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# ToLatin application acceptability evaluation to support Balinese script transliteration learning

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**ABSTRACT**

This work supported Indonesia's research focus area on information and communication technology (ICT) content improvement for information data on various forms of local wisdom. As one of the various forms of local wisdom, the Balinese script was supported by the ToLatin application that transliterates Balinese script into Latin text. It has been used to support Balinese script learning at the high school level in Buleleng Regency, Bali, Indonesia. To determine the acceptability of this application, which had not been studied before, a user acceptance evaluation was conducted using a combination of acceptance variables from the technology acceptance model (TAM) and success variables from DeLone & McLean. This study used a quantitative method with data collection through questionnaires from 385 respondents. The data analysis used the importance-performance analysis (IPA) method through suitability, gap, and quadrant analyses. The study results indicated that the acceptability of ToLatin could be more optimal. The suitability analysis revealed an average score of 87.91%, indicating the need for improvement in system quality, particularly the innovative indicator (SysQ3), based on the quadrant analysis. The gap analysis revealed an average score of -0.54 from 7 acceptance variables, indicating the need to improve system performance to meet user expectations.



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## 1. INTRODUCTION

This work was supported and in line with two of Indonesia's research focus areas [1], namely i) information and communication technology (ICT) with a research theme on the technology for ICT content improvement, and a research topic on information data on various forms of local wisdom; and ii) social humanities research, arts and culture, education with a research theme on education, and a research topic related to educational and learning technology. As one of the various forms of local wisdom in Indonesia, the Balinese language (including its Balinese script) is used in Bali, which enriches local culture and provides

nuance that supports Bali as a main tourism destination. Like other local languages, Balinese script faces the extinction signalment since its use is frequently replaced by the national language, which is simpler and more practical. This condition raises concerns about its knowledge preservation. Balinese script consists of Wréastra, Swalalita, and/or Modré script. The Wréastra script, which is more popularly known as anacaraka in Bali, is 18 in number. Swalalita script is the script used in Kawi literature, such as in writing jejawian and parwa [2]–[4]. The number of the Swalalita script is 47, divided into 14 vowels and 33 consonants. Modré script is a sacred script used in mantras, and to read it requires instructions from the Krakah palm leaf manuscript [5], [6].

The preservation of Balinese script has been carried out by the Bali Government by including it in the education curriculum in schools and requiring local, national, and international events to use the Balinese language along with different languages [7], [8]. On the other hand, technological advances must synergize with research to produce innovations in preserving Balinese script. One of the related studies that produces innovations in preserving Balinese script is the application of Balinese script transliteration [9]–[13]. There are two transliteration directions, namely, transliteration of Latin text into Balinese script [9], [10] and transliteration of Balinese script to Latin text [11]–[13]. The ToLatin application used in this study resulted from research that implemented the transliteration of Balinese script into Latin text, as shown in Figure 1 [11]. Figure 1(a) shows an empty input-output with a simple user guide on ToLatin user interface, Figure 1(b) shows a QWERTY-like Balinese script keypad for the Balinese script input, and Figure 1(c) shows the Latin output related to the Balinese script input, and a particular additional keypad layer (upon long-pressing a specific button of the keypad, i.e., sign button) that consist of signs of vowel or consonant.

