

User Friendly Dental Clinic Website Design and Development: Improving Dental Health Services and Patient Satisfaction

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Abstract: Promotion in dental health services in Indonesia must adhere to the dental ethics code. One form of promotion is introducing the various services and facilities of a dental clinic. A website can serve as a medium for introducing a dental clinic. This study aims to design and develop a dental clinic website to improve dental health services and patient satisfaction. The research method used is research and development with an action research approach. The study employed the waterfall System Development Life Cycle (SDLC) method. The website development process was based on a needs analysis, which included interviews with the dental clinic owner, website creation, testing, and evaluation using the System Usability Scale (SUS) questionnaire containing 10 Likert-scale questions. The study results showed that the average evaluation score using the SUS questionnaire was 84.3. Consequently, the adjective ratings fell into the "Excellent" category, the acceptability ranges fell into the "Acceptable" category, and the letter grade fell into category A. The conclusion drawn was that developing a dental clinic website prototype provided beneficial results for both the clinic owner and patients, particularly in obtaining information about dental health services.

Keywords: *Dental clinic, Dental health service, Patient satisfaction. Website,*

1. Introduction

Nowadays, with the advancement of information and communication technology, the presence of the internet has made it easier for individuals to interact with others quickly, without having to meet face-to-face. Introduction communication can be conducted through digital media, commonly known as digital marketing, which is an effort to inform and promote a service using the digitalization flow that can reach consumers and customers in a timely, personal, and relevant manner [1, 2]. Digital media can be applied in all fields, one of which is dental clinics. A dental clinic is a healthcare service facility. It is a place where dentists who have registration certificates practice and have the authority to perform medical practices according to their education and competencies. Besides providing services to the public, clinics also have marketing aspects within them. The larger the clinic, the more complex the processes within it. And the more problems there are, the more they require proper handling [3, 4].

In an effort to meet the community's needs for quality healthcare services, clinics need to provide good services. To enhance services, strategies are required to create and deliver added value to the community, so that people are aware of the clinic's good image and facilities through marketing. Public health service publication is regulated in the Indonesian Minister of Health Regulation Number 1787 of 2010, which states that public health service publication is a communication activity through information dissemination to introduce health development programs or health services in various fields [5, 6].

The introduction of health services can be done by introducing the clinic. Introduction is one of

the efforts of a clinic to build the community's perception of the clinic. Marketing makes the community more aware of the services provided by the clinic [7, 8]. Introduction of a clinic through soft selling, in accordance with dental ethics, can be done with a good introduction strategy [9]. Indonesia, dentists are prohibited from promoting in any form such as self-praise, advertising any tools and materials, making promises directly or indirectly, and others, with the aim of attracting patients. Dentists must maintain their professionalism in informing their professional competencies to fellow health professionals and the public, ensuring that the information is honest and objective so that the provided data is accurate and accountable, and must avoid any intention and effort to boast through mass communication means such as meetings, print media, electronic media, social media, and other advanced communication technology media [2, 10].

The introduction of a dental clinic aims to convey information to the public that health service facilities, such as dental clinics, continue to maintain the quality of their services in the post-COVID-19 era. Therefore, this study aims to design and develop a dental clinic website to improve dental health services and patient satisfaction [11, 12].

2. Research Methods

The type of research used was Research and Development (R&D) with an Action Research design. The study was conducted at Aesthetic Dental Clinic in Semarang, Indonesia, from January to April 2024. This research received ethical approval from the Health Research Ethics Committee of the Faculty of Dental Medicine, Sultan Agung Islamic University, Semarang, Indonesia, with the number: 497/B.1-KEPK/SA-FKG/XI/2023. The first stage of the research was the preparation for the development of the dental clinic website using the waterfall SDLC (System Development Life Cycle) method, which involved analyzing the needs of dental clinic users through interviews with all dentists, nurses, registration staff, and patients. Subsequently, the website design was created based on the initial needs analysis. The dental clinic website design included a homepage, access path page, dentist names and schedules page, patient services page, and a page detailing clinic facilities and technical specifications. The designed website was then tested using the black box testing method, where users logged in and checked for any errors during the website's operation. The website evaluation was conducted by distributing the SUS (System Usability Scale) questionnaire to dental clinic patients, which contained 10 questions with a 5-point Likert scale. The likert scale included categories of strongly disagree, disagree, neutral, agree, and strongly agree [13].

