

Evaluation of Web-Based Teledentistry Application as Assessment and Follow-Up for Oral and Maxillofacial Surgery Patients Using the SUS (System Usability Scale) Method

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Received 15 January 2026; Revision 1st 4 February 2026, Accepted 25 February 2026; Published online 25 February 2026

Keywords:

teledentistry, usability, SUS, web-based application, oral surgery, follow-up, user evaluation

ABSTRACT

Background: Teledentistry is an innovation in web-based dental health services that enables dentists and patients to communicate remotely without direct contact. This application plays an essential role in the assessment and follow-up of oral and maxillofacial surgery patients. This study aimed to evaluate the usability level of a web-based teledentistry application using the System Usability Scale (SUS) method.

Method: This study was a descriptive observational research with a non-experimental case study approach. Data were obtained using a SUS questionnaire consisting of 10 Likert-scale questions assessing three main aspects: effectiveness, efficiency, and user satisfaction toward the RamahCLP web application.

Result: The results showed that the web-based teledentistry application achieved a good usability score, categorized as "acceptable," indicating that users could easily understand and operate the application for assessment and follow-up needs.

Conclusion: It can be concluded that the RamahCLP web-based application has good usability and has the potential to effectively support teledentistry services.

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DOI: <http://dx.doi.org/10.30659/medali.8.1.46-53>

MEDALI Jurnal: Media Dental Intelktual accredited as **Sinta 4 Journal**

(<https://sinta.kemdikbud.go.id/journals/profile/13665>)

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How to Cite: *Iskandar et al.* Evaluation of Web-Based Teledentistry Application as Assessment and Follow-Up for Oral and Maxillofacial Surgery Patients Using the SUS (System Usability Scale) Method. MEDALI Jurnal: Media Dental Intelktual, v.8, n.1, p.46-53, February 2026.

INTRODUCTION

Advances in information technology have facilitated access to health services, especially in developing countries such as Indonesia, which spans a large territory, has an uneven population distribution, and has limited mobility to health facilities. These conditions have resulted in health services, including dental and oral health services, not being able to reach the entire population optimally.¹

Oral health problems, particularly cases of oral and maxillofacial surgery, still show a relatively high prevalence rate. Data on oral surgery patient visits at the Unpad Bandung Dental Hospital for the period 2018–2022 reached 1,700 visits, both during the pre-pandemic and pandemic periods, with variations in case types and management.² Additionally, the 2023 Indonesian Health Survey indicates a high prevalence of dental health problems, including abscesses and gum inflammation in several provinces, one of which is Central Java.

Oral and maxillofacial surgery (OMFS) is one of the oldest specialties in dentistry, treating complex conditions ranging from oral cavity infections to trauma and facial reconstruction. The risk of complications in oral surgery patients is influenced by various factors, such as bacterial infections, age, smoking habits, and comorbid conditions like diabetes mellitus and hypertension. Patient management requires systematic, comprehensive, and continuous assessment and follow-up, ideally supported by information technology.

In practice, the treatment of oral surgery patients involves multidisciplinary collaboration in accordance with standard operating procedures established by the Ministry of Health of the Republic of Indonesia. However, challenges such as patient

absence at follow-up appointments, communication barriers, and patient anxiety after surgery often hinder the success of treatment.³

As a solution, teledentistry is a potential alternative. Teledentistry is part of telemedicine that enables online consultation, diagnosis, treatment planning, education, and patient follow-up, thereby bridging the gap in access to dental health services.^{4,5} Despite limitations such as dependence on internet connection and the risk of subjectivity, web-based teledentistry is considered more accessible and efficient than download-based applications.^{6,7}

Web teledentistry can be used as a medium for assessment, follow-up, as well as health education and communication between doctors and patients.^{8,9,10} Web-based system Development generally uses the waterfall method within the System Development Life Cycle (SDLC) framework to ensure a structured Development process.¹¹

To ensure that web-based teledentistry systems meet user needs, usability evaluation is necessary. The System Usability Scale (SUS) is a simple, valid, and reliable evaluation instrument for assessing system usability from the user's perspective.^{12,13} A good usability evaluation contributes to the successful implementation of digital health systems. It increases user acceptance while also reducing the need for face-to-face visits to health facilities.^{14,15}

RESEARCH METHOD

This study used a descriptive, observational method to evaluate the usefulness of a web-based teledentistry application for the assessment and follow-up of patients undergoing oral and maxillofacial surgery. The study was conducted without intervening with users, observing their natural experience with the application.

The research design was non-experimental (observational) and used a case study approach, focusing on the use of teledentistry applications in patient assessment and follow-up. Data were collected using the System Usability Scale (SUS) questionnaire to assess system usability from a user experience perspective.

