


Enhancing Communication Between Dental Laboratories and Clinics: The Role of Information Technology Systems in a Developing Country

Farid Tawfiq Nusairat¹, Salam Walid Al-Shogran¹, Noor Almortadi², Karem H Alzoubi^{3,4} 

¹Department of Health Policy and Management, Faculty of Medicine, Jordan University of Science and Technology, Irbid, Jordan; ²Department of Applied Dental Sciences, Faculty of Applied Medical Sciences, Jordan University of Science and Technology, Irbid, Jordan; ³Department of Pharmacy Practice and Pharmacotherapeutics, College of Pharmacy University of Sharjah, Sharjah, United Arab Emirates; ⁴Department of Clinical Pharmacy, Faculty of Pharmacy, Jordan University of Science and Technology, Irbid, Jordan

Correspondence: Farid Tawfiq Nusairat, Email ftnusairat@just.edu.jo

Background: Despite the great effort between the dentist and dental technician in prosthesis fabrication, there is a lack of proper communication. According to the laboratory prescription, the communication process must include all the essential elements to complete the prosthesis fabrication correctly. The digital revolution in dentistry suggested using information technology system prescriptions instead of traditional prescriptions.

Aim: To explore the association between the application of ITS and the communication process between dental laboratories and dental clinics in a developing country setting.

Methods: The current study used a quasi-experimental design (posttest only). A convenience sample of 600 subjects was divided into two subsamples of 300 subjects each. The data from the first subsample was collected from traditional (paper-based) prescriptions, and the data from the second subsample was collected from the Information Technology System (ITS).

Results: It was associated with a statistically significant commitment to recording the most essential information in the dental lab prescription. The time spent completing and delivering the work was faster, and the need for recommunication was less common among those using ITS than those using traditional systems. Regarding the quality of the prosthesis, the need for modification or redo due to improper shade, inappropriate charting of teeth, or lack of additional information in the dental lab prescription was less among users of the ITS system compared to the traditional system ($P < 0.05$).

Conclusion: Using ITS instead of a traditional system can enhance the communication process and the amount filled in the laboratory prescription in multiple aspects, including the completeness of essential information in the dental lab prescription, the time needed to complete the cases, the need to re-communicate less frequently with the dentist, and improved the quality of the prosthesis.

Keywords: information technology system, communication process, dental laboratories, dental clinics

Introduction

Information Technology System (ITS) is the science that uses and consists of a group of elements: computers, computer networks, software products, databases, and human resources to store, process, and transfer information.¹ Due to the large amount of information needed daily, ITS has replaced the traditional system for transferring the required information using papers to provide the necessary information. ITS provides characteristics of paper that allow the information to be tracked quickly.^{2,3} Transferring information depends on how the dental laboratory and dental clinic communicate using the traditional system, such as paperwork, or the proposed new way using an Information Technology System (ITS) uploaded on their computers. Communication conveys information to create a shared understanding.⁴ However, relevant guidelines and obligatory professional standards must be established to regulate prosthodontic treatment procedures, which include dental laboratory services.⁵ The communication process between dentists and dental technicians depends on prosthetic laboratory prescription, which has the essential information to complete each patient case.⁶⁻⁸ A developed

communication process can facilitate good communication between dentists and responsible dental laboratory technicians when a dentist deals with multiple laboratories. The ITS functions include tracking patients' information, automated alerts, and real-time updates, making this system more effective than paper-based communication. Utilizing this ITS will positively impact patient outcomes, such as reducing waiting time and improving patient satisfaction. The ITS also aids the data security and handling of patient data, where dental team training will make the research more comprehensive and relevant. The successful prosthesis reflects a successful relationship between the dentist and the dental technician.^{9–12} Authors focused on the importance of communication and concluded that communication is the key to success in dentistry/laboratory relations.^{2,6,13–15}