The data from the questionnaire was measured using SUS evaluation indicators. The formula to calculate the average SUS score is the total SUS score divided by the number of respondents. The System Usability Scale (SUS) score is calculated using the following formula: $((Q1-1) + (5-Q2) + (Q3-1) + (5-Q4) + (Q5-1) + (5-Q6) + (Q7-1) + (5-Q8) + (Q9-1) + (5-Q10)) \times 2,5$. Based on the SUS score evaluation, the assessment includes three key categories. The Acceptability Ranges classify scores into "Not Acceptable" (0-50), "Marginal" (50-70), and "Acceptable" (70-100). The Grade Scale assigns grades as follows: Grade A (80.3-100), Grade B (68-80.3), Grade C (68), Grade D (51-68), and Grade F (0-51). The Adjective Ratings range from "Best Imaginable" (85-100) to "Worst Imaginable" (0-25), with intermediate categories including "Excellent" (74-85), "Good" (53-74), "Ok" (39-53), and "Poor" (25-39). The sample size in this study was 30 respondents, who were patients of Aesthetic Dental Center. Qualitative analysis results were presented with detailed explanations, and quantitative analysis results from the questionnaire responses were presented as descriptive statistical data [14].

3. Results

The creation of a user-friendly dental clinic website to enhance dental health services and patient satisfaction has been successfully completed. The design and development of the Aesthetic Dental Clinic website were achieved through interviews with the clinic owner, all dentists, nurses, registration staff, and patients. The conclusions from these interviews indicated that the content needs

of the Aesthetic Dental Clinic website included the following: the homepage layout, clinic description page, dentist schedule page, clinic facilities page, types of treatments offered by the clinic page, and the communication page with the clinic admin. The initial design of the dental clinic website was created using image design applications. The design was made as engaging as possible to prevent reader boredom, tailored to the needs, and kept simple while containing accurate and accountable information. Below are the complete results of the Aesthetic Dental Clinic website development, which includes various information about the Aesthetic Dental Clinic.

3.1. Homepage

The homepage of the Aesthetic Dental Clinic website features several essential sections. The Home page offers a concise overview of the website, giving visitors a brief introduction. The About page provides comprehensive information about the clinic, including its history, values, and mission. The Contact Service section presents the clinic's contact details, enabling patients to make inquiries and reservations easily. The Service page lists the clinic's offerings and provides detailed explanations of the treatments available. Lastly, the Blog page includes educational articles on dental and oral health, designed to inform and engage visitors.

