

Service Quality and Clients Satisfaction of Digital Dental Diagnostics in Highly Urbanized Cities in Western Visayas, Philippines



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ABSTRACT. This study assessed the relationship between service quality and client satisfaction in digital dental diagnostics across Bacolod and Iloilo City. Utilizing a descriptive-correlational design with 270 participants (135 dentists and 135 clients), the research evaluated reliability, assurance, tangibles, empathy, and responsiveness via a researcher-made questionnaire. Findings revealed that both groups perceived service quality as "Very High," particularly in empathy and responsiveness, with significant variations observed based on age and sex. A strong positive correlation confirmed that superior service quality significantly enhances client satisfaction. Consequently, the study concludes that high service quality consistently drives client satisfaction, emphasizing the synergy between advanced technology and empathetic, patient-centered care. Future research is recommended to expand the geographic scope to further validate these insights.

1.0. Introduction

The service quality of digital dental diagnostics within dental facilities plays a crucial role in ensuring accurate diagnostics and effective treatment outcomes. Advancements in digital radiography and intraoral cameras have revolutionized dental care, offering significant advantages over traditional methods, including improved image quality for precise diagnoses and reduced radiation exposure for clients (Kanani et al., 2024). However, achieving optimal service quality requires a multifaceted approach. This includes implementing robust quality assurance (QA) programs to verify equipment performance and optimize exposure settings, as recommended by professional organizations such as the American Association of Physicists in Medicine (2017). Furthermore, training dental personnel on operating and interpreting digital diagnostics is essential for ensuring accurate diagnoses and client safety (Saadeh & Tarawneh, 2015).

Client satisfaction serves as a pivotal metric in evaluating the efficacy of these digital diagnostics. Positive client experiences, characterized by prompt

service delivery, clear communication, and personalized care, contribute significantly to overall satisfaction levels (Ghanem et al., 2019). Studies indicate that clients view digital diagnostics favorably when they perceive the technology as enhancing efficiency and accuracy in treatment planning. Additionally, the accessibility and convenience afforded by digital services, such as shorter wait times and reduced appointment durations, directly influence client satisfaction. Consequently, understanding client perceptions and preferences is essential for dental facilities to tailor their services to meet expectations and improve overall satisfaction.

In the Philippines, the adoption of digital dental diagnostics faces several hurdles. Challenges such as budgetary constraints and the progressive roll-out of relevant laws may impede full implementation. Additionally, highlight existing disparities in access to healthcare resources, particularly in rural areas, which exacerbate the difficulties associated with adopting these technologies. Moreover, infrastructure limitations, including access to reliable internet connectivity and power supply, may hinder the effective utilization of digital equipment in remote locations. With the expected rise in demand for healthcare services, both public and private sectors must address these resource limitations to

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harness the full potential of digital diagnostics and improve access across the country.

Understanding the factors influencing the adoption of digital dental technologies is crucial for successful implementation. In Western Visayas, local dental facilities are experiencing a significant uptick in the adoption of digital imaging technologies. Recent market reports indicate a growing demand for digital equipment and software, signaling a shift towards more modern and advanced oral healthcare practices. This increased embrace of technology is likely driven by the need for more precise diagnostics, better client outcomes, and competitiveness in the dental care landscape. However, healthcare professionals report that infrastructure barriers, personal psychological issues, and concerns about increasing workload remain challenges, whereas training programs and positive perceptions of technology effectiveness act as facilitators.

Despite the rising interest in digital dental diagnostics and their potential to revolutionize oral healthcare, there is a significant gap in the literature regarding their adoption in the Philippine context. Existing international studies, such as Lixandru et al. (2024), reveal diverse perceptions of service quality among clients. Similarly, it highlighted the intricate relationship between service quality and client experience and the impact of global competition on healthcare services, which heightens client expectations and emphasizes the need for superior service delivery. These findings align with the increasing focus on client-centered care and the pursuit of enhanced service quality to differentiate healthcare facilities in a competitive industry.

This study aimed to determine the service quality of digital dental diagnostics and the factors affecting the five dimensions of service quality. It further assessed the significant association between service quality and client satisfaction in the utilization of digital dental diagnostics. Ultimately, the output of this study served as the basis for the development of a digital dental diagnostics strategic plan.

2.0. Framework of the Study

This study assumes that service quality directly influences client satisfaction, a premise anchored in the SERVQUAL model proposed by Parasuraman et al. (1985). Serving as the theoretical framework, this model identifies five specific dimensions of service quality: tangibility, reliability, responsiveness, assurance, and empathy. These dimensions are applied within the context of digital dental diagnostics to evaluate both the prevailing level of service quality and the corresponding level of client satisfaction.

Functioning as the study's structural lens, the SERVQUAL model systematically examines how each

service dimension impacts client satisfaction. This framework provides a comprehensive method to evaluate the quality of service delivery specifically within digital dental diagnostic settings. By isolating these factors, the framework helps identify specific areas where service delivery can be enhanced to maximize client value.

The relevance of this theoretical support lies in the SERVQUAL model's proven ability to assess service quality across diverse industries. By adapting this model to digital dental diagnostics, the study aims to measure the extent to which the five dimensions are met, thereby generating insights to improve the overall client experience. Ultimately, aligning with these established theoretical foundations enhances the validity and applicability of the findings regarding service quality assessment in this specialized field.