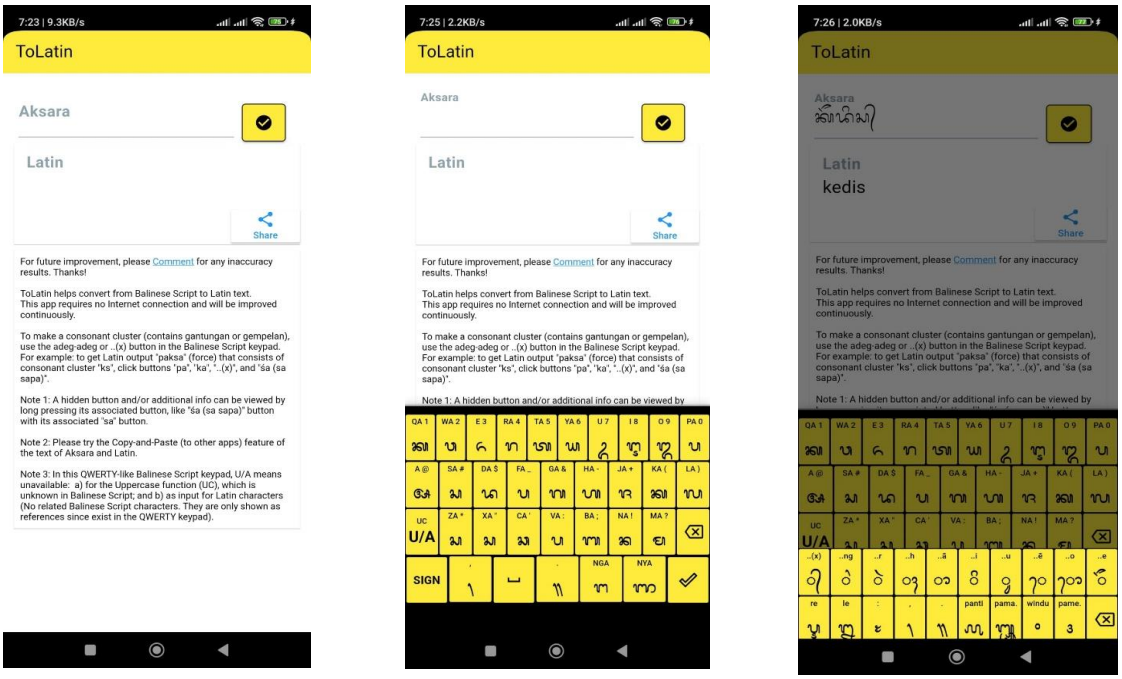


Figure 1. ToLatin application with (a) empty input-output, (b) Balinese script input, and (c) Latin output

The application's state-of-the-art included the transliteration algorithm of the Balinese script as Abugida [14] that used a mathematical model of a finite-state machine [15]–[17] and utilized a Unicode font [18], [19] to render Balinese script on the application input (keypad and text area). The application has been used in learning activities at the high school level in Buleleng Regency to support learning the Balinese script. Meaningful learning occurs when students are inspired, excited, challenged, and motivated. It was expected to occur using ToLatin under a certain level of acceptability to support Balinese script learning. To measure the application's acceptability, the acceptability evaluation was conducted using a combination of the technology acceptance model (TAM) to measure user acceptance and the DeLone & McLean information system success model (D&MISSM) to measure success.

The level of user acceptance is one of the early indicators of the success of using and utilizing technology [20], [21]. TAM has been successfully used to analyze user acceptance of the system, such as in analyzing intentions to use the Zoom platform [22] and metaverse-based learning [23]. In analyzing the

intention to use the Zoom platform, several variables from TAM were used, such as perceived usefulness, perceived ease of use, and behavioral intention. The analysis of metaverse-based learning used the same variables but added one new variable related to personal innovation in the IT field. The use of D&MISSM in analyzing the success of the online learning system was also successfully carried out using several of its variables. The analysis results show that platform quality positively influences the success of the online learning system [24]. Each model has variables that are used to evaluate the system. Using only one model will limit the variables that can be used in the TAM model, which only has three variables, and Delone & McLean, which has six variables, thus providing less in-depth system evaluation results. While TAM has been effective in explaining many kinds of systems use (i.e., e-learning, learning management systems, and web portals), including the application in this research, other frameworks like the hedonic-motivation system adoption model (HMSAM) [25] are suited to explain the adoption of purely intrinsic or hedonic systems (e.g., online games, music, and learning for pleasure). Other frameworks are relatively derived from TAM. Related to DeLone & McLean, other frameworks [26], like the Grover model, considered extending the model by adding market impacts, which is not suitable for this free learning application, and the Smithson-Hirschheim model, which is difficult to apply in practice as it does not state actual success constructs and associated measures.

Hidayah *et al*. [27] analyzed the combined model of TAM and D&MISSM to analyze the user acceptance of the academic information system (AIS) mobile application. This study used three variables from TAM, namely perceived usefulness, perceived ease of use, and acceptance of IT, and three from D&MISSM, namely information quality, system quality, and service quality. This study produced recommendations for the information technology department and database center. Adeyemi and Issa [28] proposed a student satisfaction model on web portals by integrating TAM and D&MISSM. This model adopts perceived usefulness from TAM to determine student satisfaction from university web portals and predicts that perceived usefulness has a significant direct effect on user satisfaction. In D&MISSM, the variables system quality, information quality, and service quality represent three aspects of web portal characteristics that function as external variables. Anisya *et al*. [29] evaluated the quality and successful implementation of the Nganjuk smart city mobile application using the TAM and D&MISSM approach. The result of quality implementation was in the high category and got a score of 71.4%, while successful implementation was in the high category and got a score of 69.4%.

This study developed a combination model of TAM with D&MISSM to analyze the acceptability of ToLatin users. In the developed combination model of TAM and D&MISSM, only a few variables were used based on the rationalization of their functions that adjust the conditions of ToLatin. Table 1 shows the rationalization of TAM and D&MISSM variables based on the literature review results. ToLatin is an optional application in Balinese script learning, so the intention to use it must be considered. There are seven variables used in this study, namely information quality, system quality, intention to use, user satisfaction, perceived usefulness, perceived ease of use, and acceptance of IT.