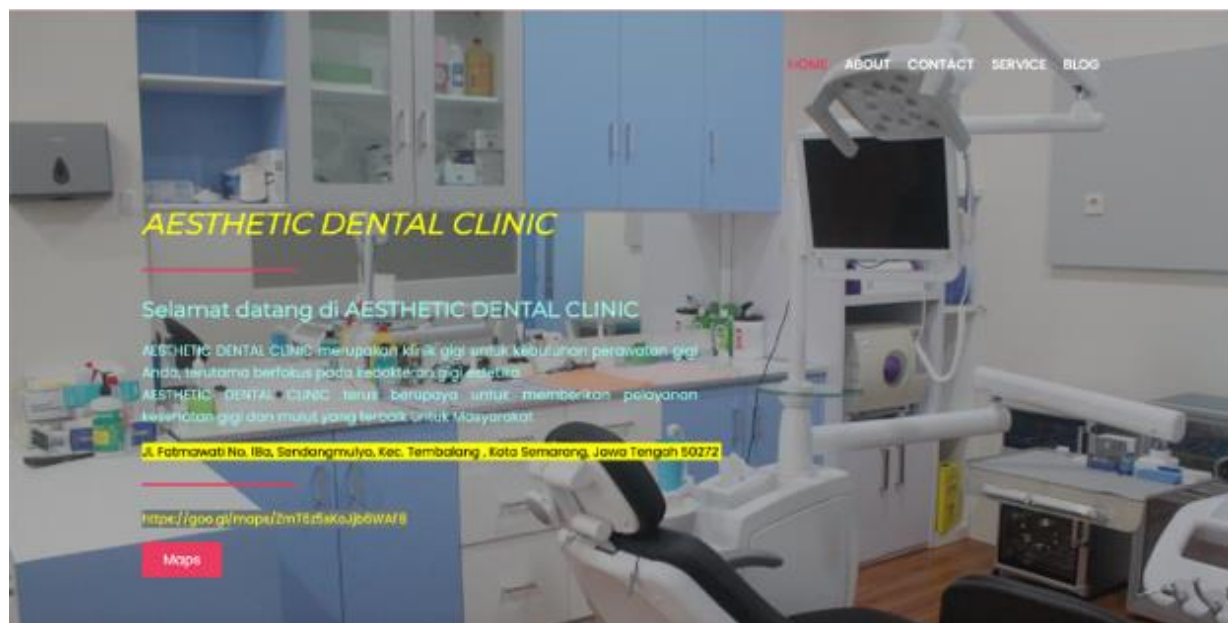


Figure 1.
Homepage.

3.2. Dental Clinic Description Page

The Dental clinic description page provides general information about Aesthetic Dental Clinic. This page highlights the clinic's advantages, vision, and mission without disparaging other professionals or self-praising.

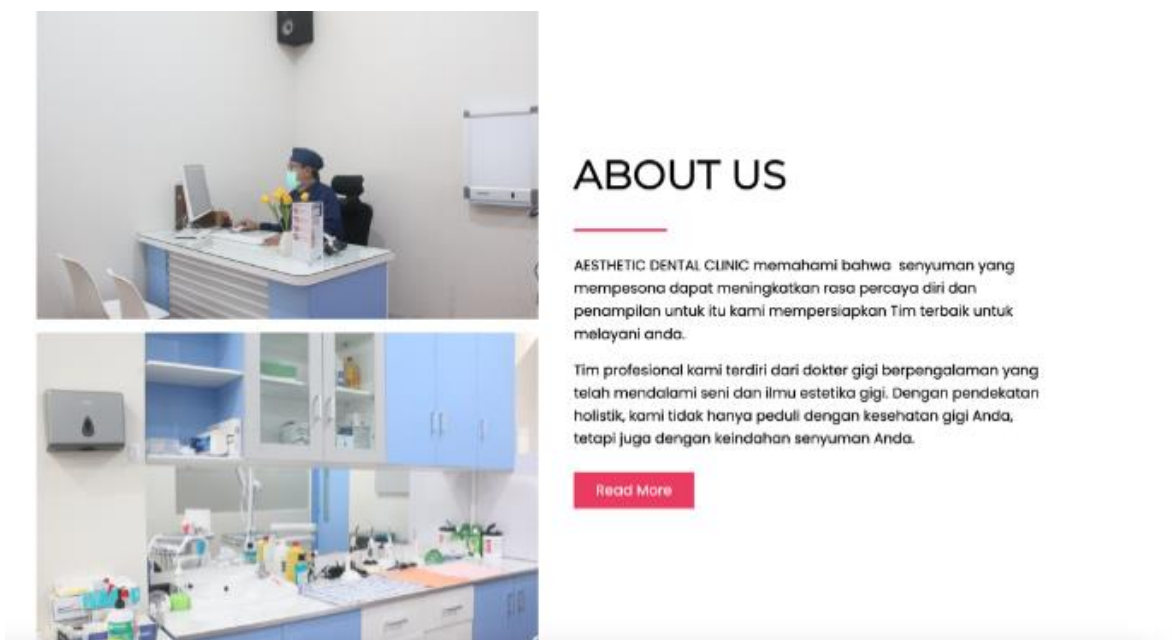


Figure 2.
Dental clinic description page.

