Applying Zone of Tolerance to a Customer Service App in a Public Higher Education Institution

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Abstract - Rapid technological evolution has compelled many higher education institutions to adopt digital-based customer service systems to improve efficiency and productivity. At the same time, service quality in higher education institutions influences credibility and competitiveness in the sector. Therefore, an evaluation of a web-based customer service platform at a university in Malang is necessary. This research aims to evaluate the service quality of this platform from a user perspective and identify priority areas for improvement using the Zone of Tolerance (ZOT) framework. This research applied a mixed-method design. The population consisted of 1,506 students from 2021 to 2023, and the sample consisted of 102 respondents, obtained through questionnaires and one interview. Quantitative analysis measured desired, adequate, and perceived services using the DeLone and McLean model, while qualitative analysis applied thematic analysis to enrich the findings. Results show that no indicators fall below the ZOT, 13 indicators are within it, and one exceeds user expectations. This research is novel in applying the ZOT for the first time to evaluate an online customer service platform in higher education and in using the DeLone and McLean model rather than the commonly applied SERVQUAL instrument. The findings provide insights for improving service quality and enhancing user satisfaction.

Keywords: customer service evaluation, DeLone & McLean, higher education institution, zone of tolerance

I. INTRODUCTION

Customer service refers to activities aimed at providing satisfaction by addressing customer needs and problems (Ayu & Srihandoko, 2021). Customer service is an important aspect of a business, institution, and organization or retaining customers, sustaining profits, and attracting new ones (Rachmi et al., 2024). Often describes as the heart of a successful business, customer service means offering reliable assistance that makes customers feel respected and valued (Forhad et al., 2022). In higher education, customer service is equally critical for ensuring smooth academic and non-academic processes. Wahab (2016) emphasizes that institutions should be responsive to customer issues, efficient, clear in communication, and capable of managing conflicts. Investment in service quality enhances institutional reputation among students, parents, and other stakeholders (Ramovš & Milfelner, 2023). Al-Refaei et al., (2024) note that institutions failing to deliver quality services risk losing credibility and competitiveness. One effective way to strengthen credibility is through positive word-of-mouth (WOM) (Qi & Kuik, 2022). Research indicates that a high quality of service significantly contributes to student satisfaction, and this enhanced satisfaction subsequently fosters positive WOM (Gabbianelli & Pencarelli, 2023). The rapid evolution of technology has pushed many higher education institutions to adopt digital-based customer service systems to improve efficiency and accessibility. In this context, digital-based customer service represents an application of information technology (IT) services that rely on effective organization and delivery of information

(Agutter, 2020). Such systems offer benefits such as flexibility of time and location and improved user experience, as seen with chatbot implementations (Tamrakar & Badholia, 2022).

As digital transformation accelerates, many universities have adopted web-based customer service platforms to improve operational efficiency and student experience. However, the effectiveness of these platforms depends heavily on service quality. Poor service quality can reduce satisfaction, lower engagement, and harm institutional reputation. Although this research focuses on one faculty in Malang, its findings are relevant to other institutions undergoing similar transformations.

Despite existing challenges, having the faculty customer service is very useful for students, as the best customer service offered by the faculty. This would lead to the faculty customer service being potentially used in the long term. Service quality, such as system quality, information quality, and service quality, influences user satisfaction with a service. Each should be measured—or controlled for—separately, because singularly or jointly, they will affect subsequent "use" and "user satisfaction" (DeLone & McLean, 2003). The applicability of faculty customer service's service quality impacts potential usage, thereby necessitating the examination of the existing service. One method of conducting the assessment is through the ZOT method.