Table 1. The variable rationalization

| Method | Variable | Rationalization | Function |
|---|---|---|---|
| TAM | Perceived usefulness | Applied | Measuring usefulness. |
| | Perceived ease of use | Applied | Measuring easiness. |
| | Acceptance of IT | Applied | Measuring acceptability. |
| DeLone & | Information quality | Applied | Measuring the quality of information. |
| McLean | System quality | Applied | Measuring system quality. |
| | Service quality | Not Applied | Not applied, because the application functionality is simple for users. |
| | Intention to use | Applied | Measuring usage interest. |
| | User satisfaction | Applied | Measuring user satisfaction. |
| | Net benefit | Not Applied | Net Benefit and perceived usefulness have similarities in measuring benefits. Net Benefit can be replaced by perceived usefulness. |

This study used a quantitative method with data collection through questionnaires distributed to respondents, namely high school students in Buleleng Regency. Data analysis used the importance-performance analysis (IPA) method that measures the level of user expectation (importance) and the level of performance measured from the reality of implementation felt by the user (performance) [30], [31]. The IPA analysis gave an understanding of user satisfaction and detected service or functional priorities that need improvement. Three analyses were carried out using this method, namely suitability analysis, gap analysis, and quadrant analysis [32], [33]. This research contributes by producing a combination model to analyze user acceptance of a system/product. The analysis results were then used as recommendations for education stakeholders and researchers to consider the future development of ToLatin to support Balinese script learning further.

## 2. METHOD

Figure 2 shows three stages of this research, namely the initial, planning, and implementation stages. In the initial stage, the existing problems were identified, and the literature reviews were continued based on the identified problems. In the planning stage, the respondents were determined, and questionnaires were prepared. In the implementation stage, data were collected for further analysis. Finally, recommendations, conclusions, and suggestions were obtained as references to improve ToLatin.

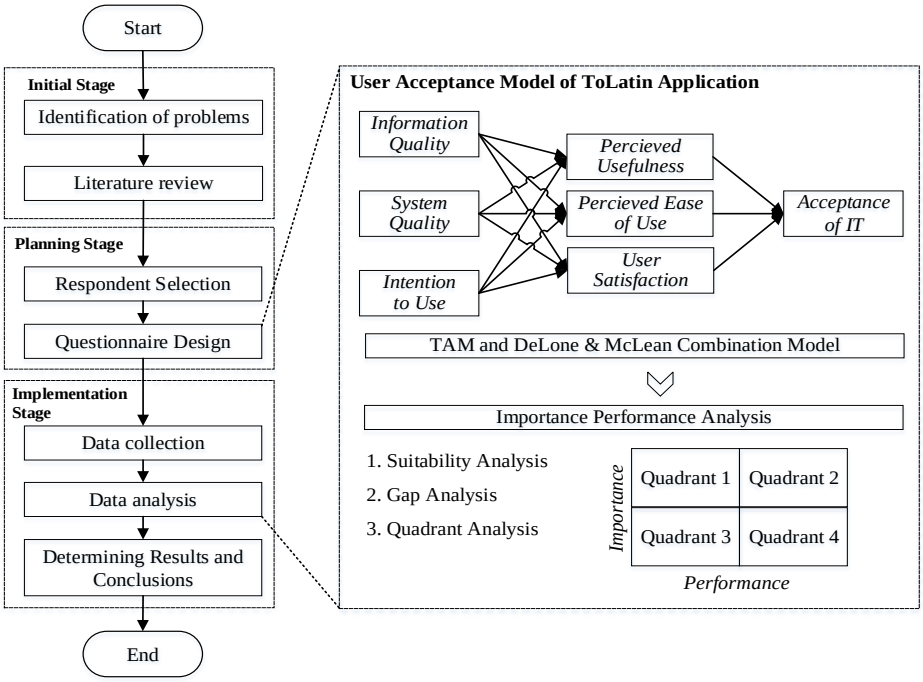


Figure 2. Research method with the TAM and the D&MISSM

### 2.1. Initial stage

In this stage, observations and problem identification were conducted directly with the research subjects to obtain an initial picture of ToLatin use by high school students in Buleleng Regency. The problem identification results were then used to conduct a literature review on evaluating user acceptance, identifying existing problems. These results also served as the basis for formulating the problems to be studied.

### 2.2. Planning stage

To determine the respondents of ToLatin users, representative samples were taken using the Slovin formula. The confidence coefficient suggested in the research was 95%, so this study used an error rate of 5% [34]. The population in this study was all high school students in Buleleng Regency, Bali, Indonesia, in the 2024/2025 academic year. Based on the Indonesian main data on education (Dapodik) application [35], there were 10,278 active students in the 2024/2025 academic year. Using the Slovin formula [36], the number of samples from the population as respondents for this research can be determined, as shown in (1).

$$n = \frac{N}{1+Ne^2} = \frac{10,278}{1+10,278(0.05^2)} = 385.0159 \quad (1)$$

Respondents in this study were 385 students who had used ToLatin. The respondents were selected using the simple random sampling technique, namely by randomly taking sample members from the population without paying attention to the strata in the population to avoid biases [37], [38]. Respondents were randomly selected from 29 high schools in Buleleng Regency, which have an age range of 15-18 years. To minimize errors due to random sample selection, selecting respondents also involved the Balinese teacher working group (MGMP) of Buleleng Regency in each school in providing student recommendations and disseminating information related to this study.

