PEOU3 | 2.00 | 5.00 | 3.8725 | 0.66843 | 2.00 | 5.00 | 3.9002 | 0.63550 |
| | PEOU4 | 3.00 | 5.00 | 3.8955 | 0.65032 | 3.00 | 5.00 | 3.9693 | 0.60940 |
| | PEOU5 | 3.00 | 5.00 | 3.8740 | 0.68800 | 3.00 | 5.00 | 3.8879 | 0.63344 |
| | PEOU6 | 2.00 | 5.00 | 3.9201 | 0.66546 | 3.00 | 5.00 | 3.9708 | 0.61325 |
| ATU | ATU1 | 2.00 | 5.00 | 3.8587 | 0.65984 | 1.00 | 5.00 | 3.9201 | 0.63953 |
| | ATU2 | 2.00 | 5.00 | 3.8679 | 0.65708 | 3.00 | 5.00 | 3.9171 | 0.60195 |
| | ATU3 | 2.00 | 5.00 | 3.8725 | 0.66843 | 2.00 | 5.00 | 3.9094 | 0.62222 |
| | ATU4 | 2.00 | 5.00 | 3.8218 | 0.66948 | 3.00 | 5.00 | 3.8449 | 0.62920 |
| | ATU5 | 3.00 | 5.00 | 3.9508 | 0.69551 | 2.00 | 5.00 | 4.0399 | 0.63362 |
| BITU | BITU1 | 2.00 | 5.00 | 3.8817 | 0.68601 | 2.00 | 5.00 | 3.9309 | 0.63232 |
| | BITU2 | 2.00 | 5.00 | 3.8633 | 0.68929 | 2.00 | 5.00 | 3.9124 | 0.64212 |
| ASU | ASU1 | 1.00 | 5.00 | 3.7665 | 0.69781 | 1.00 | 5.00 | 3.7112 | 0.67220 |
| | ASU2 | 1.00 | 5.00 | 3.7727 | 0.68428 | 1.00 | 5.00 | 3.7081 | 0.69785 |

Based on the analysis results in Table 4, the average importance score for most indicators suggests that the features in the application are considered fairly important by respondents. Meanwhile, the performance score reflects the user experience with the available features. The comparison between these two aspects provides preliminary insights into the alignment between user expectations and experience in using the Virtual Classroom application, which will be further analyzed using Importance-Performance Analysis (IPA).

### Outer model

The outer model evaluation aims to assess the validity and reliability of the research constructs before proceeding with structural analysis. This evaluation includes tests for convergent validity, discriminant validity, and construct reliability to ensure that the indicators effectively measure their respective latent variables. In this study, the assessment was conducted using factor loadings, Average Variance Extracted (AVE), Cronbach's Alpha (CA), and Composite Reliability (CR) to determine the adequacy of the measurement model. The results of outer model analysis are shown in Table 5.

Table 5. Outer model evaluation

| Variable | Indicator | Importance | | | | Performance | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Loading Factor | AVE | CA | CR | Loading Factor | AVE | CA | CR |
| PU | PU1 | 0.829 | 0.774 | 0.941 | 0.954 | 0.720 | 0.655 | 0.894 | 0.919 |
| | PU2 | 0.893 | | | | 0.819 | | | |
| | PU3 | 0.896 | | | | 0.838 | | | |
| | PU4 | 0.900 | | | | 0.817 | | | |
| | PU5 | 0.872 | | | | 0.817 | | | |
| | PU6 | 0.885 | | | | 0.839 | | | |
| PEOU | PEOU1 | 0.871 | 0.779 | 0.943 | 0.955 | 0.798 | 0.652 | 0.893 | 0.918 |
| | PEOU2 | 0.863 | | | | 0.784 | | | |
| | PEOU3 | 0.901 | | | | 0.834 | | | |
| | PEOU4 | 0.885 | | | | 0.777 | | | |
| | PEOU5 | 0.881 | | | | 0.834 | | | |
| | PEOU6 | 0.893 | | | | 0.815 | | | |
| ATU | ATU1 | 0.885 | 0.792 | 0.934 | 0.950 | 0.835 | 0.696 | 0.890 | 0.920 |
| | ATU2 | 0.906 | | | | 0.862 | | | |
| | ATU3 | 0.905 | | | | 0.847 | | | |
| | ATU4 | 0.900 | | | | 0.843 | | | |
| | ATU5 | 0.851 | | | | 0.782 | | | |
| BITU | BITU1 | 0.940 | 0.881 | 0.865 | 0.937 | 0.888 | 0.801 | 0.752 | 0.890 |
| | BITU2 | 0.938 | | | | 0.902 | | | |
| ASU | ASU1 | 0.954 | 0.910 | 0.901 | 0.953 | 0.935 | 0.871 | 0.852 | 0.931 |
| | ASU2 | 0.954 | | | | 0.931 | | | |