Appropriate interaction between dental clinics and dental laboratories can improve the quality of the fabricated prosthesis and create a happy professional relationship between clinicians and dental technicians.^{2,6,13–15} Insufficient communication between the dental clinic and the dental lab necessitates lab technicians frequently phone the dental office to clarify instructions or make decisions without the required information. Alternatively, errors in forms, measurements, or attachments to orders may occur, resulting in the need to repair or replace dental products. These challenges are exacerbated by time constraints and the pressure to quickly produce dental products, which can lead to worsening pain points or missed deadlines, either because of the dental clinic or the dental lab, all of which cause problems in the dentists' satisfaction.¹⁶ Partially filled laboratory prescriptions can waste time redoing or adjusting the prosthesis. If lab prescription information is absent or partially, the case must be scheduled for a new appointment, which affects the dentist's satisfaction, patients' budget, and confidence.¹⁷

Having the required information in the lab form leads to better communication between the dental team and results in a better quality of the final prosthesis.^{13,15,18,19} Written prescriptions with full case details are critical for producing a proper prosthesis. The dental laboratories can observe, via them, whether the communication is effective in prosthesis fabrication.¹⁸ Thoroughly filled-out prosthetic prescriptions enhance the overall quality of oral prostheses and minimize the chances of delays or the need for re-fabrication.⁶ Alshiddi (2014) reported that improving the effectiveness of communication between a dental office and a dental laboratory can save time, increase patient satisfaction, save efforts, and improve the quality of the prosthesis.² Thus, the present study aims to explore the association between the application of ITS and the effectiveness of the communication process between dental laboratories and dental clinics in a developing country setting.

This study should build on the need to integrate an effective ITS to manage dental lab information and operations as much data need to be shared between dentists and laboratory technicians of dental laboratories. The ITS will act as a channel between the dentist and the dental technician for effective communication to share patient information, information about the desired treatment and specifications about the patient teeth, photographs, and radiographs, and as a record for future treatment. The international market has ITS systems in various formats. Usually, each dental clinic works with one or more dental laboratories. These dental clinics may send their lab cases to local, national, and international dental laboratories, and Email communication is accomplished. Usually, dental laboratories receive lab cases from multiple dental clinics. Due to the large number of cases received by a dental lab, precaution and awareness are necessary to avoid missing out, as communication with clinics for tracking the information wastes time.²⁰

According to a survey conducted by Afsharzand et al, the prescription should contain the patient's name, the date of the request, and a comprehensive description of the work. Second, if applicable, a design diagram for the prosthesis, including details on the margin and pontic designs.^{14,15} Thirdly, selecting a particular category of materials for the construction of the prosthesis is crucial. Fourth, it is critical to ensure that the shade of the prosthesis is harmonized with the patient's natural teeth in their entire mouth. Additionally, any relevant details about customizing the staining should be provided. Finally, please provide the file or prescription number and the dentist's telephone number making the request. Leith et al verified that the dentist is responsible for the ultimate prosthesis, necessitating a comprehension of the manufacturing process and prerequisites, particularly the selection of materials and design characteristics.²¹ It is essential to communicate clearly and effectively regarding the design features in the fixed prostheses, either the pontic design for the fixed partial denture or the margin design between the dental team to fabricate high-quality prostheses. Otherwise, it can lead to errors in the fabrication process or failure in the final prosthesis, which will cause damage to the oral structure in the patient's mouth or redoing the prosthesis.⁹

To achieve dentist and patient satisfaction indirectly, focusing on the shade matching between the prosthesis and the patient's natural teeth is necessary. It can be achieved using photographs with appropriate shade about the standard shade guide. In some cases, it is also essential to chart and draw the customized shades on the parts of the tooth/teeth that are to be restored, especially the anterior teeth, which are in the aesthetic zone of the patient's mouth, which is no less than painting a picture. Photographs are used for recording various aspects of clinical information in the oral cavity, such as documentation for legal purposes, education, communication with patients, dental team members, and marketing. These advantages can enhance dental practice's status and improve care delivery to patients.²²

Materials and Methods

Study Design and Settings

A quasi-experimental design (post-test only) was used in the current study to investigate the relationship between the application of ITS and the communication process between dental laboratories and dental clinics. The study was conducted in five dental laboratories in two biggest cities: the capital, Amman, and Irbid, in the north of Jordan, thus covering areas that are most populated in the country. The protocol of this study was approved by the IRB of Jordan University of Science and Technology, Irbid, Jordan (Approval Number: 209/132/2020). Written informed consents were obtained from all study participants. The study was carried out by the Declaration of Helsinki and all its amendments.