Data was collected by providing the user acceptance questionnaire, which was compiled using variables from TAM and D&MISSM. There are seven variables used, namely four variables from D&MISSM,

namely information quality, system quality, intention to use, and user satisfaction; and three variables from TAM, namely perceived usefulness, perceived ease of use, and acceptance of IT. Table 2 shows seven variables and 21 indicators used to compile the user acceptance questionnaire. This study uses a Likert scale assessment technique with five assessment scales for performance and importance variables in the questionnaire. Analysis of scoring on statement questions was based on scores of 1 to 5, according to Table 3.

Table 2. Research variables and indicators

| Variables | Indicator | Code |
|---|---|---|
| Information quality | Completeness | IQ1 |
| | Understandability | IQ2 |
| | Accuracy | IQ3 |
| | Relevance | IQ4 |
| System quality | Response time | SysQ1 |
| | Attractive | SysQ2 |
| | Innovative | SysQ3 |
| Intention to use | Frequency of Use | IU1 |
| | Nature of Use | IU2 |
| User satisfaction | Efficiency | US1 |
| | Effectiveness | US2 |
| | Satisfaction | US3 |
| Perceived usefulness | Work more quickly | PU1 |
| | Increase productivity | PU2 |
| | Useful | PU3 |
| | Make the job easier | PU4 |
| Perceived ease of use | Easy to learn | PEU1 |
| | Controllable | PEU2 |
| | Easy to use | PEU3 |
| Acceptance of IT | Meets expectation | ACC1 |
| | Recommendation | ACC2 |

Table 3. Likert scale

| Performance | | Importance | |
|---|---|---|---|
| Value | Meaning | Value | Meaning |
| 1 | Very bad | 1 | Very unimportant |
| 2 | Bad | 2 | Unimportant |
| 3 | Enough | 3 | Neutral |
| 4 | Good | 4 | Important |
| 5 | Very good | 5 | Very important |

### 2.3. Implementation stage

The questionnaire that was created was then distributed using the Google Forms platform. The data obtained was not directly analyzed. In the initial stage, testing was carried out on the questionnaire (instrument) first to determine its level of validity and reliability. Valid and reliable instruments are requirements in research. Testing the validity and reliability of data used IBM SPSS Statistics [39].

Validity testing was used to measure an instrument's validity level, determining the extent to which the research data instrument reflects conformity with the truth. A validity test was done by calculating the correlation between variables and the total score of variables [40], [41]. The high or low validity of the instrument indicates the extent to which the collected data does not deviate. One of the validity test techniques used was Pearson's product-moment. In this technique, the validation criteria can be determined using the rule, where if $r$ count $>r$ table, then the instrument used was valid; if $r$ count $<r$ table, then the instrument used was not valid [42].

Reliability testing determines whether the prepared instrument directs respondents to certain answer choices. A good instrument does not direct respondents to certain answer choices [42]. This study used reliability testing with Cronbach's alpha technique, where the instrument was said to be reliable if the Cronbach's alpha value >0.7 [43].

After conducting validity and reliability testing on the instrument, the next step was to analyze the collected data from respondents. The data analysis performed in this study used the IPA approach, consisting of i) suitability analysis, ii) gap analysis, and iii) quadrant analysis [32], [44]. Suitability analysis was used to compare an object's performance value to the user's expectation or level of importance [45]. The suitability analysis result was obtained by comparing the performance level to the importance level of a service. This analysis produced a sequence to determine which attributes should be prioritized. A good suitability analysis has a suitability level of 100% [45]. In (2) shows the suitability level analysis calculation [46], where *Tki* is

the respondent's suitability level, *Xi* is the performance assessment score, and *Yi* is the respondent's importance assessment score.

$$Tki = \frac{Xi}{Yi} \times 100\% \quad (2)$$

Gap analysis measured the difference between service performance and expected performance. The analysis result was good if the service performance met the user's expectation, where the gap had a value of $Qi \geq 0$. Other than that value, service performance was stated as not meeting the user expectation or $Qi < 0$ [47], [48]. Gap level analysis was calculated using (3), where *Qi* (Gap) is the gap level, *Perf (i)* is the average service performance, and *Imp(i)* is the average value of expected performance (importance).

$$Qi(Gap) = Perf(i) - Imp(i) \quad (3)$$

Quadrant analysis identified items that should be prioritized for improvement and development to improve service quality. Performance and importance attributes were represented by the X-axis and the Y-axis [46], [49]. IPA quadrant analysis was divided into four quadrants of the Cartesian diagram (Figure 3).