The results of the  Outer Model evaluation, including Loading Factor, AVE, CA, and CR for Importance and Performance dimensions, are summarized in Table 5. The loading factor of all the indicators is greater than 0.7, which indicates a very good relationship with their respective constructs [30]. This means AVE > 0.5 will be achieved, thus establishing convergent validity, and the values for  CA and CR are also above 0.7 so that all indicators have high reliability [29], [30].

**Inner model analysis**

After the outer model evaluation confirms the validity and reliability of the measurement model, the next step is to assess the inner model to see the structural relationships between latent variables. The purpose of this evaluation is to determine the explanatory power of the proposed framework by looking at the coefficient of determination (R2), predictive relevance (Q2), and path coefficients. Through this test, an understanding of the strength of the relationship between all variables in TAM can be obtained [30].

Table 6. Coefficient of determination ($R^2$)

| Variable | Importance | | Performance | |
|---|---|---|---|---|
| | $R^2$ | Category | $R^2$ | Category |
| PU | 0.737 | Strong | 0.615 | Moderate |
| ATU | 0.806 | Strong | 0.785 | Strong |
| BITU | 0.750 | Strong | 0.673 | Strong |
| ASU | 0.587 | Moderate | 0.385 | Moderate |

Table 6 presents the R-Square ($R^2$) values for the importance and performance aspects, measuring the extent to which the independent variables explain the dependent variable. The results indicate that the model exhibits strong explanatory power for most variables [32]. After evaluating R-Square ($R^2$), the next step is to test Predictive Relevance ($Q^2$). This analysis evaluates the model's capability to predict the dependent variable outcomes. $Q^2$ values above zero demonstrate effective predictive capability, whereas those with $Q^2$ values at or below zero indicate insufficient predictive strength and suggest a need for model improvements [30]. The results of the predictive relevance analysis are shown in Table 7.

Table 7. Predictive relevance ($Q^2$)

| Variable | Importance | | Performance | |
|---|---|---|---|---|
| | $Q^2$ | Category | $Q^2$ | Category |
| PU | 0.763 | Good | 0.612 | Good |
| ATU | 0.789 | Good | 0.718 | Good |
| BITU | 0.683 | Good | 0.571 | Good |
| ASU | 0.530 | Good | 0.338 | Good |

The Path Coefficient analysis examines the direction, strength, and significance of connections between the model's latent variables. Statistical significance is determined through T-statistic and P-value measurements, with relationships considered significant when T-statistics reach or exceed 1.96 and P-values are 0.05 or lower [30].

Table 8. Path coefficient

| Hypothesis | Importance | | | | | Performance | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | Std. Deviation | T-Statistics | P Values | Sig. | Mean | Std. Deviation | T-Statistics | P Values | Sig. |
| PEOU → PU | 0.858 | 0.015 | 47.681 | 0.000 | Yes | 0.785 | 0.022 | 36.242 | 0.000 | Yes |
| PU → ATU | 0.244 | 0.048 | 5.077 | 0.000 | Yes | 0.414 | 0.039 | 10.538 | 0.000 | Yes |
| PEOU → ATU | 0.680 | 0.045 | 15.010 | 0.000 | Yes | 0.523 | 0.040 | 13.132 | 0.000 | Yes |
| PU → BITU | 0.224 | 0.048 | 4.700 | 0.000 | Yes | 0.218 | 0.050 | 4.324 | 0.000 | Yes |
| ATU → BITU | 0.672 | 0.047 | 14.286 | 0.000 | Yes | 0.632 | 0.050 | 12.538 | 0.000 | Yes |
| BITU → ASU | 0.767 | 0.040 | 25.319 | 0.000 | Yes | 0.622 | 0.038 | 16.38 | 0.000 | Yes |