3.0. Methodology

Research Design. This study utilized a descriptive-correlational research design to describe current conditions and investigate the relationship between service quality and client satisfaction in digital dental diagnostics without manipulating the variables. A descriptive-correlational design is specifically used to examine relationships between or among two or more variables in a single group, which can occur at several levels (Devi et al., 2022). By employing this approach, the researcher was able to determine the level of service quality and satisfaction while analyzing the connections between them.

Respondents. The respondents consisted of dentists and clients from digital dental diagnostic clinics in highly urbanized cities in Western Visayas. To select these participants, the researcher used quota sampling, a non-probability method where participants are chosen based on specific characteristics to ensure they represent certain attributes in proportion to their prevalence in the population. This sampling distribution ensured that both clinic owners and clients were adequately represented in the study.

Table 1

Distribution of Respondents

Respondents	N	n	%
Dentists			
A	190	57	21.1
B	260	78	28.9
Sub Total	450	135	50.0
Clients			
A	190	57	21.1
B	260	78	28.9
Sub Total	450	135	50
Grand Total	900	270	100

Research Instrument. Data were gathered using a researcher-made questionnaire designed with a 4-point Likert Scale to measure respondent profiles, service quality, and client satisfaction. To ensure validity, the instrument underwent content validation using Lawshe's Content Validity Ratio (CVR), assessed by a panel of experts including dental clinic owners, digital dental specialists, and business management. The resulting Content Validation Index was high—0.83 for dentists' service quality, 0.89 for clients' service quality, and 0.95 for client satisfaction—indicating the questionnaire was valid. Furthermore, the instrument was pilot-tested on 30 dentists and patients outside Western Visayas; analysis through Cronbach's alpha yielded reliability coefficients of .778, .723, and .710, respectively, confirming the instrument was reliable.

Interpretative Scale for the Service Quality of Digital Dental Diagnostics

Scale	Range	Description	Interpretation
4	3.26 – 4.00	Very High	The digital dental diagnostics exceeds the standard requirements.
3	2.51 – 3.25	High	The digital dental diagnostics meets the minimum standard requirements.
2	1.76 – 2.50	Low	The digital dental diagnostics could be improved.
1	1.75 – 1.00	Very Low	The digital dental diagnostics did not meet the standard requirement.

Interpretative Scale for the Client Satisfaction of Digital Dental Diagnostics

Scale	Range	Description	Interpretation
4	3.26 – 4.00	Very High	The client satisfaction of the DDD is above the standard requirements.
3	2.51 – 3.25	High	The client's satisfaction of the DDD meets the standard requirements.
2	1.76 – 2.50	Low	The client's satisfaction of service of the DDD need improvement.
1	1.75 – 1.00	Very Low	The client's satisfaction the DDD need significant improvement.

Data Collection Procedure. The data collection process began with securing formal approval through letters explaining the study's parameters to the respondents. Once approved, enumerators were designated to administer the survey, providing orientation to ensure voluntary participation. Respondents were given thirty minutes to one hour to complete the questionnaires, after which they received a token of appreciation. Following the survey, the researcher personally retrieved the instruments for tabulation and secure storage. To maintain ethical standards and privacy, all personal identifiers were removed, and physical documents were shredded after the data were statistically processed.

Data Analysis Procedure. Descriptive analysis, including mean, standard deviation, frequency, and percentage, was employed to summarize the data and provide insights into the respondents' ratings of service

quality and satisfaction. For inferential statistics, the Kolmogorov-Smirnov test was first used to determine normality; results indicated that all variables significantly deviated from a normal distribution ($p < 0.001$). Consequently, non-parametric statistical tests were deemed appropriate. The Mann-Whitney U test, Kruskal-Wallis test, and Spearman's rank-order correlation were utilized to determine statistically significant differences and relationships between the variables.

Ethical considerations. Adhering to the Philippine Health Research Ethics Board (PHREB) guidelines of autonomy, beneficence, and justice, this study ensured ethical rigor by obtaining informed consent, guaranteeing voluntary participation, and strictly safeguarding privacy in compliance with Republic Act 10173 (Data Privacy Act of 2012). The researchers minimized potential risks, such as time consumption and mental effort, by prioritizing participant convenience and comfort, while maximizing social value by generating insights to improve digital dental diagnostic practices in Western Visayas for the benefit of both business owners and patients. Justice was upheld through unbiased quota sampling and fair treatment of all 348 respondents, regardless of background, while the researchers maintained full transparency regarding the methodology, limitations, and absence of conflict of interest. Ultimately, the study leveraged community involvement from diverse stakeholders to ensure the scientific integrity and relevance of the findings, which were published with adherence to principles of truthfulness and valid data protection.

4.0. Results and Discussion

Profile of the Clients

Table 2 details the demographic profile of the clients, showing that the majority were from Iloilo (57.8%, $n=78$) rather than Bacolod (42.2%, $n=57$). The group was predominantly female (56.3%, $n=76$) compared to male (43.7%, $n=59$), with an average age of 32.8 years; younger clients (60.7%, $n=82$) outnumbered older ones (39.3%, $n=53$). Regarding education, more than half held a bachelor's degree (52.6%, $n=71$), followed by non-degree holders (41.5%, $n=56$) and those with post-graduate degrees (5.9%, $n=8$). In terms of service utilization, clients most frequently used the

Table 2*Profile of the Clients*

Variable	f	%
Sex		
Male	59	43.7
Female	76	56.3
Age		
Younger (Below 22)	82	60.7
Older (22 and above)	53	39.3
Educational Qualification		
Bachelor's Degree Holder	71	52.6
Non-degree holder	56	41.5
Post-Graduate Degree Holder	8	5.9
Frequency of Utilization		
Regularly	40	29.6
Occasionally	51	37.8
Rarely	44	32.6
Total	135	100.0

service occasionally (37.8%, n=51), followed by rarely (32.6%, n=44) and regularly (29.6%, n=40).