3.3. Dentist Schedule Page

The dentist schedule page displays the practice schedule, allowing the public to know the availability of dentists and adjust their schedules according to their needs. This schedule page aids in the clinic's patient service operations and can be modified as needed by clinic management.

JADWAL PRAKTEK

AESTHETIC DENTAL CLINIC Memiliki jadwal Praktek Dokter Gigi dari Hari Senin sampai dengan hari Sabtu. Jadwal Praktek diisi oleh tim Dokter gigi AESTHETIC DENTAL CLINIC

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No	Jam praktek	senin	selasa	rabu	kamis	Jum'at	sabtu
1	09.00 – 13.00	Drg. Dhita	Drg. Dhita	Drg. Dhita	Drg. Rahmat, Sp.Prof	Drg. Arum	Drg. Muchtar, M.Biomed (Ortho)
2	13.00 – 17.00	Drg. Rahmat, Sp.Prof	Drg. Rahmat, Sp.Prof	Drg. Rahmat, Sp.Prof	Drg. Rahmat, Sp.Prof	Drg. Rahmat, Sp.Prof	
3	18.00 – 21.00	Drg. Rahmat, Sp.Prof	Drg. Rahmat, Sp.Prof	Drg. Rahmat, Sp.Prof	Drg. Muchtar, M.Biomed (Ortho)	Drg. Rajiv	Drg. Christina, Sp. KG

Figure 3.
Dentist schedule page.

3.4. Dental Clinic Facilities Page

This page showcases the facilities available at Aesthetic Dental Clinic, accompanied by attractive images. The clinic facilities page provides patients and the general public with an overview of the room setup, equipment, and cleanliness of the dental clinic. This helps in promoting the clinic and assists prospective patients in choosing dental care options

AESTHETIC DENTAL CLINIC memiliki fasilitas yang cukup lengkap meliputi : Ruang tunggu, Ruang laktasi, Mushola, kamar mandi, Rekam medis, Ruang tindakan, Dispenser, AC, Kulkas.