| | |
|---|---|
| **Quadrant I**<br>High Importance and Low Performance<br>Concentrate Here | **Quadrant II**<br>High Importance and High Performance<br>Keep Up the Good Work |
| **Quadrant III**<br>Low Importance and Low Performance<br>Low Priority | **Quadrant IV**<br>Low Importance and High Performance<br>Possible Overkill |

Figure 3. Respondent characteristics in the Cartesian diagram

## 3. RESULTS AND DISCUSSION

From the collected 385 respondents' data, there were several respondent characteristics, such as age and gender (Figure 4). Based on age, there were 30 15-year-old respondents (7.79%), 175 16-year-old respondents (45.45%), 130 17-year-old respondents (33.77%), and 50 18-year-old respondents (12.99%). Based on gender, there were 225 male respondents (58.44%) and 160 female respondents (41.56%).

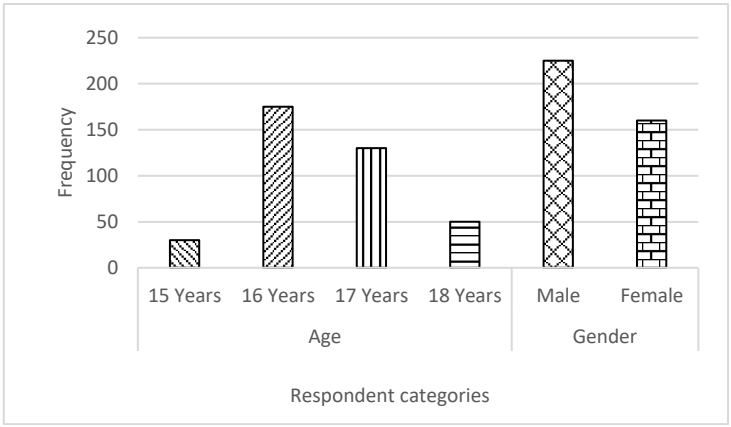


Figure 4. Respondent characteristics by age and gender

### 3.1. Validity and reliability test results

The instrument was said to be valid if *r* count >*r* table. The *r* table value was based on product moment with 385 respondents and a significance level of 5%, which was 0.113. The instrument was declared valid if the *r* count >0.113. Otherwise, it was declared invalid. Table 4 shows the results of the performance and importance validity testing. The validity testing was conducted on all indicators of performance and importance. Based on the validity testing results in Table 4, it can be seen that all statements

from the acceptability indicators in the questionnaire were valid because *r* count >*r* table, where *r* table was equal to 0.113.

The reliability testing was conducted on all the performance and importance indicators. Based on the reliability testing results, all statements from the acceptability indicators in the questionnaire were reliable. It was shown by Cronbach's alpha values on all indicators, which were greater than 0.7. Table 5 shows the results of the performance and importance reliability testing.

Table 4. Performance and importance validity test

| Indicator | Performance | | | Importance | | |
|---|---|---|---|---|---|---|
| | *r* count | *r* table | Status | *r* count | *r* table | Status |
| IQ1 | 0.522 | 0.113 | Valid | 0.337 | 0.113 | Valid |
| IQ2 | 0.5 | 0.113 | Valid | 0.452 | 0.113 | Valid |
| IQ3 | 0.391 | 0.113 | Valid | 0.267 | 0.113 | Valid |
| IQ4 | 0.521 | 0.113 | Valid | 0.365 | 0.113 | Valid |
| SysQ1 | 0.549 | 0.113 | Valid | 0.422 | 0.113 | Valid |
| SysQ2 | 0.498 | 0.113 | Valid | 0.424 | 0.113 | Valid |
| SysQ3 | 0.548 | 0.113 | Valid | 0.441 | 0.113 | Valid |
| IU1 | 0.503 | 0.113 | Valid | 0.444 | 0.113 | Valid |
| IU2 | 0.464 | 0.113 | Valid | 0.356 | 0.113 | Valid |
| US1 | 0.535 | 0.113 | Valid | 0.388 | 0.113 | Valid |
| US2 | 0.472 | 0.113 | Valid | 0.342 | 0.113 | Valid |
| US3 | 0.495 | 0.113 | Valid | 0.382 | 0.113 | Valid |
| PU1 | 0.512 | 0.113 | Valid | 0.403 | 0.113 | Valid |
| PU2 | 0.557 | 0.113 | Valid | 0.396 | 0.113 | Valid |
| PU3 | 0.482 | 0.113 | Valid | 0.377 | 0.113 | Valid |
| PU4 | 0.575 | 0.113 | Valid | 0.433 | 0.113 | Valid |
| PEU1 | 0.557 | 0.113 | Valid | 0.424 | 0.113 | Valid |
| PEU2 | 0.536 | 0.113 | Valid | 0.388 | 0.113 | Valid |
| PEU3 | 0.542 | 0.113 | Valid | 0.384 | 0.113 | Valid |
| ACC1 | 0.595 | 0.113 | Valid | 0.415 | 0.113 | Valid |
| ACC2 | 0.428 | 0.113 | Valid | 0.343 | 0.113 | Valid |