Study Population and Sample

The population of interest for the study was the dental laboratories in Jordan. The sampling process has been done in many stages. Firstly, the laboratories were chosen for a judgmental type of sampling based on having the highest prescription rate. To be included, the dental lab should use an ITS system and be among the labs with high prescription rates. Excluded were dental labs that do not use ITS. Then, each laboratory manager chose eight dentists who he previously dealt with. Four of them have accounts in the ITS used in the dental laboratory. The other four dentists used the traditional communication system, which means they used paper laboratory prescriptions or written forms to communicate. In the second stage, the laboratory manager needed to observe five dental prescriptions for each dentist using the ITS or the traditional system in a convenience sampling process. The laboratory managers were interviewed before the dentists' selection process was started. They were given a comprehensive training workshop on the study protocol, including the dentists' selection process, the procedures and forms used during the dentists' observation, and the data collection stages. The study was planned to be carried out for three months for the five mentioned labs based on an average case completion time of four to five business days. The sample size is a total of 600 cases: 300 cases using ITS and the other 300 using the traditional system (Figure 1). The sample size was based on a previous study with a similar scope.¹⁷

The Study Instrument

A questionnaire was used to evaluate both ITS and traditional prescriptions. The primary data were collected using a questionnaire covering the most significant elements needed for each case. The study questionnaire was based on a previous study.¹⁷ The initial version of the study questionnaire was validated by examining five experts, including two dental lab managers, two professors in applied dental technology, and one expert dentist. Modifications and suggestions by the mentioned experts were implemented. The study questionnaire was then piloted among five additional laboratory managers who were invited to provide feedback about the clarity of the question or any potential concerns they had. The laboratory managers from the pilot study were not included in the actual study. The finalized questionnaire was then used for the study implementation by directly administering it to the laboratory managers to ensure the privacy of the information. The secondary data were a direct observation by each lab manager. The observation sheet covered the following elements: (1) time allowance for finishing cases in days, (2) the need for more communication with the dentist to get missing or extra information, and (3) The quality of the prosthesis, which was based on number of cases that needed redoing or modification due to improper determination of shade or material.

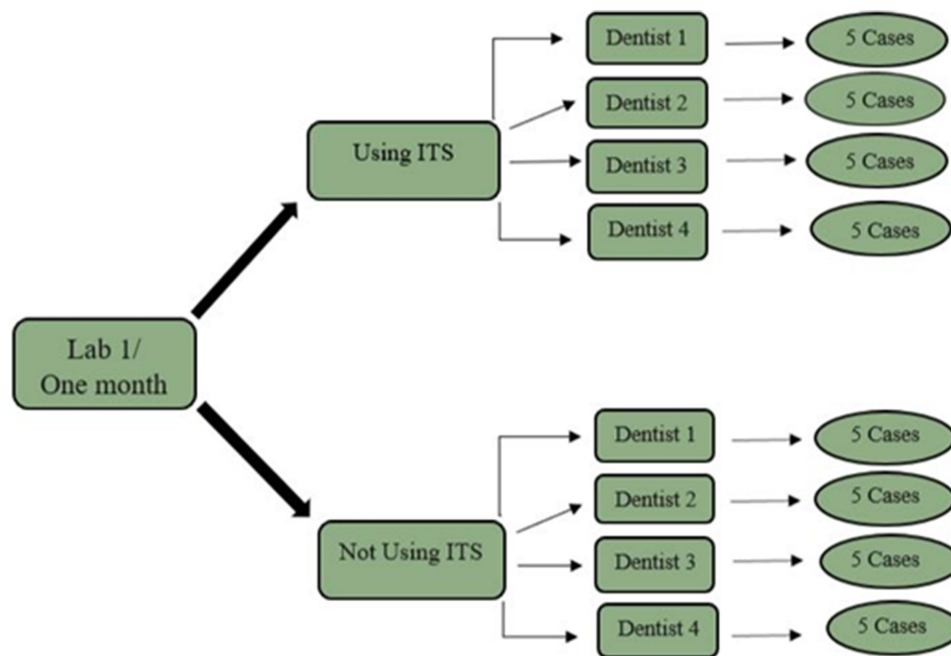


Figure 1 The procedure for the study sample selection. Every laboratory manager chose eight dentists who he previously dealt with. Four of them have accounts in the ITS used in the dental laboratory. The other four dentists used the traditional communication system (Not using ITS). The laboratory manager observed five dental prescriptions for each dentist using the ITS or the conventional system in a convenience sampling process.