The ZOT evaluates service performance by comparing desired service, adequate service, and perceived service (Parasuraman et al., 1994). It represents the acceptable range between adequate and desired service quality levels. User perceptions are classified into dissatisfaction, satisfaction, and delight (Johnston, 1995). Parasuraman (2004) states that users become satisfied if the perceived service falls within the ZOT. If the perceived service is better than their desired service, users are delighted. However, users become dissatisfied when the perceived service falls below the ZOT. Evaluation using the zone of tolerance initially employed the five dimensions of SERVQUAL: reliability, assurance, tangibility, empathy, and responsiveness (Kesharwani et al., 2021). However, over time, these dimensions and their corresponding instruments can be adapted to suit the context of the service being researched, such as hospitals (Jabarethina, 2023), libraries (Khoirunissa et al., 2023), and even e-commerce (Niman, 2025). The method underscores that service need not always exceed expectations but should remain within the tolerance zone. As it is, the maximum score recorded in a service indicator does not always imply that the indicator is optimum, particularly if user expectations are high to begin with. Through this process, the faculty will know which of the service indicators have surpassed user expectations and which have yet to meet them. The 2019 report released by the Association of Research Libraries (2019) discussed the application of LibQUAL, a service quality methodology for libraries utilizing the zone of tolerance calculation. The report describes the process of grouping service indicators

into below, above, or within the zone of tolerance and highlights the importance of ranking specific service indicators that require improvement.

Numerous studies illustrate ZOT's application across sectors. Li (2024) combines ZOT with importance-performance analysis to evaluate restaurant service quality. In the educational sector, Hussain et al. (2021) assessed service quality for hospitality and tourism education. Moreover, Saufa (2023), Zulfiqar and Khalid (2024), and Kaapu and Zimu-Biyela (2025) measure library service quality using the LibQUAL+ method, a customized version of the ZOT method for measuring library service quality. Library service quality has also been measured by integrating Libqual, Webqual, and importance-performance analysis (Agustiono et al., 2025). In the other sector, Sitorus and Montana (2023) measure service quality for the commuter line in Jakarta, and Suwanto et al. (2024) measure the quality of childcare service.

However, despite the growing reliance on web-based customer service in higher education, challenges remain. The studied faculty platform faces critical issues such as low effectiveness, security risks, and usability concerns, as noted in the university's 2023 Public Satisfaction Survey and supported by findings from previous studies (Vebriansyah et al., 2024; Wibisono et al., 2022; Yahyasamdie et al., 2024). Limited studies have applied ZOT in this context, as most focus on e-commerce, libraries, transportation, or hospitality. This study addresses that gap by integrating ZOT with the DeLone and McLean model to evaluate three dimensions: information quality, system quality, and service quality. Combining quantitative analysis with qualitative thematic insights offers a comprehensive view of user perceptions and provides actionable recommendations. Academically, this researchcontributes to the body of knowledge on service quality measurement in higher education. Practically, the findings can guide the faculty in further developing its customer service.

II. METHODS

This research follows a mixed-method approach, combining quantitative and qualitative analysis. Quantitative analysis applied the ZOT to assess user perceptions of faculty customer service. Thematic analysis is used to interpret qualitative data that collected through open-ended questionnaire items and a student interview, complementing the quantitative findings.

The dimensions are 14 indicators that correspond to the dimensions suggested in the DeLone and McLean model by Zhang and Lu (2023) and are adapted to the faculty customer service's service context. Numerous previous studies have adopted this model to evaluate information system services, such as health records (Bashiri et al., 2023), accounting (Lutfi et al., 2022), civil registration (Viontita & Mahendrawathi, 2024),