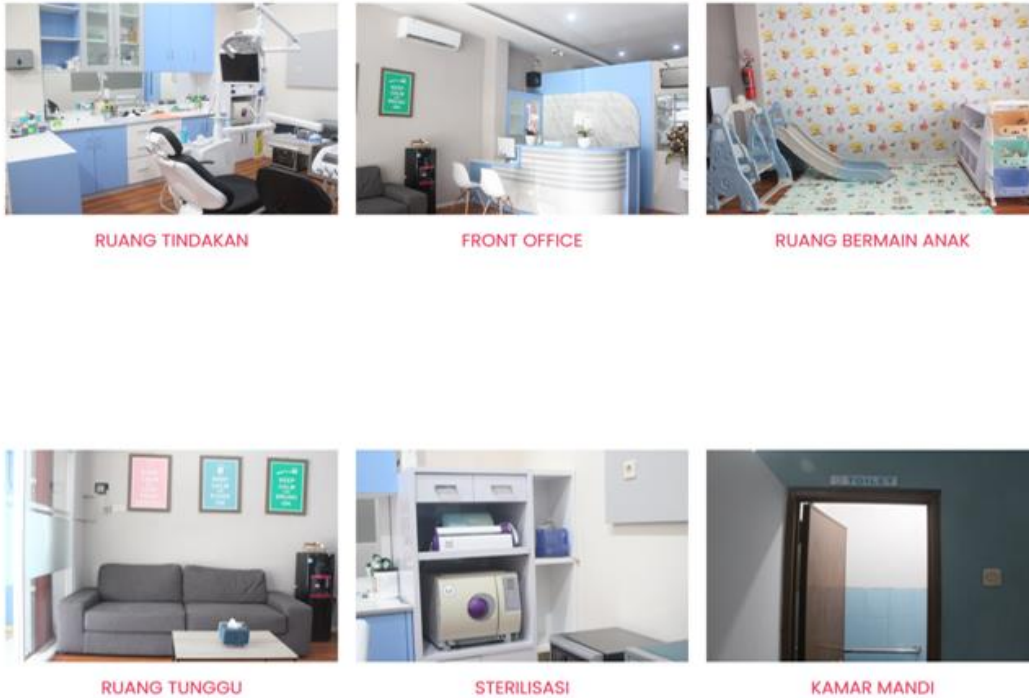


Figure 4.
Dental clinic facilities page.

3.5. Types of Treatments Page

This page outlines the treatments provided by the dental clinic. Presenting the treatments helps patients easily find information about the services offered. The types of treatments can be adjusted according to the clinic's management needs. If new treatments are introduced, clinic management can add detailed information to this page.

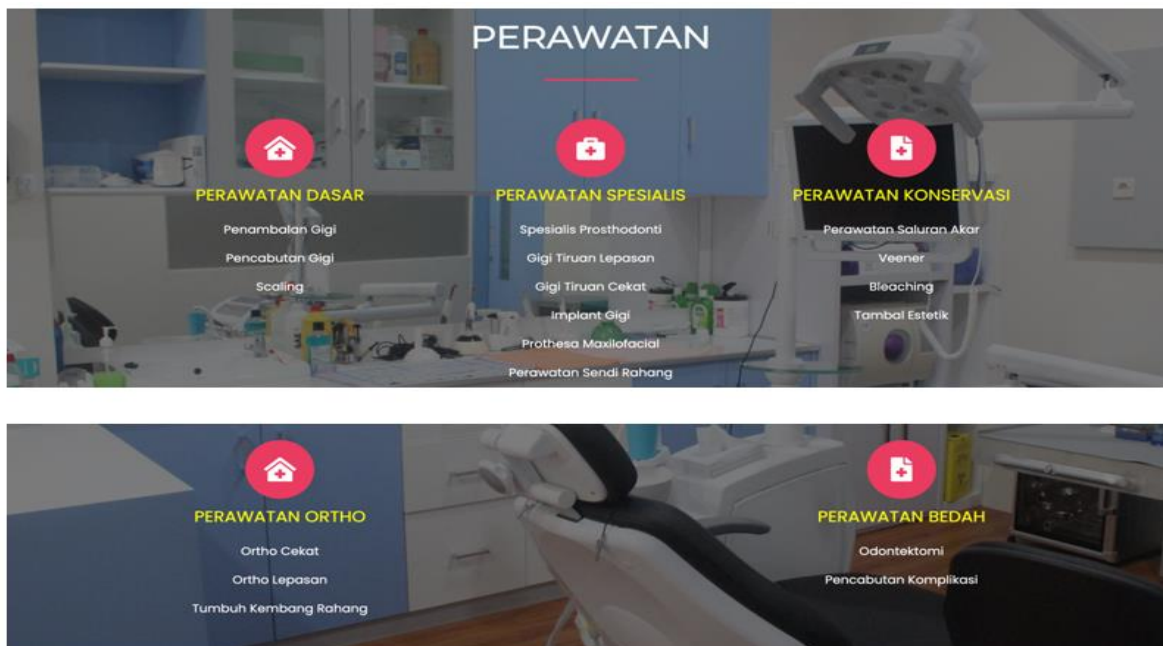


Figure 5.
Types of treatments page.

3.6. Customer Service Page

This page contains contact information for the clinic's admin as a means of communication between patients and the clinic. It facilitates reservations and allows patients to ask further questions to the admin.



Figure 6.
Customer service page.