The ITS Used

The ITS used in all dental labs is the Xanthus Dental Labs software, developed in Haiti. This software is widely used in the management of dental laboratories, spreading in 16 countries worldwide. The software includes comprehensive functionalities related to dental case management, delivery schedule, prostheses production control, billing and sales, customer statements, custom pricing support, financial reporting, statistics of the lab work, barcoding support, communication support, automated invoice completion, label printing, and tax support. The software was assessed in previous studies.¹⁷ The current studies compared the most important functionalities: dental case management and the delivery schedule. Items compared were the patient's name, the dentist's name, the prescription (file) number, the tooth to be restored, the type of material, the Delivery deadline, appropriate charting of teeth, the general shade of teeth, and other specific requests.

Statistical Analysis

Data was keyed into Excel spreadsheets. Descriptive statistics were generated, and the results were presented as percentages. Categorical data were analyzed to assess trends in laboratory prescription practices. Cross-tabulation was performed utilizing chi-squared tests in the SPSS software, version 21. The significance threshold was established at $p < 0.05$.

Results

Descriptive Analysis of the Communication Process Construct

The communication process between the dental laboratory and dental clinic depends on the lab prescription, which has many elements that enhance the effectiveness of this process, as mentioned previously. It includes two parts: general and specific information. Table 1 shows the descriptive analysis of the communication process construct. It illustrates the frequencies of lab orders containing general information using the study sample's technology system. The use of the technological system showed statistically significant commitment to recording the name of the patient (93.2%), the dentist's name (99.7%), and the number of prescriptions (51.2%) compared with the traditional system 81.8%, 84.0%, 33.6%, respectively ($P < 0.000001$). About 98.0% of respondents who used a technological system recorded the tooth to be restored in their laboratory prescriptions compared with

Table I Descriptive Analysis of Communication Process Construct

Characteristics	System used		χ^2 – test value sig.
	Traditional N (%)	Technology N (%)	
Patient's name			χ^2 value =17.66; P<0.000001
Yes	251(81.8)	273(93.2)	
No	56(18.2)	20(6.8)	
Dentist's name			χ^2 value =47.88; P<0.000001
Yes	258(84.0)	292(99.7)	
No	49(16.0)	1(0.3)	
Prescription (file) number			χ^2 value =19.14; P<0.000001
Yes	103(33.6)	150(51.2)	
No	204(66.4)	143(48.8)	
The tooth to be restored			χ^2 value =60.99; P<0.000001
Yes	237(77.2)	288(98.3)	
No	70(22.8)	5(1.7)	
Type of material			χ^2 value =4.91; P=0.027
Yes	211(68.7)	225(76.8)	
No	96(31.3)	68(23.2)	
Deadline / due date			χ^2 value =2.47; P=0.116
Yes	181(59.0)	191(65.2)	
No	126(41.0)	102(34.8)	
Appropriate charting of teeth			χ^2 value =17.73; P<0.000001
Yes	48(15.6)	88(30.0)	
No	259(84.4)	205(70.0)	
The general shade of teeth			χ^2 value =2.53; P=0.112
Yes	225(73.3)	231(78.8)	
No	82(26.7)	62(21.2)	
Specific requests			χ^2 value =3.92; P=0.048
Yes	80(26.1)	98(33.4)	
No	227(73.9)	195(66.6)	

a significantly lower proportion (77.2%) of those using traditional systems ($P < 0.000001$). Approximately 77.0% of the respondents who used the technology system stated material type in the prescriptions compared to 68.7% of those who used the traditional system ($P = 0.027$).