Table 1 Dimensions and Indicators

Dimensions	Indicators	Definitions
Information quality	*Accuracy* (IQ1)	Information provided by customer service is consistent with the objective facts
	Richness (IQ2)	Information provided by customer service is comprehensive
	Timeliness (IQ3)	Information provided by customer service updates the situation in time
	Interestingness (IQ4)	Information provided by customer service is interesting in theme and language expression.
	Comprehensible (IQ5)	Information provided by customer service is simple, concise, and easy to understand
System quality	*User-friendliness* (SYQ1)	The operation settings of customer service are reasonable and easy to use.
	Stability (SYQ2)	The services run smoothly and barely experience technical disruptions.
	Fluency (SYQ3)	The services usually load fast and rarely experience delays
	Safety (SYQ4)	Customer service provided effective measures that can be taken to protect user information security.
	Availability (SYQ5)	Customer service is always available to use whenever needed
Service quality	*Interface design rationality* (SEQ1)	The interface layout of customer service is simple and beautiful
	Responsiveness (SEQ2)	Customer service can respond to users in time and provide services for users
	Information overload degree (SEQ3)	Customer service does not show obtrusive information such as ads or content that is not relevant to the user's needs.
	Link quality (SEQ4)	Customer service ensures correct and valid links to access more information supporting the answer or content provided

Table 2 Open-ended Questions

Open-ended questions
How would you describe your general experience with the customer service?
What do you think should be included or enhanced in customer service to be even better?

and even e-learning (Rokhman et al., 2022). The indicators cover information quality, system quality, service quality, and two open-ended questions. Details of these indicators are presented in Table 1.

These indicators are subsequently be assessed by respondents within a questionnaire, which is followed by open-ended questions section at the end. The open-ended questions are intented to give more detailed, personal insights from each respondent. The two specific questions are presented in Table 2.

A validity test is conducted using Pearson correlation, and the results show that all instruments are valid because the calculated r value is greater than the tabulated r value (0.361). In addition, face validity is carried out to ensure that the instruments were appropriate, clear, and relevant to the research. The instruments are developed based on an extensive literature review on service quality and expert opinions (Cavana et al., 2007, Zainol et al., 2010, Li, 2024). The reliability test indicates that all instruments have Cronbach's Alpha values above 0.7, confirming high reliability and consistency. It means that the indicators produce similar results when applied to the same group of individuals at different times.

The participants in this research are students from the 2021, 2022, and 2023 cohorts who had used the faculty's customer service. These cohorts are chosen because they represent the majority of service users and have sufficient experience with academic processes than junior students. The sample size is determined using Slovin's formula with a 10 percent margin of error. From a population of 1,506 students (609 from 2021, 485 from 2022, and 412 from 2023), the sample size is calculated as 94, rounded up to 102 respondents. The final sample includes 34 students from 2021, 27 from 2022, and 41 from 2023.

The questionnaire is tested for validity, reliability, and expert judgment. Expert judgment is obrtained from faculty lecturers, and a pilot test of 30 respondents is conducted to establish validity and reliability. The pilot data are then analyzed using IBM SPSS Statistics 26 to confirm the suitability of the research instrument. Once validated, the questionnaire is distributed to the full sample. Quantitative data are analyzed using the ZOT method to assess users' perceptions of the faculty's customer service. After

calculating the ZOT, thematic analysis is applied to generate qualitative insights that complement the quantitative findings. Qualitative data are collected from open-ended questionnaire responses and a student interview. This mixed approach allows for a synthesis of users' perspectives on customer service, along with recommendations for further research.

The procedure for quantifying the ZOT involved computing the mean scores for perceived service, desired service, and adequate service, as shown in Equations (1), (2), and (3).

$$\bar{P} = \frac{\sum P_n}{N} \qquad (1)$$

$$\bar{D} = \frac{\sum D_n}{N} \qquad (2)$$

$$\bar{A} = \frac{\sum A_n}{N} \qquad (3)$$

Notes:

$\bar{P}$	= mean of perceived service
$\sum P_n$	= result of perceived service
$\bar{D}$	= mean of desired service
$\sum P_n$	= result of desired service
$\bar{A}$	= mean of adequate service
$\sum A_n$	= result of adequate service
N	= number of respondents

Next, the calculation of Measure of Service Adequacy (MSA) and Measure of Service Superiority (MSS) is performed, as shown in Equations 4 and 5 (Saufa, 2023).