These demographic characteristics significantly shape the adoption of digital dental diagnostics. The higher participation of women aligns with literature suggesting they are more proactive in health-seeking behaviors and adopt health technologies more frequently for preventive care (Goswami & Dutta, 2016). Similarly, the prevalence of younger clients and degree holders mirrors findings that these groups are more comfortable with technology and more inclined to adopt digital health solutions (Berkowsky et al., 2017). While tech-savvy populations may easily engage with these platforms, the data suggests that clinics must ensure their systems are intuitive for older or less educated users and consider gender-targeted strategies to encourage broader adoption and satisfaction.

Profile of the Dentists

Table 3 details the demographic profile of the dentists, revealing patterns that influence their engagement with digital technologies. Geographically, the majority of respondents were from Iloilo (57.8%, n=78) rather than Bacolod (42.2%, n=57). This distribution aligns with observations by Taira et al. (2021), who noted that urban areas often possess the superior infrastructure and training access necessary for integrating digital diagnostics. The workforce is predominantly female (62.2%, n=84) and younger (63.7%, n=86), with a mean age of 37.2 years, indicating a demographic that is likely adaptable and open to digital innovation. Regarding education, the majority hold a standard Doctor of Dental Medicine degree (85.2%, n=115), while 14.8% (n=20) have completed post-graduate studies, potentially equipping them with specialized skills for these tools.

In terms of utilization, a significant majority of dentists reported using the service regularly (74.8%, n=101), reflecting the documented benefits of digital

diagnostics in improving accuracy and treatment planning (Radwan et al., 2023). However, 25.2% (n=34) reported only occasional usage. Radwan et al. (2023) highlight that while the value of these tools is recognized, barriers such as high costs, training demands, and equipment accessibility can hinder full-scale adoption. To bridge this gap and foster consistent integration, it is essential to address these practical limitations through financial support, expanded training opportunities, and improved infrastructure (Taira et al., 2021; Radwan et al., 2023).

Level of Service Quality as Assessed by Clients

Table 4 indicates that clients evaluate the overall service quality as "Very High" (M=3.76, SD=0.27). This positive assessment is consistent across demographics, though nuances exist. Female respondents (M=3.80) rated the service slightly higher than males (M=3.70), likely due to a greater appreciation for client-oriented approaches involving communication and empathy. Age also plays a significant role; older clients (M=3.85) reported higher satisfaction than younger ones (M=3.70), reflecting a value for the non-invasive and dependable nature of digital diagnostics. Educational background influenced ratings as well, with post-graduate degree holders providing the highest scores

Table 3*Demographic Profile of the Dentists*

Variable	f	%
Location		
Bacolod	57	42.2
Iloilo	78	57.8
Sex		
Male	51	37.8
Female	84	62.2
Age		
Younger (Below 30)	86	63.7
Older (30 and above)	49	36.3
Educational Qualification		
Doctor of Dental Medicine	115	85.2
Post-Graduate Degree Holder	20	14.8
Total	135	100.0

(M=3.86), possibly due to a deeper understanding of the diagnostic process. Interestingly, regarding frequency of use, occasional users reported the highest satisfaction (M=3.80). This suggests that standout positive experiences can leave strong impressions even with limited engagement, whereas frequent users often develop trust through repeated experiences.

In terms of *reliability*, the service was rated "Very High" (M=3.77, SD=0.31) across all demographic categories, indicating a uniform perception of dependability. Post-graduate degree holders (M=3.88) and occasional users (M=3.85) provided particularly high ratings, suggesting that the core processes ensuring accuracy are well-established. This trust is crucial;

Table 4*Level of Service Quality as Assessed by Clients*

Variable	Reliability			Assurance			Tangibility			Empathy			Responsiveness			Service Quality		
	M	SD	Int	M	SD	Int	M	SD	Int	M	SD	Int	M	SD	Int	M	SD	Int
Gender																		
Male	3.71	0.33	VH	3.69	0.35	VH	3.64	0.37	VH	3.67	0.38	VH	3.78	0.32	VH	3.70	0.30	VH
Female	3.82	0.29	VH	3.80	0.32	VH	3.78	0.33	VH	3.81	0.30	VH	3.81	0.31	VH	3.80	0.24	VH
Age																		
Younger	3.74	0.32	VH	3.71	0.35	VH	3.66	0.36	VH	3.67	0.37	VH	3.70	0.34	VH	3.70	0.29	VH
Older	3.82	0.29	VH	3.81	0.31	VH	3.80	0.32	VH	3.88	0.25	VH	3.93	0.20	VH	3.85	0.22	VH
Educational Qualification																		
Bachelor's Degree Holder	3.76	0.32	VH	3.75	0.34	VH	3.70	0.36	VH	3.77	0.32	VH	3.84	0.27	VH	3.77	0.25	VH
Non-degree holder	3.76	0.31	VH	3.74	0.34	VH	3.71	0.35	VH	3.70	0.37	VH	3.72	0.34	VH	3.73	0.29	VH
Post-Graduate Degree Holder	3.88	0.35	VH	3.80	0.35	VH	3.88	0.35	VH	3.88	0.35	VH	3.88	0.35	VH	3.86	0.35	VH
Frequency of Utilization																		
Regularly	3.71	0.33	VH	3.69	0.36	VH	3.69	0.35	VH	3.68	0.35	VH	3.78	0.34	VH	3.71	0.28	VH
Occasionally	3.85	0.25	VH	3.80	0.31	VH	3.77	0.34	VH	3.81	0.32	VH	3.80	0.29	VH	3.80	0.25	VH
Rarely	3.74	0.34	VH	3.75	0.35	VH	3.69	0.37	VH	3.75	0.37	VH	3.80	0.31	VH	3.75	0.30	VH
Whole	3.77	0.31	VH	3.75	0.34	VH	3.72	0.35	VH	3.75	0.35	VH	3.79	0.31	VH	3.76	0.27	VH