On the other hand, the proportions of prescriptions that mention the deadline date and available shade of teeth on laboratory sheets did not show any statistically significant differences between both groups regarding technology use ($P > 0.05$). The

appropriate charting of teeth, additional information, and specific requests were mentioned in less than one-third of the prescriptions using the traditional system, whereas using the technological system, there were higher percentages (30.0% or 26.6% or 33.4%, respectively) of commitment to mention those details ($P < 0.000001$, $P = 0.048$).

Descriptive Analysis of the Dentist Satisfaction Construct

Concerning the communication process, the time to complete each case and the need to re-communicate with the dentist can affect the satisfaction between the dentist and the dental laboratory. Table 2 shows a descriptive analysis of the dentist satisfaction construct. Interestingly, the reported time spent to complete and deliver the work was faster among those using technology than those using traditional systems ($P = 0.001$). Regarding recommunication, respondents using technology reported less communication than the other group ($P = 0.018$).

Descriptive Analysis of the Quality of Prosthesis Construct

General Relationship

The quality of prostheses is mainly concerned with the shade and material relevant to the laboratory prescription elements. Reported details, such as modification due to improper shade or redoing due to improper shade or inappropriate material, did not show any statistically significant difference among both groups regarding technology use ($P > 0.05$, Table 3).

Specific Relationships

Regarding the laboratory prescription, the quality of the prosthesis depends on many elements. These elements are (1) type of material, (2) appropriate charting of teeth, (3) general shade of teeth, and (4) additional information. When the type of material was not provided in the prescription and that led to redo due to improper material, missing type of material was in 66.7% of prescriptions from the traditional system compared to 16.7% among the technology system user (χ^2 value = 3.62; $P = 0.119$, Table 4). Regarding prosthesis modification or redoing, when the appropriate teeth charting is done in the dental lab prescription, the technology system is twice as good as the traditional system (Modification: χ^2 value = 16.83; $P < 0.00001$; Redoing: χ^2 value = 16.94; $P < 0.00001$ Table 4). Due to not mentioning the general shade of teeth, 56% of cases in the traditional system needed prosthesis modification due to improper shade compared with 25.0% among technology system users (χ^2 value = 5.93; $P = 0.015$). In about 66.7% of cases in the traditional system, when the general shade of teeth was not mentioned, a prosthesis redo was needed due to improper shade compared with none among technology system users (χ^2 value = 6.29; $P = 0.029$). Regarding additional information, in about 15% of cases in the traditional system when the additional information was not mentioned, prosthesis modification due to improper shade was needed compared to 25.3% among technology system users (χ^2 value = 8.71; $P = 0.003$). In about 14.9% of cases in

Table 2 Descriptive Analysis of Dentist Satisfaction Construct

Characteristics	System used		χ^2 – test value sig.
	Traditional N(%)	Technology N (%)	
The time to complete cases			Z-value* = -3.42; P=0.001
Median (day)	5.0	4.0	
Range	(1–10)	(1–19)	
The need to re-communicate			χ^2 value = 7.93; P=0.018
No	160(52.1)	186(63.5)	
Once	105(34.2)	78(26.6)	
Twice or more	42(13.7)	29(9.9)	

Note: *Mann–Whitney U-test.

Table 3 Descriptive Analysis of the Quality of Prosthesis Construct (General Relationship)

Characteristics	System used		χ^2 – test value sig.
	Traditional N (%)	Technology N (%)	
Modification due to improper shade			χ^2 value = 4.14; P=0.080
No	266(86.6)	269(91.8)	
Once	34(11.1)	22(7.5)	
Twice	7(2.3)	2(0.7)	
Redoing due to improper shade			χ^2 value =2.64; P=0.104
No	295(96.1)	288(98.3)	
Yes	12(3.9)	5(1.7)	
Redoing due to improper material			χ^2 value =0.48; P=0.488
No	298(97.1)	287(98.0)	
Yes	9(2.9)	6(2.0)	

Table 4 Descriptive Analysis of the Quality Criteria of Prosthesis Construct According to Elements Provided in the Laboratory Prescription versus the Type of Information System Used