Table 5. Performance and importance reliability test

| Indicator | Performance | | Importance | |
|---|---|---|---|---|
| | Cronbach's Alpha | Status | Cronbach's Alpha | Status |
| IQ1 | 0.855 | Reliable | 0.717 | Reliable |
| IQ2 | 0.856 | Reliable | 0.706 | Reliable |
| IQ3 | 0.859 | Reliable | 0.721 | Reliable |
| IQ4 | 0.855 | Reliable | 0.715 | Reliable |
| SysQ1 | 0.854 | Reliable | 0.710 | Reliable |
| SysQ2 | 0.856 | Reliable | 0.709 | Reliable |
| SysQ3 | 0.854 | Reliable | 0.708 | Reliable |
| IU1 | 0.856 | Reliable | 0.707 | Reliable |
| IU2 | 0.857 | Reliable | 0.714 | Reliable |
| US1 | 0.854 | Reliable | 0.713 | Reliable |
| US2 | 0.857 | Reliable | 0.716 | Reliable |
| US3 | 0.856 | Reliable | 0.713 | Reliable |
| PU1 | 0.855 | Reliable | 0.711 | Reliable |
| PU2 | 0.853 | Reliable | 0.712 | Reliable |
| PU3 | 0.856 | Reliable | 0.713 | Reliable |
| PU4 | 0.853 | Reliable | 0.708 | Reliable |
| PEU1 | 0.853 | Reliable | 0.710 | Reliable |
| PEU2 | 0.854 | Reliable | 0.712 | Reliable |
| PEU3 | 0.854 | Reliable | 0.713 | Reliable |
| ACC1 | 0.852 | Reliable | 0.710 | Reliable |
| ACC2 | 0.858 | Reliable | 0.716 | Reliable |

### 3.2. Importance performance analysis results

After conducting validity and reliability tests on the combination model instrument proposed in this study, the next step was to process and analyze questionnaire data from 385 respondents using the IPA method: suitability analysis, gap analysis, and quadrant analysis. A suitability level analysis was conducted to determine the performance achievement of the ToLatin application based on user assessments of this application in Balinese script learning activities. Gap analysis measured the gap between the ToLatin application's performance and the application users' importance. Quadrant analysis was done by mapping the priority of each acceptance indicator into four quadrants with performance on the X axis and importance on the Y axis.

#### 3.2.1. Suitability analysis

Measurements were made by comparing application performance and importance level in the ToLatin application service. Table 6 shows the suitability levels of performance and interest for all indicators. Based on the results of the processing that has been done, it can be seen that the level of suitability of each indicator in this study produces an average of 87.91%. This value shows that overall, it was still under 100%, or the level of suitability was <100%. This value indicates that the quality of the ToLatin application still needs to be improved or has not yet met the expectations of respondents, who were high school students in Buleleng Regency. So, improving the ToLatin application service quality was still necessary to meet the importance/expectations of ToLatin application users.

#### 3.2.2. Gap analysis

The gap was obtained by measuring the difference between the average performance and the average importance. Table 7 shows the values of the performance and interest gaps in all indicators. The analysis result was said to be good if the service performance met the importance of users, with a gap that produced a positive value or ≥0. The result was said to be lacking or had not met the importance of users if the gap was negative or <0. Based on the results of measuring the gap between application performance and the importance of application users, the seven acceptance variables produced negative values. From the results of the average level of gap of all variables in this study, the gap value of -0.54 was obtained, which ideally should be positive. So, the performance of the ToLatin application was still considered to need improvement in the application service's performance to suit the importance of ToLatin application users.

Table 6. Level of suitability of performance and importance

| Indicator | Performance score | Importance score | Level of suitability Indicator | Level of suitability Variable |
|---|---|---|---|---|
| IQ1 | 1545 | 1739 | 88.84 | 88.49 |
| IQ2 | 1516 | 1700 | 89.18 | |
| IQ3 | 1529 | 1737 | 88.03 | |
| IQ4 | 1499 | 1705 | 87.92 | |
| SysQ1 | 1502 | 1705 | 88.09 | 87.75 |
| SysQ2 | 1517 | 1722 | 88.10 | |
| SysQ3 | 1507 | 1731 | 87.06 | |
| IU1 | 1529 | 1728 | 88.48 | 88.16 |
| IU2 | 1517 | 1727 | 87.84 | |
| US1 | 1509 | 1706 | 88.45 | 87.90 |
| US2 | 1497 | 1714 | 87.34 | |
| US3 | 1503 | 1710 | 87.89 | |
| PU1 | 1500 | 1706 | 87.92 | 87.16 |
| PU2 | 1486 | 1712 | 86.80 | |
| PU3 | 1522 | 1736 | 87.67 | |
| PU4 | 1480 | 1716 | 86.25 | |
| PEU1 | 1501 | 1699 | 88.35 | 87.89 |
| PEU2 | 1517 | 1729 | 87.74 | |
| PEU3 | 1489 | 1700 | 87.59 | |
| ACC1 | 1494 | 1703 | 87.73 | 88.03 |
| ACC2 | 1522 | 1723 | 88.33 | |