Mean Range: 1.00 - 1.75=Very Low (VL), 1.76 - 2.50=Low (Lo), 2.51 - 3.25=High (Hi), 3.26 - 4.00=Very High (VH)

reliable digital tools not only bolster dentist satisfaction but also enhance communication with clients. Conversely, inconsistencies in diagnostic systems can provoke practitioner complaints regarding misdiagnosis, and software malfunctions are a common source of client grievances. Therefore, maintaining unwavering reliability is essential for cementing confidence among both clinicians and clients.

The **assurance** dimension also received "Very High" ratings ($M=3.75$, $SD=0.34$), reflecting client confidence in the providers' expertise, courtesy, and trustworthiness. Older clients ($M=3.81$) and post-graduate degree holders ($M=3.80$) perceived this aspect most positively. While this indicates strong professional conduct, assurance in digital settings also hinges on data security. For instance, clients in South Korea have voiced fears of unauthorized access to records, and practitioners in India have noted concerns about the security of cloud-based platforms. To reinforce trust, clinics must be transparent about data protection, as clear security policies and open dialogue effectively bolster confidence.

Tangibility, referring to the physical and visual aspects of the service such as equipment and interfaces, was consistently rated "Very High" ($M=3.72$, $SD=0.35$). Older clients ($M=3.80$) and post-graduate degree holders ($M=3.88$) were particularly appreciative of these elements. These physical features are vital for user comfort and confidence; when digital platforms are designed to be user-friendly and visually appealing, clients are less inclined to register complaints. Furthermore, intuitive interfaces and robust functionality are known to significantly reduce frustration and dissatisfaction in telehealth settings, highlighting the importance of investing in high-quality hardware and design.

Clients rated the **empathy** dimension as "Very High" ($M=3.75$, $SD=0.35$), indicating they felt cared for and received individualized attention. This sentiment was strongest among older clients ($M=3.88$) and female respondents ($M=3.81$). Fostering genuine connections remains vital when care is delivered through digital tools.

However, standard platforms may fall short of addressing cultural nuances; interfaces must be tailored to local languages and customs to alleviate anxiety. By embracing human-centered design, developers can bridge the empathy gap and ensure that users feel truly seen and supported.

Finally, **responsiveness** was rated "Very High" ($M=3.79$, $SD=0.31$), with older clients providing the highest rating ($M=3.93$) among all subgroups. This demonstrates a strong perception that providers offer prompt and helpful assistance. Rapid response times and clear, ongoing communication are marked enhancers of satisfaction and loyalty. Additionally, transparently communicating any service limitations during peak periods is essential to manage expectations and foster trust. These findings emphasize that efficient, proactive support is essential for nurturing long-term engagement with digital dental services.

Level of Service Quality as Assessed by Dentist

Table 5 presents the level of service quality as evaluated by dentists, revealing a "Very High" rating overall ($M=3.88$, $SD=0.17$). This positive assessment is consistent across demographics, with both male ($M=3.88$, $SD=0.17$) and female ($M=3.88$, $SD=0.17$) respondents providing identical ratings. Regarding age, both younger ($M=3.86$, $SD=0.18$) and older ($M=3.90$, $SD=0.15$) dentists perceived service quality favorably, though older dentists reported slightly higher

satisfaction, likely due to their appreciation for technological advancements over traditional methods. Similarly, educational background did not significantly diminish satisfaction, as holders of Doctor of Dental Medicine degrees ($M=3.89$, $SD=0.17$) and post-graduate degrees ($M=3.83$, $SD=0.15$) both rated quality as very high. Furthermore, familiarity enhances trust; regular users ($M=3.89$, $SD=0.16$) expressed the greatest confidence, yet even occasional users ($M=3.85$, $SD=0.20$) maintained a strong positive impression.

Reliability was rated as "Very High" ($M=3.78$, $SD=0.34$), reflecting strong internal confidence in the system's accuracy and dependability across all groups, including gender, age, and education. Reliable systems are crucial for reducing errors and streamlining clinical workflows (Hoque et al., 2023). This consistency is vital not only for clinician satisfaction but also for preventing client grievances; dependable systems strengthen dentist confidence and client communication (Tran et al., 2025). Conversely, inconsistencies in diagnostic outputs can provoke complaints driven by fear of misdiagnosis (El-Wakeel & Ezzeldin, 2022), and a significant share of client complaints stems from system malfunctions (Rahim et al., 2019). Thus, unwavering reliability is essential for fostering professional trust and minimizing dissatisfaction.