3.7. Questionnaire Evaluation

After the website was completed, the prototype was tested and evaluated using the SUS questionnaire to measure the "usability" of the Aesthetic Dental Clinic website. The results of the questionnaire evaluation are displayed in the following table

Table 1.
Questionnaire results.

Question	SD	D	N	A	SA
I frequently access clinic information through the website	0	0	2	12	16
I find this website too complicated/Complex	3	19	8	0	0
I find this website easy to use	0	0	7	15	8
I need assistance from someone who is skilled or knowledgeable about how to use this website	4	7	14	5	0
I believe the features/Menu on this website are interrelated and help in reading information	0	0	6	9	15
I think the features/Menu on this website are inconsistent	10	12	7	1	0
I believe a layperson would quickly understand and easily use this website to access information	0	0	3	6	21
I find this website too difficult to use	14	8	6	2	
I feel comfortable reading information on this website	1	0	4	9	16
I need to learn many things before using this website	10	13	6	1	0

SUS questionnaire results

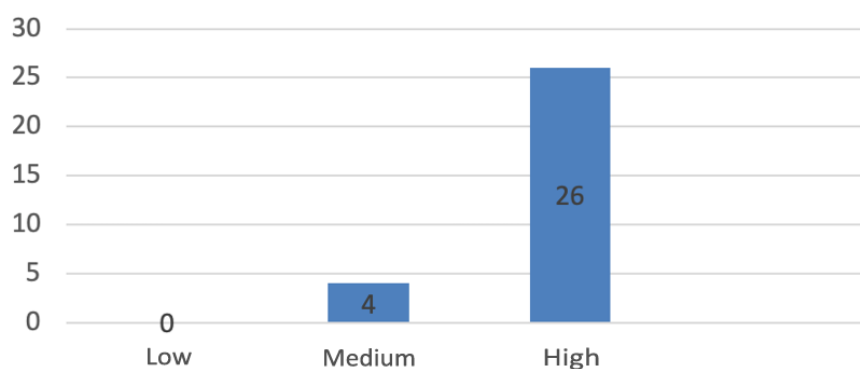


Figure 7.
SUS questionnaire results diagram.

Figure 7 illustrated the results of the SUS questionnaire test conducted with patients at Aesthetic Dental Center. The questionnaire results showed that 4 patients rated the website's effectiveness as medium, while 26 patients rated it as high. The SUS method evaluation of the Aesthetic Dental Center website yielded a SUS score of 84.3. When converted to percentile ranks, this score was at the 84.3% level. In terms of letter grades, it fell into category A, and according to adjective ratings, it was categorized as "Excellent." For acceptability ranges, the website was classified as "Acceptable".

4. Discussion

In general, the promotion of a healthcare facility should be informative, providing knowledge relevant to the various services and programs offered by the facility that are effective for patients or the community. Promotion should also be educational, expanding the public's awareness of the different functions and services of the healthcare facility. It should be prescriptive, offering guidance to the general public and patients specifically about the role of healthcare seekers in the diagnosis and therapy process. The final requirement is preparative, which involves assisting patients or their families in making concrete decisions based on the Indonesian Dental Medical Code of Ethics [15, 16].

The development of technology is widely used as a means of promotion and information, especially through websites, which have become a media offering various conveniences in presenting information. Speed and convenience are positive aspects of the internet. Websites are more accessible to people in various regions simply by using the internet. For instance, in the context of introducing a healthcare facility, a website can serve as an effective and efficient means of introducing and conveying information to the public. Creating a website for marketing a product is essential for the healthcare sector. Through web-based introductions, it becomes easier to be recognized by the public. Introducing a healthcare clinic via the web is also necessary, including for Aesthetic Dental Clinics involved in dental services [2, 17].

The design of the Aesthetic Dental Clinic introduction website, as shown in Figures 1 through 6, has been aligned with Indonesian Minister of Health Regulation Number 178 of 2010, which states that the publication of healthcare services must be informative, providing accountable explanations related to the healthcare facilities and the services provided by the dental clinic. Regulations concerning the publication of healthcare services should also be communicative, which is reflected in the website design that includes a contact person for reaching out to the clinic. The publication on the website design can also be held accountable, ensuring that the available facilities are accurately represented and not merely false claims [10, 18].