$$MSA = \bar{P} - \bar{A} \qquad (4)$$

$$MSS = \bar{P} - \bar{D} \qquad (5)$$

The last step is to map values between MSS and MSA. Johnston (1995) and the Association of Research Library (2019) state that the final mapping outcomes fit into three distinct categories. First, if the MSA is negative, it indicates that the perceived service is below the adequate service, and users feel dissatisfied. Second, if the MSS is positive, it indicates that the perceived service exceeds the desired service, and users feel delighted. Third, service quality is considered e within the zone of tolerance when perceived service lies between a positive MSA and a negative MSS, indicating that users feel satisfied. The assessment of service indicators is led by the determination of the worst MSA values. The indicators with the most negative MSAs are given the highest priority for improvement.

Thematic analysis is then used to validate the quantitative findings. Following Braun and Clarke (2006), the analysis involves six steps: familiarizing with the data, generating codes, searching for themes, reviewing themes, defining themes, and producing the report. Thematic analysis allows patterns to be identified and interpreted, strengthening the conclusions drawn from the ZOT assessment.

III. RESULTS AND DISCUSSIONS

Respondents characteristics are grouped by gender, major, and class. Among 102 participants, 59 are male and 43 are female. Based on academic major, 48 participants are from the Information Systems department, 14 from Information Technology, 10 from Information Technology Education, 18 from Informatics Engineering, and 12 from Computer Engineering. By class year, the respondents consist of 34 from 2021, 27 from 2022, and 41 from 2023.

The collected data are analyzed using the ZOT. The analysis began by identifying the mean values for adequate service, desired service, and perceived service across all indicators. The results are presented in Table 2.

Table 2 Mean and Standard Deviation (SD)

Dimensions	Code	Adequate	Desired	Perceived
Information Quality	IQ1	5.22 (1.66)	7.60 (1.51)	6.58 (1.70)
	IQ2	5.15 (1.77)	7.53 (1.69)	6.59 (1.67)
	IQ3	5.46 (1.76)	7.68 (1.56)	6.76 (1.90)
	IQ4	4.34 (1.87)	6.70 (1.87)	5.85 (1.76)
	IQ5	5.34 (1.74)	7.46 (1.49)	6.82 (1.49)
System Quality	SYQ1	5.47 (1.80)	7.71 (1.55)	7.18 (1.64)
	SYQ2	5.27 (1.89)	7.49 (1.82)	7.02 (1.75)
	SYQ3	5.20 (1.83)	7.43 (1.61)	6.82 (1.61)
	SYQ4	5.48 (1.93)	7.53 (1.60)	6.37 (1.99)
	SYQ5	5.52 (1.90)	7.69 (1.64)	6.59 (2.05)
Service Quality	SEQ1	4.63 (1.84)	6.97 (1.71)	6.02 (1.72)
	SEQ2	5.17 (1.83)	7.59 (1.53)	6.30 (1.76)
	SEQ3	5.53 (2.25)	7.59 (1.74)	7.79 (1.59)
	SEQ4	5.49 (1.94)	7.62 (1.48)	6.53 (1.94)

Information quality dimension focuses on the quality of information produced by the information System (DeLone & McLean, 2003). Information presented on a website should be detailed, easy to understand, factually relevant, and personalized to the user. In this study, the information quality dimension includes accuracy, richness, timeliness, interestingness, and comprehensible (Zhang & Lu, 2023).
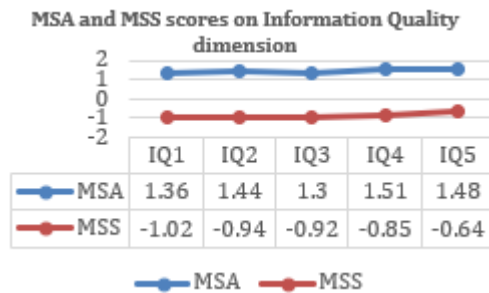