Table 7. Results of performance and importance gap levels

| Indicator | Mean performance | Mean importance | Level of the gap Indicator | Level of the gap Variable |
|---|---|---|---|---|
| IQ1 | 4.013 | 4.517 | -0.50 | -0.51 |
| IQ2 | 3.938 | 4.416 | -0.48 | |
| IQ3 | 3.971 | 4.512 | -0.54 | |
| IQ4 | 3.894 | 4.429 | -0.54 | |
| SysQ1 | 3.901 | 4.429 | -0.53 | -0.55 |
| SysQ2 | 3.940 | 4.473 | -0.53 | |
| SysQ3 | 3.914 | 4.496 | -0.58 | |
| IU1 | 3.971 | 4.488 | -0.52 | -0.53 |
| IU2 | 3.940 | 4.486 | -0.55 | |
| US1 | 3.919 | 4.431 | -0.51 | -0.54 |
| US2 | 3.888 | 4.452 | -0.56 | |
| US3 | 3.904 | 4.442 | -0.54 | |
| PU1 | 3.896 | 4.431 | -0.54 | -0.57 |
| PU2 | 3.860 | 4.447 | -0.59 | |
| PU3 | 3.953 | 4.509 | -0.56 | |
| PU4 | 3.844 | 4.457 | -0.61 | |
| PEU1 | 3.899 | 4.413 | -0.51 | -0.54 |
| PEU2 | 3.940 | 4.491 | -0.55 | |
| PEU3 | 3.868 | 4.416 | -0.55 | |
| ACC1 | 3.881 | 4.423 | -0.54 | -0.53 |
| ACC2 | 3.953 | 4.475 | -0.52 | |

### 3.2.3. Quadrant analysis

Quadrant analysis was done by mapping the priority of each acceptance indicator into four quadrants. The IPA quadrant result was constructed using performance on the X-axis and importance on the Y-axis. Figure 5 shows the result of mapping the four quadrants on the Cartesian diagram for the performance and importance of ToLatin.

Quadrant I was the main priority, and users considered this quadrant important, but the application performance did not meet user expectations. The SysQ3 indicator in quadrant I was the main priority for improving the ToLatin service performance. SysQ3 was an innovative indicator where users felt the application presented something innovative for learning the Balinese script.

Quadrant II shows indicators considered important by users, and their performance was considered good. The application performance on those indicators must be maintained to provide good application services that meet user expectations. Indicators in quadrant II were i) IQ1 related to the completeness of features; ii) IQ3 related to the accuracy of transliteration functionality; iii) SysQ2 related to the application attractiveness; iv) IU1 related to how often the application was used; v) IU2 related to the nature of use; vi) PU3 related to the application usefulness; vii) PEU2 related to the controllable transliteration results; and viii) ACC2 is related to providing recommendations for the application use.

Quadrant III shows indicators with low priority because they were considered not too important for users. Indicators in this quadrant do not need to be prioritized for improvement because their performance and importance are low. Indicators in quadrant III were i) IQ4, which was related to the relevance of the application in learning Balinese script; ii) SysQ1, which was related to the response time in transliterating; iii) US2, which was related to the effectiveness of using the application; iv) US3, which was related to the level of satisfaction in using the application; v) PU1, which was related to the usefulness of the application so that learning Balinese script can be faster; vi) PU2, which was related to increasing user productivity in learning Balinese script, vii) PU4, which was related to facilitating learning Balinese script; viii) PEU1, which was related to the ease of learning to use the application; ix) PEU3, which was related to the ease of using the application in learning Balinese script; and x) ACC1, which was related to meeting user expectations.

Quadrant IV tends to be overperformance, where this quadrant contains indicators of importance that users consider low. Indicators in quadrant IV were i) US1, which was related to the efficiency of application use; and ii) IQ2, which was related to the ease of application to understand. Both of these indicators were related to the shortcuts of the Balinese script keyboard when searching for special characters in the Balinese script.

As described in the three results of the IPA, the ToLatin application still needs to meet users' expectations. The level of suitability produces an average score of 87.91%, and the level of gap produces an average value of -0.54. The results show that the performance of the ToLatin application still needs to improve the performance of the application service to suit the interests of the ToLatin application users.