Assurance received consistently positive evaluations ($M=3.90$, $SD=0.24$), indicating that dentists feel secure in the system's expertise and legitimacy. High ratings were uniform across males ($M=3.92$), females ($M=3.89$), and all age and educational groups. Assurance fosters trust by addressing privacy concerns and demonstrating professional credibility (Etemad-

Sajadi et al., 2023). However, in the broader Asian context, assurance is linked to data security; clients in South Korea fear unauthorized record access (Hashem et al., 2019), and Indian practitioners remain wary of cloud-based platforms (Rahim et al., 2019). Consequently, maintaining trust requires clear security policies (Zhang et al., 2023) and compliance with data-protection laws to reassure users (Zhang et al., 2020).

Tangibility, referring to the physical and visual aspects of the service, was also rated as "Very High" ($M=3.84$, $SD=0.28$). Dentists across all demographics, including younger ($M=3.83$) and older ($M=3.86$) respondents, expressed appreciation for the professional appearance of facilities and the clarity of communication materials. This positive perception of the interface and equipment supports a professional image. Research suggests that when digital platforms are user-friendly and visually appealing, clients are less likely to register complaints (Park et al., 2021). Furthermore, intuitive interfaces and robust functionality significantly reduce dissatisfaction (Nguyen et al., 2021), empowering clinicians to engage confidently with digital diagnostics.

Empathy garnered the highest ratings of all dimensions ($M=3.95$, $SD=0.16$), with remarkable consistency across regular ($M=3.96$) and occasional ($M=3.92$) users. This suggests a strong consensus that the service provides caring, individualized attention. Building rapport remains crucial even in digital healthcare settings (Hashish, 2025). To maintain this, interfaces must be culturally sensitive to address diverse client anxieties (Erku et al., 2023). By applying human-centered design—such as multilingual interfaces—developers can ensure that virtual interactions bridge the

Table 5

Level of Service Quality as Assessed by Dentists

Variable	Reliability			Assurance			Tangibility			Empathy			Responsiveness			Service Quality		
	M	SD	Int	M	SD	Int	M	SD	Int	M	SD	Int	M	SD	Int	M	SD	Int
Gender																		
Male	3.80	0.35	VH	3.92	0.21	VH	3.80	0.33	VH	3.94	0.19	VH	3.95	0.17	VH	3.88	0.17	VH
Female	3.77	0.33	VH	3.89	0.25	VH	3.87	0.25	VH	3.96	0.14	VH	3.90	0.24	VH	3.88	0.17	VH
Age																		
Younger	3.76	0.34	VH	3.88	0.26	VH	3.83	0.29	VH	3.94	0.17	VH	3.90	0.23	VH	3.86	0.18	VH
Older	3.82	0.33	VH	3.93	0.18	VH	3.86	0.27	VH	3.97	0.15	VH	3.94	0.18	VH	3.90	0.15	VH
Educational Qualification																		
Doctor of Dental Medicine	3.79	0.33	VH	3.91	0.23	VH	3.85	0.28	VH	3.96	0.16	VH	3.93	0.22	VH	3.89	0.17	VH
Post-Graduate Degree Holder	3.73	0.37	VH	3.85	0.25	VH	3.78	0.32	VH	3.91	0.17	VH	3.86	0.20	VH	3.83	0.15	VH
Frequency of Utilization																		
Regularly	3.79	0.33	VH	3.91	0.22	VH	3.85	0.27	VH	3.96	0.14	VH	3.92	0.21	VH	3.89	0.16	VH
Occasionally	3.75	0.37	VH	3.87	0.28	VH	3.81	0.32	VH	3.92	0.20	VH	3.91	0.24	VH	3.85	0.20	VH
Whole	3.78	0.34	VH	3.90	0.24	VH	3.84	0.28	VH	3.95	0.16	VH	3.92	0.21	VH	3.88	0.17	VH

Mean Range: 1.00 - 1.75=Very Low (VL), 1.76 - 2.50=Low (Lo), 2.51 - 3.25=High (Hi), 3.26 - 4.00=Very High (VH)

empathy gap and convey the warmth found in face-to-face care (Perski & Short, 2021).

Finally, **responsiveness** was rated as "Very High" ($M=3.92$, $SD=0.21$), highlighting the dentists' perception of the service's promptness and willingness to help. High ratings were consistent across male ($M=3.95$) and female ($M=3.90$) respondents. This dimension underscores the importance of quickly addressing concerns to reinforce trust. Rapid resolution of queries and transparent updates are known to boost satisfaction and loyalty (Fairuz et al., 2021). Additionally, openly communicating service limitations is essential to avoid unrealistic expectations (Rahim et al., 2019), making proactive support and candid dialogue critical for long-term engagement.

Level of Service Quality as a Whole

Table 6 reveals that the overall level of service quality in digital dental diagnostics is "very high" ($M=3.82$, $SD=0.24$), with strong consensus between clients ($M=3.76$, $SD=0.27$) and dentists ($M=3.88$, $SD=0.17$). This pattern of excellence permeates all five SERVQUAL dimensions, which were all rated as "very high" across respondent categories. Reliability ($M=3.78$) was perceived with remarkable consistency between groups, reflecting a shared confidence in the system's accuracy. Assurance ($M=3.83$) and Tangibility ($M=3.78$) were also positively evaluated, though dentists provided slightly higher ratings than clients, indicating a robust internal confidence in their expertise and equipment. This trend continued in the dimensions of Empathy ($M=3.85$) and Responsiveness ($M=3.85$), where dentists reported higher means and lower standard deviations than clients. This discrepancy suggests that while clients are highly satisfied, providers perceive their own delivery of personalized care and timely assistance as more consistent than clients experience it, highlighting a minor gap in perception despite the overall positive results.