Figure 1 Graph of MSA and MSS Scores on the Information Quality Dimension

Figure 1 shows that all indicators have positive MSA and negative MSS, indicating that service quality falls within the ZOT and that users are generally satisfied. IQ4 and IQ5 have the highest MSA values (1.51 and 1.48), suggesting that users are most satisfied with these indicators. The lowest MSA scores appear in IQ3 and IQ1 (1.30 and 1.36), indicating that these indicators are less effective compared to IQ4 and IQ5. Nevertheless, since all indicators have positive MSA, it can be inferred that customer service meets minimal user expectations. IQ1 and IQ2 have the lowest MSS values (-1.02 and -0.94), showing that customer service fails to meet user expectations in these areas. Even though IQ5 and IQ4 record the least negative MSS values (-0.64 and -0.85), all indicators remain below user expectations. Thus, improvements are required across the dimension, with priority given to indicators with the lowest MSS values.

Thematic analysis reveals several recurring issues raised by respondents. One prominent theme is information credibility, whic describes users' perceptions of the consistency and accuracy of information provided. Users are more inclined to rely on credible sources when making decisions online (Ngo et al., 2024). Many respondents stated that the information provided is not always reliable, even when addressing similar questions, aligning with the lowest MSS value for IQ1. This highlights the lack of clear information guidelines, which contributes to confusion regarding the information validity. A proposed solution is to develop more structured and regularly updated information guidelines. Inconsistencies often stem from multiple sources and outdated references, making regular updates essential.

Closely related is the theme of completeness of information, reflecting users' perceptions of the relevance and depth of the information provided. Providing detailed information is considered crucial for customer satisfaction and loyalty (Wijaya et al., 2021). Several respondents feel that the information is insufficiently detailed, prompting follow-up questions, which supports the second-lowest MSS value for IQ2. This indicates users' expectations for more comprehensive responses. One suggested solution is to include supporting links, such as those leading to financial help procedures, when answering user questions. Additionally, the content in the FAQ section should be clarified to help users find answers independently without contacting the customer service. Respondents also recommend adding information about estimated response times and providing notifications through channels other than email.

In addition to these concerns, respondents also raised issues regarding the clarity of language and expression. The clarity of language and expression theme describes users' perceptions of the clarity of language used to convey information, aligning with IQ5. Hong et al. (2023) state that the use of unfamiliar terms and long sentences reduces readability. Respondents report that complex or ambiguous wording often requires clarification, leading to follow-up questions. A recommendation is to adopt simpler, more direct language. Customer service could also provide general explanations supplemented with links to guide users toward detailed information.

Respondents also raised concerns about outdated information. The outdated information theme describes users' perceptions of whether the information provided is up to date and aligned with the most recent developments. The relevance of updated information influences how users decide on their next course of action. For example, patients with a certain illness may have difficulty understanding their condition and seeking appropriate consultation for treatment if the information on a website lacks credibility (Hong et al., 2023). Several respondents state that the information provided is not always up to date. This issue overlaps with the information credibility theme, as it may stem from reference materials that are not regularly updated, resulting in the delivery of outdated or irrelevant information. In addition to improving information depth, respondents also highlighted the importance of regularly updating the FAQ section.

Since IQ4 relates to information interestingness, it connects with another theme, namely, human resource quality. This theme describes users' perceptions of the competence and professionalism of customer service staff. Human resource management has been shown to play a critical role in improving user satisfaction and service effectiveness (Shah & Shrestha, 2022; Papademetriou et al., 2023). One respondent expressed dissatisfaction, feeling dismissed because of their student status. It is suggested that all users should be treated equally, regardless of background. Regularly collecting user feedback is also recommended, as it not only improves service quality but also helps users feel heard and appreciated.