The research variable was a single variable, namely the evaluation of a web-based teledentistry application as an assessment and follow-up tool using the SUS method. The evaluation used 10 standard SUS questions on a Likert scale, yielding a usability score of 0–100 that reflects learnability, memorability, efficiency, and user satisfaction.

The study population consisted of oral and maxillofacial surgery patients in Central Java. Based on data from the last three months of 2025 from the Central Java Provincial Health Office, the recorded population was 111,873 patients. The sample size was determined using the Slovin formula with a 10% margin of error, resulting in 100 respondents. The sampling technique used simple random sampling, in which each member of the population had an equal chance of being selected.

The inclusion criteria included adult patients or guardians of child patients who were able to access the web-based teledentistry application, were willing to fill out the SUS questionnaire, and resided in Central Java. The exclusion criteria included respondents who were unable to use the application, were uncooperative in filling out the questionnaire, or came from outside the Central Java region.

The research instruments consisted of the RamahCLP web-based teledentistry application and the SUS questionnaire. The RamahCLP application provides teleconsultation and telemonitoring services for patients undergoing oral and maxillofacial surgery during the initial

screening, consultation, and postoperative monitoring stages.

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RESEARCH RESULTS

This study examines the implementation and evaluation of the RamahCLP web-based teledentistry application used for the assessment and follow-up of oral and maxillofacial surgery patients. Respondents were directed to access the RamahCLP website (<https://ramahclp.xyz/>) and then fill out an evaluation questionnaire via Google Form. The system implementation displays various

key features, including the initial access page (register and log in), main page, information, services, schedule, and help.

The RamahCLP application is a web-based teledentistry platform connected to an online database and accessible on smartphones and laptops. The registration feature allows patients to fill in basic personal data, while registered patients use the login feature. The main page displays menus for information, services, schedules, help, search features, profiles, and consultation history. The information feature serves as a means of remote health education, supporting an important aspect of teledentistry services.

The service feature includes the storage of electronic medical records, including assessments and follow-ups, through teleconsultation and telemonitoring via chat, telephone, and video calls. The input data is stored systematically and can be reaccessed through the history menu. In addition, the schedule feature allows patients to adjust their consultation times with the doctor on duty. In contrast, the help feature provides access to emergency services and contact assistance if users encounter problems.

The evaluation stage used the System Usability Scale (SUS) with 100 patients in Central Java undergoing oral and maxillofacial surgery. The distribution of respondents showed a predominance of females (80%) and males (20%). By age group, the most significant number of respondents were in the 21–22 age range, indicating that the majority were young adults.

Table 1. Frequency Distribution of Gender

Gender	Number of Respondents	Percentage
Women	80	80%
Men	20	20%
Total	100	100%

Table 2. Frequency Distribution of Age

Age of Respondents	Number of Respondents	Percentage
5	1	1%
7	1	1%
19	1	1%
20	11	11%
21	28	28%
22	29	29%
23	4	4%
24	2	2%
25	2	2%
26	3	3%
27	1	1%
29	1	1%
30	3	3%
31	1	1%
32	2	2%
33	1	1%
35	1	1%
43	1	1%
45	1	1%
47	1	1%
49	1	1%
56	1	1%
57	1	1%
61	1	1%
62	1	1%
Total	100	100%

The results of the SUS questionnaire show that the RamahCLP application received an average score of 73.45, which is above the global SUS average. This score indicates that the application meets the criteria for effectiveness, efficiency, and user satisfaction. Positive statements (odd items) received high scores,

especially for ease of use, ease of learning, and user confidence in operating the system. Meanwhile, negative statements (even items) received low scores, which, after conversion, actually strengthened the final SUS score, indicating a low level of confusion and user barriers.

Table 3. Acceptability Category Distribution

No.	Category	Responden (N)
1.	Acceptable	62
2.	Marginal	29
3.	Not Acceptable	9

Based on the acceptability category, the majority of respondents (62) rated the application as Acceptable, followed by Marginal (29) and Not Acceptable (9). These results show that, in general, the RamahCLP application is acceptable to users, although there is still room for improvement.

Table 4. Grade Scale Category Distribution

c	Category	Responden
1.	A	32
2.	B	19
3.	C	15
4.	D	25
5.	F	9

DISCUSSION

The RamahCLP website was developed using the CodeIgniter 3 framework due to its advantages in Development speed, clear structure, and support for the Model–View–Controller (MVC) pattern, which facilitates system management without having to build the structure from scratch.¹⁶ This framework is open source, has a light footprint, provides a complete library and helpers, and basic security features that support efficient and secure website Development. CodeIgniter 3 is suitable for systems that require fast information access, simple navigation, and service integration, such as teleconsultation and service scheduling, which are relatively easy to implement with this framework.¹⁷

In the grade-scale assessment, category A was the most dominant, with 32 respondents, followed by categories B and C, while categories D and F had lower numbers. The dominance of category A indicates high user satisfaction and the perception that the application is easy and fun to use.