These findings strongly resonate with Santosa and Azam's (2019) assertion that client-centered care is essential for satisfaction, and Rane et al.'s (2023) conclusion that such satisfaction drives organizational profitability. In terms of reliability, the results support Tran et al. (2025), who note that dependable tools enhance trust, while El-Wakeel and Ezzeldin (2022) and Rahim et al. (2019) warn that software errors and

inconsistencies are primary drivers of complaints. Regarding assurance, while the ratings were high, literature suggests this trust relies on security; Hashem et al. (2019) and Rahim et al. (2019) highlight concerns over data privacy, which can be mitigated through clear communication and compliance (Zhang et al., 2020; Zhang et al., 2023). The positive tangibility scores align with Park et al. (2021) and Nguyen et al. (2021), who found that intuitive interfaces reduce user frustration. Finally, the strong empathy and responsiveness ratings underscore the value of human-centered design and rapid communication in digital health (Perski & Short, 2021; Erku et al., 2023; Hashish, 2025). As Fairuz et al. (2021) argue, prompt responses foster loyalty, though Rahim et al. (2019) emphasize that transparency regarding availability is crucial to managing expectations and maintaining these high service levels.

Level of Client Satisfaction

The client satisfaction with digital dental diagnostics was rated as very high ($M=3.78$, $SD=0.24$), a sentiment that remained consistent across all demographic categories. This positive perception extended to every element of the marketing mix: People ($M=3.82$, $SD=0.28$) and Physical Evidence ($M=3.82$, $SD=0.30$) received the highest ratings, followed closely by Place ($M=3.81$, $SD=0.32$), Process ($M=3.79$, $SD=0.31$), and Product Quality ($M=3.77$, $SD=0.34$), with Price and Promotion both rated at ($M=3.71$, $SD=0.36$). These results indicate a uniform appreciation of service quality regardless of gender, age, education, or usage frequency. For instance, both younger ($M=3.73$) and older clients ($M=3.85$) reported high satisfaction, as did regular, occasional, and rare users. The lack of significant statistical variation suggests that the platform is user-friendly and accessible, effectively bridging gaps between different client profiles, from those with limited formal education to post-graduates, and ensuring that expectations are met with efficiency and ease.

The qualitative analysis reinforces that digital dental diagnostics successfully balance technical efficiency with human-centric care. The high satisfaction among older clients aligns with Jalagat and Sayari (2021), who noted that this demographic increasingly values the efficiencies of digital services, while the consistent

Table 6

Level of Service Quality as a Whole

Variable	Reliability			Assurance			Tangibility			Empathy			Responsiveness			Service Quality		
	M	SD	Int	M	SD	Int	M	SD	Int	M	SD	Int	M	SD	Int	M	SD	Int
Respondent																		
Clients	3.77	0.31	VH	3.75	0.34	VH	3.72	0.35	VH	3.75	0.35	VH	3.79	0.31	VH	3.76	0.27	VH
Dentists	3.78	0.34	VH	3.90	0.24	VH	3.84	0.28	VH	3.95	0.16	VH	3.92	0.21	VH	3.88	0.17	VH
Whole	3.78	0.32	VH	3.83	0.30	VH	3.78	0.32	VH	3.85	0.29	VH	3.85	0.27	VH	3.82	0.24	VH
Mean Range: 1.00 - 1.75=Very Low (VL), 1.76 - 2.50=Low (Lo), 2.51 - 3.25=High (Hi), 3.26 - 4.00=Very High (VH)																		

ratings across genders support Dauda et al. (2022) in that inclusive design bridges user experience gaps. regarding Product and Place, the findings echoed

Chatterjee et al. (2024), who emphasized that tele-dentistry enhances access and matches traditional treatment outcomes. Clients also perceived the Price as fair, consistent with Lixandru et al. (2024), who observed that clients accept costs when they are offset by enhanced communication. Promotional strategies effectively engaged users via digital channels, a trend noted by Parmar et al. (2018). Furthermore, the high scores for People and Process confirmed that empathetic communication and standardized workflows remain essential for building trust, as suggested by Ho and Chai (2024) and Zhang et al. (2024). Finally, the strong approval of Physical Evidence highlights the importance of visual clarity in digital interfaces, which Lixandru et al. (2024) identify as critical for establishing professional credibility.

Difference in the Level of Service Quality as Evaluated by Clients

Initial analysis indicated that all variables significantly deviated from a normal distribution [Service Quality (Clients): $D(135) = 0.187$, $p < 0.001$; Service Quality (Dentists): $D(135) = 0.281$, $p < 0.001$; Client Satisfaction: $D(135) = 0.174$, $p < 0.001$]. Subsequent testing revealed significant differences in service quality perceptions based on sex [$U=1778.000$, $p=0.036$] and age [$U=1469.500$, $p=0.001$]. Specifically, female clients rated service quality significantly higher than males, suggesting they may place greater value on interpersonal elements and emotional attentiveness. Similarly, older clients held significantly more positive perceptions than younger ones, indicating that despite potential initial hesitation, they appreciate the efficiency and clarity of digital services. In contrast, no significant

Table 7

Difference in the Level of Service Quality as Assessed by Clients

Variable	U	z	p
Sex	1778.000*	-2.102	0.036
Age	1469.500*	-3.238	0.001
	χ^2	df	p
Educational Qualification	3.968	2	0.138
Frequency of Utilization	3.955	2	0.138

Note: The difference in the means is significant when $p \leq 0.05$

differences were found regarding educational qualification [$\chi^2(2) = 3.968$, $p=0.138$] or frequency of utilization [$\chi^2(2) = 3.955$, $p=0.138$], which highlights the consistent accessibility and performance of these services across diverse user backgrounds.