Quality Characteristics	Laboratory prescription element	Used system		χ^2 – test value sig.
		Traditional N (%)	Technology N (%)	
Redoing due to improper material (Yes)	Type of material			χ^2 value = 3.62; P=0.119
	Not Provided	6(66.7)	1(16.7)	
	Provided	3(33.3)	5(83.3)	
Modification due to improper shade (No)	Appropriate charting of teeth			χ^2 value = 16.83; P<0.00001
	Not Provided	227(85.3)	190(70.6)	
	Provided	39(14.7)	79(29.4)	
Redoing due to improper shade (No)	Appropriate charting of teeth			χ^2 value = 16.94;P<0.00001
	Not Provided	249(84.4)	202(70.1)	
	Provided	46(15.6)	86(29.9)	
Modification due to improper shade (Yes)	The general shade of teeth			χ^2 value = 5.93; P=0.015
	Not Provided	23(56.1)	6(25.0)	
	Provided	18(43.9)	18(75.0)	
Redoing due to improper shade (Yes)	The general shade of teeth			χ^2 value = 6.29; P=0.029
	Not Provided	8(66.7)	0(0.0)	
	Provided	4(33.3)	5(100.0)	

(Continued)

Table 4 (Continued).

Quality Characteristics	Laboratory prescription element	Used system		χ^2 – test value sig.
		Traditional N (%)	Technology N (%)	
Modification due to improper shade (No)	Additional information			χ^2 value = 8.71; P=0.003
	Not Provided	226(85.0)	201(74.7)	
	Provided	40(15.0)	68(25.3)	
Redoing due to improper shade (No)	Additional information			χ^2 value = 11.74; P=0.001
	Not Provided	251(85.1)	212(73.6)	
	Provided	44 (14.9)	76(26.4)	

the traditional system when the additional information was not mentioned, the prosthesis needed redo due to improper shade compared with 26.4% among technology system users (χ^2 value = 11.74; P = 0.001, Table 4).

Descriptive Analysis of the Amount of Information of Laboratory Prescription Construct

Figure 2 shows the distribution of answers for each data field in the two types of systems: Traditional and Technological. The ‘Patient’s Name’ was included in 81.8% of the prescriptions in the traditional system. The ‘Prescription number’ was included in 84% of the prescriptions. Only 33.6% of laboratory prescriptions contained the technician’s name. The technological system showed a marked increase in the number of prescriptions containing the dentist’s name, patient’s name, and prescription number, 93.2%, 99.7%, and 51.2%, respectively. About 77.2%, 68.7%, and 59% of the prescriptions in the traditional system contained the tooth to be restored, type of material, and deadline/due date, respectively, compared with the technological system, which was 98.3%, 76.8%, and 59%, respectively. About half of the prescriptions had increased in the appropriate teeth charting in a technological system. Although the proportion of those who mention information such as additional information or specific requests in their laboratory prescription is less than one-third of the respondents, users of the technological system showed higher

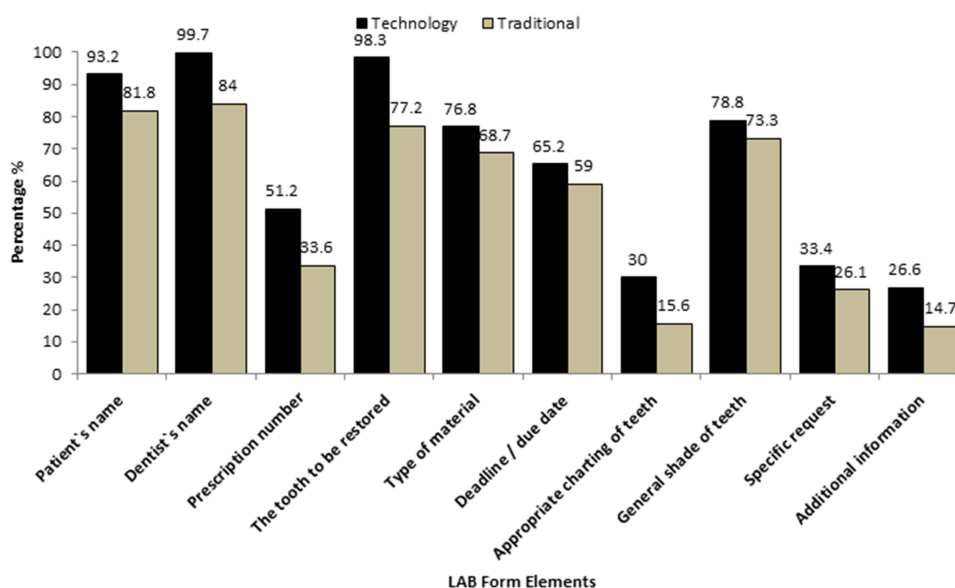


Figure 2 The Amount of Information of Laboratory Prescription Elements.

percentages (26.6% or 33.4%, respectively) of commitment to mention those details compared with those who use the traditional system.