The Path Coefficient analysis results, displayed in Table 8, show the relationships between model variables across both performance and importance dimensions. The analysis reveals that all variable relationships demonstrate statistical significance, evidenced by T-Statistics of 1.96 or higher and P-Values of 0.000, thereby validating all research hypotheses [33], [34].

Perceived usefulness is strongly influenced by Perceived ease of use (H1). This suggests that the more navigable the system is, the more value the users perceive from it, iterating that usability adds to the values that are generated by an application. These findings are in line with earlier research [5, 30, 33, 34, 35], that suggested that the more user-friendly an LMS is perceived to be the increases the perceived usefulness, creating an increased likelihood of being adopted.

Perceived usefulness is strongly affect the attitudes (H2). This suggests that users are more inclined to use the platform when they recognize its benefits. This outcome is in line with [35], [36], who found that user acceptance and willingness to interact with an LMS platform are significantly influenced by perceived usefulness.

Perceived ease of use also strongly affects the attitudes (H3). This implies that the benefits of the system have an impact on user perceptions. A more easy application to use, users will have a more positive attitude toward the application. These findings are in line with earlier research [8], [35], [36], which highlights that, in the context of digital learning, adoption rises when system complexity is decreased.

Behavioral intention to use is significantly influenced by perceived usefulness (H4). This shows that the more benefits that are perceived, the more inclined one is to keep using the Virtual Classroom app. According to the findings, perceived usefulness is a powerful indicator of how well technology is used across various LMS platforms, which is consistent with earlier research [8], [30], [37], [38], [39].

Behavioral intention to use is strongly influenced by attitudes (H5). This shows that users who have a positive perception of the system are more likely to intend to use it. This confirms the findings of earlier research [30], [35], [36], which highlighted the impact of initial interactions with an LMS on long-term adoption.

Finally, Behavioral intention to use strongly affects actual system use (H6), confirming that users who intend to use the Virtual Class application are more likely to engage with it in practice. This reinforces previous studies [12], [30], [38], which demonstrated that behavioral intention is a strong determinant of actual usage behavior in LMS adoption.

**Suitability analysis**

The suitability analysis is carried out by comparing the average performance value with the average importance value for each indicator to evaluate the alignment between application performance and user expectations. The results of the suitability analysis from this research are presented in Table 9.

Table 9. Suitability analysis

| Variable | Indicator | Mean Performance | Mean Importance | Suitability | |
|---|---|---|---|---|---|
| | | | | Indicator | Variable |
| Perceived Usefulness | PU1 | 4.01 | 3.96 | 101.26% | 101.51% |
| | PU2 | 4.00 | 3.96 | 101.01% | |
| | PU3 | 4.00 | 3.95 | 101.27% | |
| | PU4 | 4.02 | 3.95 | 101.77% | |
| | PU5 | 4.07 | 3.98 | 102.26% | |
| | PU6 | 4.03 | 3.97 | 101.51% | |
| Perceived Ease of Use | PEOU1 | 3.98 | 3.93 | 101.27% | 100.85% |
| | PEOU2 | 3.92 | 3.89 | 100.77% | |
| | PEOU3 | 3.92 | 3.90 | 100.51% | |
| | PEOU4 | 3.99 | 3.93 | 101.53% | |
| | PEOU5 | 3.90 | 3.90 | 100.00% | |
| | PEOU6 | 3.99 | 3.95 | 101.01% | |
| Attitude Toward Using | ATU1 | 3.94 | 3.90 | 101.03% | 101.02% |
| | ATU2 | 3.94 | 3.90 | 101.03% | |
| | ATU3 | 3.93 | 3.91 | 100.51% | |
| | ATU4 | 3.88 | 3.86 | 100.52% | |
| | ATU5 | 4.06 | 3.98 | 102.01% | |
| Behavioral Intention to Use | BITU1 | 3.96 | 3.92 | 101.02% | 101.02% |
| | BITU2 | 3.94 | 3.90 | 101.03% | |
| Actual System Use | ASU1 | 3.72 | 3.80 | 97.89% | 97.76% |
| | ASU2 | 3.71 | 3.80 | 97.63% | |