Following the findings on information quality, the analysis then shifts to system quality. This dimension focuses on the technical performance and functionality of the systems (DeLone & McLean, 2003). Regarding the Internet, this dimension assesses characteristics such as availability, reliability, and loading speed. In this research, the dimension includes user-friendliness, stability, fluency, safety, and availability (Zhang & Lu, 2023; Lwoga, 2013).
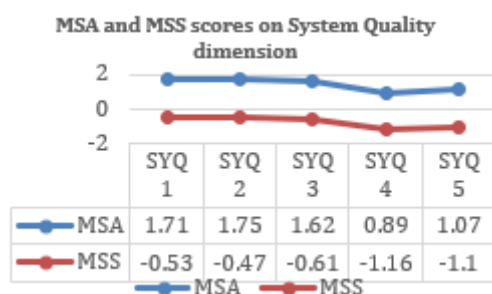

Figure 2 MSA and MSS Scores on System Quality Dimension

Figure 2 shows that all indicators in this dimension have positive MSA and negative MSS, indicating all indicators are within the ZOT and that users are satisfied overall. SYQ2 and SYQ1 have the highest MSAs with scores of 1.75 and 1.71, respectively. This suggests that good service functionality and ease of use are the indicators closest to meeting users' desired expectations. Meanwhile, SYQ4 and SYQ5 record the lowest MSA values (0.89 and 1.07), indicating that user perceptions of security and availability are weaker compared to indicators such as SYQ2 and SYQ1, even though they remain within the zone of tolerance. Across this dimension, all indicators carry negative MSS values, indicating that none fully meet user expectations, although they still fall within the ZOT. SYQ4 and SYQ5 require closer attention, as they hold the lowest MSS values (-1.16 and -1.10), making them priority areas for improvement.

A prominent theme emerging from the thematic analysis is user understanding and ease of use, which aligns with SYQ1. This theme reflects users' perceptions of the accessibility and usability of the customer service. In e-commerce, ease of use significantly influences purchase intention. When users perceive a service as easy to use, they are more likely to engage with it and complete transactions (Suryanto et al., 2024). Respondents report that procedures are confusing, especially for new users, due to unclear instructions and technical terms such as "open ticket." To address this matter, instructional videos and the use of faculty social media platforms could effectively introduce customer service functions and explain usage. In learning contexts, videos have been shown to improve comprehension (Galatsopoulou et al., 2022). Respondents also recommend improving ticket access

and login mechanisms to enhance user-friendliness and efficiency. Integration with social media or other student service platforms, such as Gapura, an information system platform made for students and lecturers in Brawijaya University is also suggested to improve accessibility.

Another recurring theme is service availability and accessibility, closely tied to SYQ5. This theme reflects users' perceptions of whether customer service is available when needed. Availability has a strong positive relationship with customer satisfaction (Mohd Abd Razak & Khan, 2024). Respondents express dissatisfaction with the lack of service outside normal working hours, including weekends and public holidays. This causes delays in resolving issues, especially in time-sensitive cases, and may stem from limited human resources. A proposed solution is to adopt automation, such as chatbots, to handle inquiries outside office hours. Chatbots have proven effective in managing low-complexity tasks across industries (Nicolescu & Tudorache, 2022) and could help address respondents' requests for 24/7 availability.

The third theme relates to data security, which is associated with SYQ4. This theme describes users' perceptions of the policies implemented to safeguard their information. Data security strongly influences user trust, and services must prioritize measures such as encryption and authentication to protect customer data from unauthorized access (Zhang et al., 2023). The current security mechanism, CAPTCHA, is seen as adequate but not optimal. Some respondents acknowledge that security policies add value to the service, but others felt secure even without them, since submitted data are not highly sensitive.