The current era of technological advancement and digitization requires clinics or healthcare facilities to utilize social media platforms for introduction and promotion in order to create a global brand image related to the effectiveness of social media usage, which can influence the clinic's reputation. Constant monitoring and oversight, along with a commitment to quality improvement, in addition to preventive, promotional, and curative efforts, allow clinics to effectively use digital marketing [19, 20].

The design of this clinic website has also been adjusted in accordance with Indonesian laws and regulations, ensuring it does not disparage or contain elements that defame other healthcare professionals. The website also complies with the Indonesian Dental Medical Code of Ethics (KODEKGI) Article 3 related to promotion, as it avoids self-praise, advertising any tools or materials, and making promises, whether directly or indirectly, to attract patients to the dental clinic. The explanations about the clinic and dental professionals on the website adhere to KODEKGI guidelines by ensuring that information related to professional competence is truthful and objective, thus guaranteeing the accuracy and accountability of the data provided. Dentists in Indonesia who are found to have violated ethical standards in accordance with KODEKGI in their dental practice will face sanctions. Therefore, the creation of introductions or promotions related to healthcare services must be based on professional ethics and in compliance with existing regulations to avoid sanctions and adhere to applicable rules [12, 18].

SUS (System Usability Scale) is a global assessment of usability aspects (effectiveness, efficiency, and satisfaction) perceived subjectively by users. The SUS score can indicate the level of user acceptance. A SUS score must be higher than 70 to be classified as Acceptable. In this study, the average evaluation score for the Aesthetic Dental Clinic introduction website was 84.3. Thus, it can be said that the website falls into the Acceptable category, as it demonstrates usability. According to respondents, the appearance and design of the clinic introduction website are considered quite good, up-to-date, and informative [21].

The results from Table 1 for the first question show that the majority of respondents provided positive feedback regarding the comfort of using the website. Comfort in finding information online affects the ease with which respondents obtain information. This ease leads respondents to feel comfortable using a website. Questions 2, 3, 4, 8, 9, and 10 (Table 1) related to the ease of use received positive responses from most respondents, indicating that the website is easy to use. For answer point 9, there was one respondent who felt uncomfortable using the website on a smartphone. This discomfort was due to the smaller screen size on smartphones compared to computers, which made the user

experience less comfortable. An indicator that a website is easy to use is that it should have a straightforward design with minimal options to avoid confusing the user [22].

The responses regarding the integration of the website received positive feedback because the integration between the website and the contact person greatly facilitates patients in reaching out to the dental clinic. The responses concerning the speed of website usage were also positive (Table 1), as the website is designed to provide quicker access to information about an object to internet visitors. A website is a media containing pages of information that can be accessed via the internet and enjoyed globally. A limitation of this study was that the website experienced errors due to using a hosting system. The drawback of the hosting system is its limited usage, so it is recommended that future research use a website that can be accessed more broadly [23, 24].

5. Conclusion

The implementation of a website as a medium for introducing a dental clinic has achieved its intended purpose and has proven to facilitate patients in accessing information related to the clinic. The evaluation of the website as a medium for introducing the dental clinic, using the SUS method, was conducted with the public, specifically patients visiting the Aesthetic Dental Clinic. The results showed that the adjective ratings fell into the "Excellent" category, the acceptability ranges were in the "Acceptable" category, and the letter grade fell into the A category.

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Institutional Review Board Statement:

This research received ethical approval from the Health Research Ethics Committee of the Faculty of Dental Medicine, Universitas Islam Sultan Agung, Semarang, Indonesia, with the number: 497/B.1-KEPK/SA-FKG/XI/2023

Transparency:

The authors confirm that the manuscript is an honest, accurate and transparent account of the study that no vital features of the study have been omitted and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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