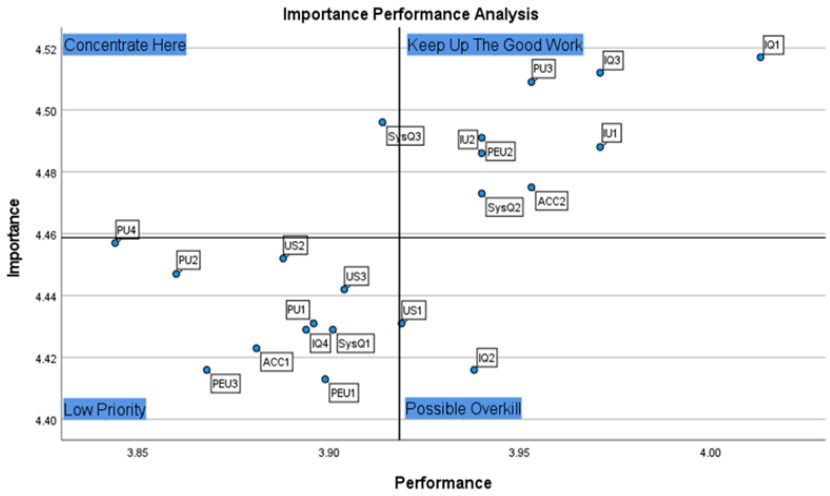


Figure 5. Results of the IPA quadrant

### 3.3. Discussion

This study examines the level of user acceptability of ToLatin as a specific Balinese-to-Latin transliteration application from previous authors' research. In this research area, there is no application comparison as the object of this evaluation. Acceptability evaluation is conducted using a combination of TAM-DeLone & McLean, which is continued with suitability, gap, and quadrant analysis. Based on previous research, a good suitability analysis has a suitability level of 100% [44], and the gap produces a positive value of Qi ≥0 [48]. We found that the application was not yet optimal, with the results of the suitability analysis producing a value of 87.91%, and the average level of gap was -0.54. The proposed method in this study tends to have an inordinately higher proportion of acceptability evaluation. This differs from previous studies' findings, where this study shows the priority of application improvements based on quadrant analysis. Our findings indicate that the combination model we designed using seven variables with 21 indicators has successfully evaluated the acceptability of the application. The analysis showed that the application was not optimal, where improvements could be prioritized on the SysQ3 indicator in quadrant I. Users felt that this application presented something innovative for learning the Balinese script. This study still has limitations, as the details of improvements to innovative indicators have not been described. Details of these improvements can be obtained using other evaluation methods based on end-users or application experts. Based on previous research, the user-based evaluation method that can be used is usability evaluation. Usability evaluation is a system evaluation method that focuses on evaluating how well users can learn and use the system and how satisfied users are with the processes in the system. This evaluation shows that it can produce problems felt by users [50], [51] or problems from expert analysis [52]–[54]. In addition, further analysis can be done by analyzing the relationship between variables in the TAM and the Delone & Mclean combination model used in this study. Relationship analysis is needed to determine the priority of improvements required for an application/product [55] and also determines variables that significantly influence other variables that affect user satisfaction [56].

## 4. CONCLUSION

The results of the evaluation of the acceptability of the ToLatin application for high school students in Buleleng Regency to support ubiquitous learning of Balinese script show that user acceptance was not yet optimal. The results of the suitability analysis produced an average value of 87.91%, which indicates that the quality of the ToLatin application still needed to meet what respondents, namely high school students in Buleleng Regency, expected. The gap analysis results showed that seven acceptance variables used produced negative values. The average level of gap in this study was -0.54, where a negative gap value indicates that the performance of the ToLatin application was not following the importance of the users. So, it is still necessary to improve the ToLatin application service quality to meet the expectations of ToLatin application users. Based on the results of the quadrant analysis, the main priority for improving the performance of the ToLatin application service can be done on the innovative indicator (SysQ3) of the system quality variable. This indicator can be enhanced by adding application features to support Balinese script learning better. This research still has limitations, where detailed improvements or user problems related to the indicators are not generated from the designed evaluation model. Further evaluation related to the definition of user problems

with usability evaluation and statistical analysis of the relationship between variables can be carried out in further research.

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C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

## CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

## INFORMED CONSENT

We have obtained informed consent from all individuals included in this study.

## ETHICAL APPROVAL

The research related to human use has been complied with all the relevant national regulations and institutional policies in accordance with the tenets of the Helsinki Declaration and has been approved by the authors' institutional review board or equivalent committee.

## DATA AVAILABILITY

The data that support the findings of this study are available on request from the corresponding author, [LJED]. The data, which contain information that could compromise the privacy of research participants, are not publicly available due to certain restrictions.

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