Following the finding of system quality, the analysis then shifts to service quality. Service quality refers to the support users receive from the organization and information system staff, including responsiveness, assurance, and empathy, whether delivered through training, maintenance, or technical assistance (DeLone & McLean, 2003). In this research, the service quality dimension includes interface design rationality, responsiveness, information overload, and link quality (Zhang & Lu, 2023).
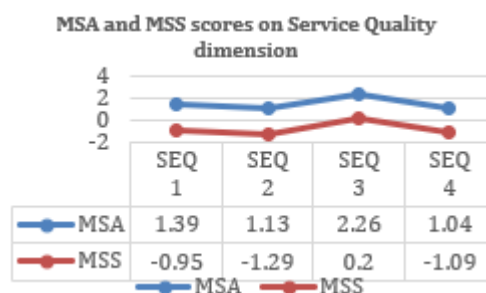

Figure 3 Graph of MSA and MSS Scores on the Service Quality Dimension

Based on Figure 3, all MSA values are positive

and all MSS values are negative, indicating that all indicators lie within the zone of tolerance. SEQ3 is the only indicator with a positive MSS (0.2), suggesting that it exceeds user expectations. This finding implies that users feel delighted with this aspect of customer service, particularly due to the absence of irrelevant ads or content. However, SEQ2 records the lowest MSS (-1.29), indicating it is as the most urgent area for improvement.

Thematic analysis provides further insights into these findings. In the Service Interface and User Experience theme, respondents state that the interface is unappealing, monotonous, and confusing, particularly aligning with SEQ1. A well-designed interface enhances usability, increases user enjoyment, and promotes engagement with the platform (Judijanto & Wardhani, 2024; Suryanto et al., 2024). Respondents highlight the lack of a clear ticket status indicator, which caused confusion, especially among new users. They also note that the interface resembles a generic template, leading to boredom. The suggested improvements include simplifying navigation and incorporating user-preference features, such as a dark mode option to make the interface more engaging.

Another recurring theme concerns service response time and consistency, directly supporting SEQ2 as the indicator with the lowest MSS. This theme captures users' perceptions of how quickly customer service responds. Prompt responsiveness reflects respect for users' time, builds a positive reputation, and strengthens loyalty intentions (Kapoor et al., 2024). Most respondents consider the responses slow and inconsistent. This issue may stem from the complexity of questions, with simple inquiries answered quickly while complex ones take longer. Limited working hours and staff capacity are also cited as factors. A potential solution is to implement chatbots to handle repetitive queries, allowing staff to focus on more complex questions (Nicolescu & Tudorache, 2022). Chatbots have been shown to improve satisfaction by effectively addressing common problems (Anita et al., 2023). Additionally, providing access to past information guidelines could help reduce response times for recurring issues.

The final theme, Information Tracking Access, relates to users' perceptions of the service's ability to provide access to previously retrieved information. Respondents emphasize the usefulness of reopening ticket histories, as it allowed them to retrieve prior information without resubmitting the same questions. They also value the inclusion of relevant links in responses, which facilitates access to additional resources without requiring independent searches. Accordingly, ensuring access to ticket history and embedding relevant links are key recommendations for service improvement. Figure 4 presents the mean scores for all indicators measured across adequate, desired, and perceived service, indicating whether user perceptions fall within or outside the zone of tolerance.
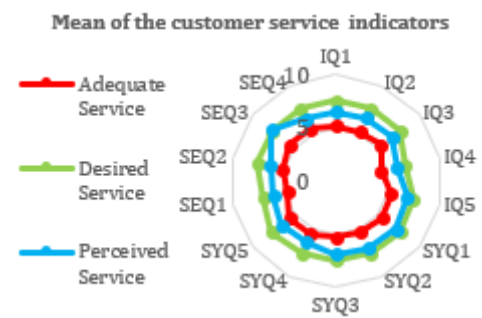