Discussion

Communication Process and Using ITS

The present findings indicated a significant association between the communication process and using ITS. Hence, the communication process depends on the laboratory prescription elements. All elements showed significant relationships with ITS except the deadline/due date and the general shade of teeth. Multiple reasons could explain such results. For example, dentists may think that the deadline/due date and the general shade of teeth are essential elements in laboratory prescription. Thus, they care about including them in ITS and the traditional paper-based prescription. On the other hand, dentists may perceive that they do not have enough time to fill out all the different elements of the conventional paper prescription. Still, they may find it easier with ITS to fill all the prescription elements. Previous studies indicated that the ITS enhances the communication process between the dental laboratory and the dental clinic.^{19,20}

Client/ Dentist Satisfaction and Using ITS

The current study showed a significant positive association between dentist satisfaction and using ITS, whereby excessive times for recommunication with dentists and increasing the number of days for completing cases may significantly affect this association. The dentist may find the ITS easier and faster in locating case information instead of recommunication with the dental technician. Additionally, the technician may find the critical information they need in the fabrication process more available in ITS, so they take fewer days to finish the case. These findings are directly supported by previous studies, which have indicated that the elongation in producing the dental product and the repeated communication with the dentists can negatively affect the dentist's satisfaction.^{2,6,13–17} Hence, it can be suggested that ITS reduces the time for complete cases and increases dentist satisfaction.

Quality of Prosthesis and Using ITS

The findings showed no significant association between the quality of prosthesis and the use of ITS, where modification due to improper shade and redoing due to improper shade and material did not show any statistical change in association with ITS. However, when a more specific determination of the relationship with the laboratory prescription elements related to the quality of the prosthesis (type of material, appropriate charting of teeth, general shade of teeth, and additional information) was done, the ITS use reduced the rate prosthesis redoing due to improper material. For appropriate general shade of teeth, ITS was associated with fewer modifications and redoing due to improper shade. This could mean that the dentists are more accurate with ITS in defining the shade of patients' teeth that had been taken, whereas the shade may be written less accurately using the traditional prescription. In accordance, El-Masri et al²⁰ reported that using ITS improves dental laboratories' performance and sustains long-term relationships between dental laboratories and dental clinics.

According to the additional information element, pictures of patients' teeth shall be sent to the laboratory via social network or by visiting the laboratory to photograph by the camera if available or uploaded by the dentist using ITS. However, this element showed statistical significance related to the modification and redoing of the cases. This indicates that the ITS improves the quality of the uploaded photographs. In addition, the dentist may believe in the benefit of ITS in being more organized and saving data on cases without any misy situation or problem, especially when the patient returns to do another prosthesis.

Appropriate charting of teeth, which means gradual manual customization, showed statistical significance in modifying and redoing cases to be more customized; this can help elevate the quality process of fabricating the prostheses.

Amount of Laboratory Prescription Information and Using ITS

In this study, all the laboratory prescription elements have positive changes in the amount of information on them using ITS, indicating that using ITS will improve the amount of information applied to the laboratory prescription. It is

essential to be aware that this study occurs during COVID-19. Thus, it is possible that the pandemic encouraged fewer visits to the dental laboratories from the dentist and the patient for modification if any case is needed. Therefore, dentists may find the application process in ITS easier and safer than in the traditional system. Therefore, the restrictions that were implemented may have positively influenced the utilization of ITS. Following up with longer-term data would be beneficial to assess if these results and quality improvements are sustainable over time. It may also be helpful to consider the challenges of adopting ITS, such as the learning curve or costs, which could influence its broader application. Future considerations for long-term effects and the challenges of adopting ITS could provide additional depth to the present results.