These findings align with broader research establishing service quality as a primary driver of satisfaction and loyalty in healthcare. Fitriani et al. (2024) emphasized that dimensions such as tangibles, reliability, responsiveness, and empathy significantly shape client satisfaction, with

reliability often acting as the most influential factor. These insights support the applicability of healthcare service quality models to dental care, where client satisfaction relies on similar perceptions. Furthermore, Darmawan (2018) found that responsiveness and assurance were critical in driving satisfaction within the banking sector, illustrating the cross-industry relevance of these dimensions. Therefore, when applied to digital dental diagnostics, fostering dependable, responsive, and trust-based interactions is essential for enhancing client satisfaction and ensuring the service remains inclusive and user-centered.

Difference in the Level of Service Quality as Assessed by Dentists

Table 8 indicates that educational qualification is the only demographic factor significantly influencing dentists' assessment of service quality ($p = 0.032$), while no significant differences were observed based on sex ($p = 0.810$) or age ($p = 0.189$). This statistical outcome suggests that perceptions of digital diagnostic tools are largely consistent across different age groups and genders, reflecting a general consensus on the utility of these systems in clinical settings. However, the significant variance found in educational background implies that the depth of a dentist's clinical training shapes their evaluation. Specifically, the findings suggest that dentists with post-graduate qualifications evaluate service quality more positively than those holding only a Doctor of Dental Medicine (DMD) degree, potentially due to a deeper understanding of the technology's clinical integration.

These observations reflect broader patterns in healthcare technology adoption. While Biroudian et al. (2025) found that older professionals tend to value technological efficiency, this study's lack of significant age-based differences points to a wider, uniform acceptance of digital tools. Similarly, the findings support Chaudhary et al., who observed no significant gender-related variation in technology perception. Most notably, the role of education aligns with Erfani et al. (2025), who noted that healthcare professionals with higher qualifications demonstrate more favorable views of digital tools. This suggests that advanced education enhances the appreciation of digital diagnostics, highlighting the value of ongoing training in facilitating the successful adoption of these technologies.

Table 8

Difference in the Level of Service Quality as Assessed by Dentists

Variable	U	z	p
Sex	2093.000	-0.240	0.810
Age	1841.000	-1.313	0.189
Educational Qualification	830.000*	-2.139	0.032

*Note: *The difference in the means is significant when $p \leq 0.05$*

Difference in the Level of Client Satisfaction

Table 9 presents the analysis of client satisfaction across various demographic groups. The results indicated no significant difference according to sex [$U=2068.500$, $p=0.432$], educational qualification [$\chi^2(2)=0.437$, $p=0.804$], or frequency of utilization [$\chi^2(2)=0.522$, $p=0.770$], suggesting a broadly consistent and accessible service experience across these categories. However, a significant difference was observed according to age [$U=1543.500$, $p=0.004$]. Specifically, older clients reported a significantly more positive perception of client satisfaction than their younger counterparts, particularly in dimensions such as "Place," "Physical Evidence," and "Process." This implies that older users place a higher value on the clarity, professionalism, and streamlined experience of digital services, which may compare favorably to their past traditional healthcare encounters. While the uniform satisfaction across sex and education reflects the platform's overall user-friendliness, providers might consider adopting more interactive features to further engage younger clients and ensure high satisfaction remains balanced across all age groups.

The relationship between age and satisfaction found in this study aligns with existing literature. For instance, Jokisch et al. (2022) observed that older adults report higher satisfaction with digital health services due to the perceived efficiency and convenience these platforms offer. This mirrors the current findings where mature users rated the digital dental diagnostic service more positively, underscoring the value of streamlined processes and the importance of designing health technologies with age-sensitive features. Conversely, the lack of gender-based variation aligns with Kincl and Štrach (2018), who reported minimal differences in satisfaction between male and female users across online platforms. This consistency reinforces the conclusion that the platform delivers a universally positive experience, demonstrating an inclusive and user-centered design that effectively meets the needs of diverse client groups.

Table 9

Difference in the Level of Client Satisfaction

Variable	U	z	p
Sex	2068.500	-0.787	0.432
Age	1543.500*	-2.899	0.004
	χ^2	df	p
Educational Qualification	0.437	2	0.804
Frequency of Utilization	0.522	2	0.770

Note: The difference in the means is significant when $p \leq 0.05$

Relationship between Service Quality and Client Satisfaction

Table 10 reveals a significant positive correlation between service quality and client satisfaction

[$r_s(133)=0.689$, $p=0.000$], indicating that as users perceive higher quality in the digital dental diagnostic platform, their overall satisfaction increases. This strong relationship suggests that satisfaction is driven not only by technical performance but also by service dimensions such as reliability, assurance, tangibility, empathy, and responsiveness. Essentially, when clients experience timely care, clear communication, and professional support alongside effective digital tools, their trust and likelihood of continued use grow. These findings highlight the necessity of maintaining high standards across both technological capabilities and human-centered care to foster lasting relationships in a digital dental healthcare setting.