Table 5. Distribution of Adjective Rating Categories

No.	Category	Responden
1.	Best Imaginable	30
2.	Excellent	21
3.	Good	23
4.	OK	17
5.	Poor	9
6.	Worst Imaginable	0

Furthermore, the adjective rating results show that the application was rated from Poor to Best Imaginable, with the majority of respondents placing the application in the Best Imaginable category. These findings confirm that the RamahCLP application provides a positive user experience and is highly rated by most users.

The RamahCLP website plays an important role in supporting teledentistry services, particularly in the assessment and follow-up stages. The assessment process is carried out online through digital forms, electronic medical records, and intraoral photo uploads, thereby increasing efficiency and accuracy and minimizing manual input errors. The follow-up stage enables real-time periodic monitoring through progress reporting, automatic reminders, and online consultations, thereby increasing respondent engagement and the quality of service follow-up.¹⁸ The integration of communication, data collection, and digital patient monitoring makes the website an important

component in effective and accurate modern teledentistry services.¹⁹

Respondents ranged in age from 5 to 57 years old. Respondents aged 5 years were most likely to have accessed the website with their parents or guardians, suggesting that young children are beginning to learn about and interact with digital technology, especially for health and educational applications.²⁰ The 22-year-old age group was the dominant respondent group, indicating high readiness and adaptability to digital health technology innovations, along with strong digital competence and device use habits. The presence of 57-year-old respondents confirms that older age groups can access teledentistry technology, provided the system is designed with a simple, easy-to-use interface, underscoring the importance of user-friendly design principles in digital health systems²¹

The gender distribution shows a dominance of female respondents at 80%, which can be explained by women's tendency to pay more attention to their own and their family's health, as well as their greater activity in seeking information and using digital health services compared to men.

The results of the usability evaluation using the System Usability Scale (SUS) showed an average score of 73.45, which is above the global SUS average of 68 and falls into the "Acceptable" category. This score indicates that the RamahCLP website has a good level of usability, is efficient, and provides a positive user experience.²² The score also represents above-average usability, where users can complete tasks effectively and comfortably.²³ The acceptable category is supported by key features such as teleconsultation, service schedules, and patient education, which have simple navigation, responsive displays for various screen sizes, and easy-to-understand interaction flows.

Most respondents chose the Acceptable category, indicating that the system is easy to learn, not complex, and the main functions work well, so users are willing to use it again. Websites in this category generally have easily accessible information, a responsive However, 9 respondents rated the website as Not Acceptable, indicating problems with effectiveness, efficiency, or user satisfaction. This may be influenced by technical factors such as internet connectivity, device limitations, or differences in users' digital capabilities, rather than solely by major system design flaws.

The grade scale distribution shows that the Grade A category is the most dominant, indicating an excellent level of usability with high effectiveness, efficiency, and user satisfaction.^{25 26} Websites with a Grade A rating are not only usable, but also provide a positive experience that encourages continued use.²⁷ Conversely, a small number of respondents gave a Grade F rating, indicating a usability gap between user expectations and system performance, which is generally influenced by technical constraints or access limitations, thus requiring further evaluation and refinement.^{28 29}

In the Adjective Rating category, the majority of respondents rated the RamahCLP website as Best Imaginable, which represents the highest level of satisfaction on the SUS scale. This shows that the system not only works well but also provides an enjoyable user experience, supported by an attractive visual display, system responsiveness, and interface consistency. Conversely, the Poor category describes low satisfaction, as indicated by a SUS score below 50, which is generally caused by a mismatch between user expectations and the system's actual functionality.

CONCLUSION

The results of the usability evaluation using the System Usability Scale (SUS) show that the RamahCLP web-based application received an average score of 73.45, indicating above-average usability and placing it in the acceptable category. The majority of respondents rated the application as acceptable and suitable for use, as reflected in the dominance of the Acceptable category in the acceptability range. In the grade scale, most respondents placed the application in Grade A, with a score range of 80–100, indicating that the system has achieved an optimal level of usability and provides high user satisfaction. In addition, the adjective rating results reinforce these findings, with the majority of respondents rating the RamahCLP application in the Best Imaginable category, indicating that the website has a simple yet attractive visual appearance and a navigation and guidance system that is easy to understand for various age groups. Overall, these results show that the RamahCLP web-based application has good usability and has the potential to support teledentistry services effectively.

EXPRESSION OF GRATITUDE

Thanks to Dr. Yayun Siti Rochmah, Sp.BM as Dean of the Faculty of Dentistry, Sultan Agung Islamic University, Dr. Moh. Husnun Niam, A.Md.Kom, MKM as the first supervisor, and Dr. Nira Ardlina, MDSc as the examiner, who have guided and directed the author from the beginning to the completion of this scientific paper.

Thanks to my parents, who have patiently educated and always motivated the author, offering prayers and support in both material and non-material forms.

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