The analysis results in Table 9 indicate that all indicators have a suitability level above 80%, categorizing them as high suitability [16]. However, some indicators still have a suitability level below 100%, suggesting that performance in these aspects does not fully meet user expectations and requires further improvement. Overall, the Perceived Usefulness variable has the highest suitability level (101,51%), while Actual System Use has the lowest suitability level (97,76%). This finding shows that while most features align with user expectations, certain aspects still require improvement.

**Gap analysis**

Gap analysis is performed by determining the difference between the average performance value and the average importance value for each indicator. A positive gap value signifies that performance surpasses user expectations, while a negative gap value indicates that performance does not meet user expectations, highlighting the need for further improvement [16], [21]. The results of the gap analysis from this research are presented in Table 10.

Table 10. Gap analysis

| Variable | Indicator | Mean Performance | Mean Importance | Gap | |
|---|---|---|---|---|---|
| | | | | Indicator | Variable |
| Perceived Usefulness | PU1 | 4.01 | 3.96 | 0.05 | 0.06 |
| | PU2 | 4.00 | 3.96 | 0.04 | |
| | PU3 | 4.00 | 3.95 | 0.05 | |
| | PU4 | 4.02 | 3.95 | 0.07 | |
| | PU5 | 4.07 | 3.98 | 0.09 | |
| | PU6 | 4.03 | 3.97 | 0.06 | |
| Perceived Ease of Use | PEOU1 | 3.98 | 3.93 | 0.05 | 0.03 |
| | PEOU2 | 3.92 | 3.89 | 0.03 | |
| | PEOU3 | 3.92 | 3.90 | 0.02 | |
| | PEOU4 | 3.99 | 3.93 | 0.06 | |
| | PEOU5 | 3.90 | 3.90 | 0.00 | |
| | PEOU6 | 3.99 | 3.95 | 0.04 | |
| Attitude Toward Using | ATU1 | 3.94 | 3.90 | 0.04 | 0.04 |
| | ATU2 | 3.94 | 3.90 | 0.04 | |
| | ATU3 | 3.93 | 3.91 | 0.02 | |
| | ATU4 | 3.88 | 3.86 | 0.02 | |
| | ATU5 | 4.06 | 3.98 | 0.08 | |
| Behavioral Intention to Use | BITU1 | 3.96 | 3.92 | 0.04 | 0.04 |
| | BITU2 | 3.94 | 3.90 | 0.04 | |
| Actual System Use | ASU1 | 3.72 | 3.80 | -0.08 | -0.09 |
| | ASU2 | 3.71 | 3.80 | -0.09 | |

The analysis results in Table 10 indicate that most indicators have positive gap values, showing that system performance has met or exceeded user expectations. However, Actual System Use has the largest negative gap (-0.09), indicating that this aspect still falls short of user expectations and requires improvement. Meanwhile, Perceived Usefulness has the highest positive gap (0.06), signifying that its actual performance exceeds user expectations.

**Quadrant analysis**

Quadrant analysis is conducted to map each indicator based on the average importance and performance values. Figure 2 presents the Cartesian quadrant resulting from the Importance-Performance Analysis (IPA), which is divided into four quadrants [21], [31]. The IPA quadrant in Figure 2 was generated using the SPSS software. A detailed explanation of the items in each quadrant is provided in Table 11.