These results are corroborated by multiple studies affirming the link between service quality and satisfaction in digital health platforms. Halim et al. (2023) demonstrated that superior service quality—particularly regarding system reliability, user-friendliness, and communication—directly enhances user satisfaction. Similarly, Wulandari et al. (2024) found that high-quality healthcare technologies lead to increased satisfaction and user loyalty, suggesting that improvements in core service elements are vital for engagement and retention. Tantarto et al. (2020) further emphasized the critical role of reliability, ease of use, and responsiveness, noting that satisfied users are more inclined to promote services through referrals. Collectively, these studies reinforce the conclusion that consistently enhancing service quality is essential for securing client satisfaction and long-term success in digital dental diagnostics.

Table 10

Relationship between Service Quality and Client Satisfaction

Variable	r_s	df	p
Service Quality x Client Satisfaction	0.689*	133	0.000

Note: *correlation is significant when $p \leq 0.05$

The synthesis of client and dentist perspectives reveals a uniformly high appraisal of digital dental diagnostics across all five SERVQUAL dimensions—reliability, assurance, tangibility, empathy, and responsiveness—underscoring shared confidence in the platform's consistency, professional expertise, and user-friendly design. Both groups highlighted the dependability of diagnostic outputs and the intuitiveness of the digital interface, while praising the genuine concern and prompt support that help bridge the gap between virtual and traditional care. These findings are further nuanced by demographic patterns: female and older users reported stronger positive perceptions, particularly regarding empathy and responsiveness, while general dentists expressed slightly higher satisfaction than post-graduates, suggesting differing expectations based on specialization. Ultimately, the

strong positive correlation between perceived service quality and overall satisfaction demonstrates that combining technical excellence with human-centered service is essential for meeting diverse user needs, fostering loyalty, and ensuring the sustained adoption of digital dental diagnostics.

5.0. Conclusion

Clients and dentists in highly urbanized cities in Western Visayas, Philippines consistently perceive digital dental diagnostic services as delivering very high service quality across all SERVQUAL dimensions. Empathy and responsiveness emerged as the most valued attributes, underscoring the importance of client-centered communication and swift service within technology-enhanced care. While significant demographic nuances indicated that female and older clients expressed stronger quality perceptions and satisfaction than their male and younger counterparts, overall satisfaction remained uniformly “very high.” The study confirmed a positive correlation between service quality and client satisfaction, demonstrating that sustaining excellence in any dimension directly bolsters client approval. Ultimately, these findings suggest that pairing digital diagnostic technologies with empathetic, reliable, and responsive clinical practices allows providers to effectively meet or exceed expectations across diverse demographic groups.

6.0. Limitations of the Findings

This study presents several notable limitations that affect the generalizability and robustness of its findings. First, data collection was restricted to two mid-sized urban centers in Western Visayas using a cross-sectional design, which limits the results to a specific timeframe and geographic context while failing to capture evolving perceptions or rural perspectives. Methodological constraints included a reliance on voluntary, self-reported measures subject to bias, the absence of objective clinical metrics, and the use of non-parametric tests on non-normal data, which restricted complex modeling. Furthermore, the study’s broad categorization of “digital dental diagnostics” failed to differentiate between specific technologies, and the adaptation of the SERVQUAL instrument without re-validation may have impacted construct validity.

Additionally, broad age classifications and potential selection bias may have obscured subtle demographic differences. Consequently, while these findings offer valuable insights, they should be viewed as indicative rather than definitive, warranting future research that employs broader sampling, objective quality indicators, and longitudinal or mixed-methods approaches to confirm and deepen these results.

7.0. Practical Value of the Findings

The practical value of this paper lies in its implications for enhancing digital dental diagnostics and the overall client experience. By demonstrating a strong link between high-quality, technology-enhanced care and client satisfaction, the study guides dental providers to prioritize key service dimensions such as empathy, responsiveness, reliability, and assurance. These findings offer actionable insights for tailoring practices to meet client expectations, particularly regarding the heightened importance of personalized care among female and older clients. Furthermore, the evidence of uniform excellence across service quality dimensions supports a continued commitment to both technological investment and client-centered communication, which can effectively inform service strategies, staff training, and marketing initiatives. Ultimately, this study serves as a roadmap for dental practices aiming to build trust, optimize service delivery, and secure a competitive advantage in an increasingly digital healthcare landscape.

8.0. Directions for Future Research

To enhance the generalizability of findings, future research should extend the geographic scope beyond Bacolod and Iloilo to encompass diverse urban and rural regions. Scholars are encouraged to employ longitudinal designs to track how the evolution of digital dental diagnostic technologies influences service quality and client satisfaction over time, while utilizing mixed-methods approaches—integrating quantitative surveys with qualitative interviews—to gain deeper insights into client expectations. Furthermore, future studies should complement subjective assessments with objective performance metrics, such as diagnostic accuracy and treatment efficiency, and isolate the specific impacts of distinct technologies within the digital diagnostics spectrum. Finally, rigorous validation of adapted instruments through techniques like factor analysis is recommended to ensure robust measurement of service quality in the context of evolving digital healthcare practices.

9.0. Declaration of Conflict of Interest

The authors declare no potential conflicts of interest regarding the research, authorship, or publication of this article.

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