Figure 4 Diagram of The Mean Analysis Results for Each Indicator

Table 3 Result of Thematic Analysis

Code	Theme
Unattractive appearance, UI improvement, Boring interface, UI limitations, Dark mode feature, Better design/layout, More appealing interface, Providing estimated waiting time, More user-friendly interface, Confusing layout, Confusing reply waiting system, Simpler design, Clearer interface, More interactive interface, UI/UX enhancement, Outdated/old-fashioned interface, Incomplete interface	Service interface and user experience
Slow response, Response time improvement, Inconsistent response time, Long waiting time, Faster response, Slow-responding admin, No response, Delayed response time, Chatbot feature, Question prioritization, Inefficient workflow	Service response time and consistency
More accurate information, Inconsistent answers, Unreliable/inconsistent information, Doubtful responses	Information credibility
Addition of automation features, Availability at all times, Limited working hours, Weekend availability, Chatbot feature, Extension of operation hours	Service availability and accessibility
Addition of notifications, More topic options, Unanswered responses, More detailed answers, Clearer FAQ information, Ambiguous answer, Irrelevant answer, Answer not addressing the question, Information sometimes unhelpful, Estimated ticket response time information, More detailed information, Lack of detail in answers, Inconsistent detail in answers, Supporting links in responses	Completeness of information

Table 3 Result of Thematic Analysis (Continued)

Code	Theme
Ambiguous answer, Easily understandable language, Difficult-to-understand language, Simpler language, Occasionally unclear answer, Clearer information	Clarity of language and expression
Provision of user guide, Introduction to the customer service, Easier ticket access, Integration with other services, Not user-friendly for new users, More effective login, User guide, Technically difficult to use, Confusing service, Service socialization, Confusing terminology, Video-based user guide, Mobile application	User understanding and ease of use
Outdated information, More updated FAQ, More up-to-date information, Outdated FAQ	Outdated information
Staff professionalism, Regular feedback collection from students	Human resource quality
Ticket history access	Information tracking access
Security mechanism is not optimal, Urgency of security features	Data security

The area enclosed between the desired service (green line) and adequate service (red line) is referred to as the zone of tolerance (see Figure 4). Figure 4 indicates that the mean of perceived service (blue line) for all indicators is higher than adequate service but lower than desired service, indicating all indicators fall within the ZOT. This shows that customer service has achieved user satisfaction but has not met the expectations set by users, except for SEQ3. The graph further indicates that the average perceived service of SEQ3 is above the desired service level, suggesting that users are delighted. This demonstrates that customer service has exceeded user expectations, particularly regarding the absence of advertisements or irrelevant content that conflict with users' needs.

The priority order for evaluation can be determined when both MSA and MSS values are negative. The previous analysis reveals that none of the indicators exhibited negative MSA. Figure 4 confirms this finding, as no indicators are plotted below the red line, signifying that all are above the established minimum threshold. Consequently, the priority order is determined based on negative MSS values. A more negative MSS indicates a wider gap between desired service and perceived service. Moreover, as shown in Figure 4, indicators within the ZOT may eventually reach the desired service level, facilitating their assessment. In this context, SEQ2 emerges as the main priority for evaluation due to its lowest MSS value.

Table 3 presents the findings obtained through thematic analysis of the questionnaires and interviews. The codes listed under each theme serve as justifications for measuring indicators and therefore reinforce the earlier findings regarding the zone of tolerance.

IV. CONCLUSIONS

Based on the analysis of customer service quality, it is concluded that none of the indicators fell below the ZOT, indicating that all aspects of the service meet the minimum acceptable level for users. Only one indicator exceeded user expectations, placing it above

the zone of tolerance. Meanwhile, the remaining 13 indicators are within the ZOT, meaning that while they satisfied users' minimum expectations, they did not surpass them. Therefore, service improvements should focus on these indicators to ensure that they not only meet but also exceed user expectations. Overall, the customer service meets the minimum level of user expectations, resulting in adequate but not optimal satisfaction.

Based on research results, the following suggestions are proposed for future research. Future research should evaluate similar services across diverse environments or institutions to facilitate a more generalized comparison of customer service quality, thereby yielding broader and more applicable findings. Furthermore, a more diverse respondent group, including administrative staff, lecturers, and external users outside the faculty environment should be incorporated into future studies to ensure the results represent a wider range of perspectives on service quality. Lastly, further research should explore alternative service evaluation models or integrate dimensions of the DeLone and McLean model with other instruments. This comprehensive approach is necessary to gain a deeper understanding of service quality and to expand the scope of evaluation.

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