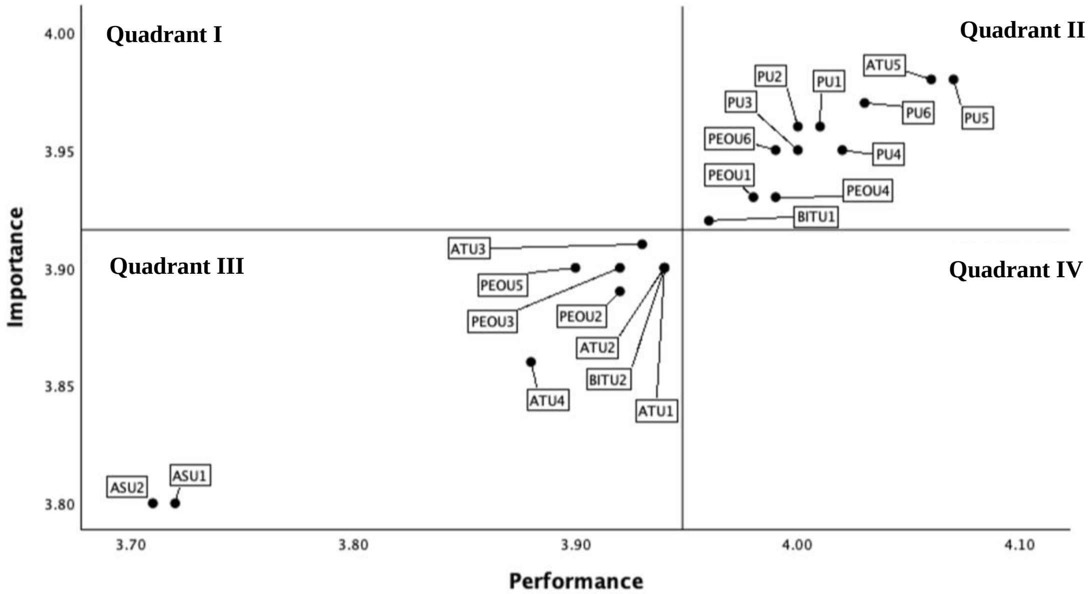

Figure 2. Cartesian diagram of IPA quadrants

The quadrant analysis categorizes system attributes based on importance and performance scores, mapping them into a Cartesian diagram to determine priority areas for improvement. Each quadrant reflects how well the system meets user expectations and highlights features that require attention or maintenance [21].

In Quadrant I (Concentrate Here), which typically identifies features of high importance but low performance, no items were placed. This suggests that none of the system features are perceived as critically important yet underperforming. While this may indicate that major usability issues are not present, it is still essential to ensure that user needs are continuously met and that no emerging gaps are overlooked [17].

In Quadrant II (Keep Up the Good Work), several key features are identified, including Perceived Usefulness (PU1–PU6), Perceived Ease of Use (PEOU1, PEOU4, PEOU6), Attitude Toward Using (ATU5), and Behavioral Intention to Use (BITU1). These features are considered important and perform well, indicating their significant contribution to user acceptance. Maintaining the performance of these attributes is essential to sustain user engagement with the Virtual Classroom application. The ease of use and usability of the system, in particular, must be continuously refined to ensure a smooth learning experience and encourage continued adoption [14].

In Quadrant III (Low Priority), which includes features of low importance and low performance, several items related to Perceived Ease of Use (PEOU2, PEOU3, PEOU5), Attitude Toward Using (ATU1–ATU4), Behavioral Intention to Use (BITU2), and Actual System Use (ASU1, ASU2) were identified. Since these attributes are not considered highly important by users, improvements in these areas should not be prioritized over more critical aspects. However, minor refinements, such as optimizing certain usability aspects or encouraging system engagement through better user motivation strategies, may still contribute to an overall improved experience [21].

In Quadrant IV (Possible Overkill), which typically contains features of low importance but high performance, no items were placed. This suggests that all well-performing features align with user priorities, and there is no unnecessary overinvestment in non-essential aspects. This efficient allocation of resources indicates that the Virtual Class application's development efforts are aligned with user expectations, ensuring a balanced approach to system improvements [40].

Table 11. Item for each IPA quadrant

| Quadrant | Category | Item |
|---|---|---|
| Quadrant I | Concentrate Here | - |
| Quadrant II | Keep Up the Good Work | PU1<br>PU2<br>PU3<br>PU4<br>PU5<br>PU6<br>PEOU1<br>PEOU4<br>PEOU6<br>ATU5<br>BITU1 |
| Quadrant III | Low Priority | PEOU2<br>PEOU3<br>PEOU5<br>ATU1<br>ATU2<br>ATU3<br>ATU4<br>BITU2<br>ASU1<br>ASU2 |
| Quadrant IV | Possible Overkill | - |

**Improvement recommendations**

The results of the suitability analysis show that all items assessed have a high level of suitability, which is above 80%. However, even so, there are still items that have a level of suitability below 100%, namely Actual System Use. This indicates that the variable still does not meet user expectations, so the application manager needs to improve this area.

The results of the gap analysis indicate that most assessed items have a positive gap, except for Actual System Use, which has a negative gap. This finding aligns with the suitability analysis results, which suggest that this variable does not fully meet user expectations, necessitating improvements by the application manager.

The quadrant analysis in this study revealed that no items were positioned in Quadrant I, which indicates priority improvement, or in Quadrant IV, which represents excessive performance. In Quadrant II, 11 items had performance levels that met user expectations, highlighting the need for maintenance and consistency. Meanwhile, Quadrant III contained 10 items with both low performance and low perceived importance by users. However, referring to the research conducted by Premana Putra et al. [21], items in Quadrant III still require recommendations for improvement due to their relatively low performance. The proposed improvement recommendation is presented in Table 12.

Table 12. Improvement recommendation

| Aspect/Variable | Indicator | Recommendations |
|---|---|---|
| Perceived Ease of Use | PEOU2<br>PEOU3<br>PEOU5 | 1. Improve the application's navigation and user interface to make it more consistent and user-friendly.<br>2. Integrate interactive usage tutorials within the application to improve user engagement.<br>3. Create automated support tools, like tooltips or AI chatbots, to assist users in understanding the application without requiring them to read extensive manuals. |
| Attitude Toward Using | ATU1<br>ATU2<br>ATU3 | 1. To improve user experience and enjoyment, include interactive and captivating visual elements.<br>2. Assess and improve application performance to guarantee increased speed and |

| Aspect/Variable | Indicator | Recommendations |
|---|---|---|
| | ATU4 | responsiveness, enhancing user comfort.<br>3. Implement gamification elements like leaderboards, badges, and points to boost user involvement and promote healthy competition. |
| Behavioral Intention to Use | BITU2 | 1. Include a referral program that enables users to encourage others to sign up and receive incentives for actively promoting the app. |
| Actual System Use | ASU1 | 1. Increase school outreach and support initiatives to encourage the use of the app and its advantages. |
| | ASU2 | 2. Provide case studies and success stories from educational institutions that have effectively used the application.<br>3. Provide interesting and varied learning materials within the application to prevent user difficulties and boredom in accessing content.<br>4. To keep users happy and loyal, improve responsiveness to their feedback. |

## CONCLUSION

This research employs a combination of TAM and IPA to evaluate the user's acceptance and performance of the Virtual Class application featured on the Bali Melajah Portal, showing that user attitudes and intentions are significantly influenced by the perception of usefulness and ease of use of the system. These perceptions in turn impact how the system is used. However, the gap between user expectations and actual usage emphasizes the necessity of enhancing institutional support, accessibility, and system engagement. Quadrant analysis shows that while ease and usability perform well, actual system usage needs attention. This study enhances the understanding of LMS implementation in secondary schools by emphasizing the importance of technical improvements, interactive learning strategies, and policy integration to enhance digital learning. The impact of this study lies in its ability to guide educational institutions and system developers in optimizing LMS platforms by addressing important adoption barriers and reinforcing sustainable digital learning practices. However, this study still has limitations, namely the area in this study is only limited to the Sarbagita area in Bali, which may not represent the wider geographical context. Future research can address this limitation by expanding the study area to other areas to gain a more comprehensive understanding of LMS adoption.

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