This study has some limitations to consider. To avoid any bias related to the lab manager being both responsible for the observations and directly involved in the labs, the laboratory managers were interviewed before the dentists' selection process was started. They were given a comprehensive training workshop on the study protocol, including the dentists' selection process, the procedures and forms used during the dentists' observation, and the data collection stages. Other potential confounders in the present study include the dentists' skill level, the cases' complexity, or familiarity with ITS.

Conclusion

Using ITS instead of a traditional system can enhance the communication process and the amount filled in the laboratory prescription. The ITS also reduces the time needed to complete the cases and re-communicate with the dentist. It improves the prosthesis's quality, including the prosthesis's shade, additional information, and appropriate charting of teeth used in the dental laboratory prescription. Based on that, it is recommended to avail training programs for the lab manager and dentists on using ITS for dental lab prescriptions, which should enhance the communication efficiency among dentists and dental laboratories, which should elevate patient care in developing countries' dental health settings.

Data Sharing Statement

The datasets generated during and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Funding

This study was funded by the Deanship of Research, Jordan University of Science and Technology, Irbid, Jordan (Grant # 431/2020).

Disclosure

The authors report no conflicts of interest in his work.

References

- Borghosh R. Researcher, Moussa@women R. The seven sources of information technology and its role in the development of scientific research. *Al-Kitab J Pure Sci.* 2023;7(1):11–26. doi:10.32441/kjps.07.01.p2
- Alshiddi IF, Dent D. Communication between dental office and dental laboratory: from paper-based to web-based. 2014.
- Vyklyuk Y, Kunanets N, Kalahurka T, Voronovsky M. Information technology platform “dental laboratory”. *InIDDM.* 2018;287–300.
- Velentzas J. Communication cycle: definition, process, models and examples. *Recent Advances in Financial Planning and Product Development.* 2014;17:117–131.
- Sui L, Wu X, Wu S, Gao P, Li R. The quality of written instructions for dental prostheses in China. *J Prosthodont.* 2014;23(8):602–609. doi:10.1111/jopr.12163
- Stewart CA. An audit of dental prescriptions between clinics and dental laboratories. *Br Dent J.* 2011;211(3):E5. doi:10.1038/sj.bdj.2011.623
- Reeson MG, Jepson NJ. Bridging the gap. Should the training of dental technicians be linked with that of the dental undergraduate? *Br Dent J.* 2005;198(10):642–645. doi:10.1038/sj.bdj.4812354
- Parry GR, Evans JL, Cameron A. Communicating prosthetic prescriptions from dental students to the dental laboratory: is the message getting through? *J Dent Educ.* 2014;78(12):1636–1642. doi:10.1002/j.0022-0337.2014.78.12.tb05842.x
- Lynch C, McConnell R, Allen P. Trends in indirect dentistry: 7. communicating design features for fixed and removable prostheses. *Dental Update.* 2005;32(9):502–510. doi:10.12968/denu.2005.32.9.502
- Lynch CD, Allen PF. Quality of communication between dental practitioners and dental technicians for fixed prosthodontics in Ireland. *J Oral Rehabil.* 2005;32(12):901–905. doi:10.1111/j.1365-2842.2005.01544.x

11. Jenkins SJ, Lynch CD, Sloan AJ, Gilmour AS. Quality of prescription and fabrication of single-unit crowns by general dental practitioners in Wales. *J Oral Rehabil.* 2009;36(2):150–156. doi:10.1111/j.1365-2842.2008.01916.x
12. Costin LI, Gherman N, Mihaela CE. Romanian journal of oral rehabilitation. *J Oral Rehabil.* 2012;4(3):34–37.
13. Carneiro LC. Specifications provided by practitioners for fabrication of removable acrylic prostheses in Tanzania. *J Oral Rehabil.* 2006;33(9):660–665. doi:10.1111/j.1365-2842.2005.01611.x
14. Afsharzand Z, Rashedi B, Petropoulos VC. Dentist communication with the dental laboratory for prosthodontic treatment using implants. *J Prosthodont.* 2006;15(3):202–207. doi:10.1111/j.1532-849X.2006.00102.x
15. Afsharzand Z, Rashedi B, Petropoulos VC. Communication between the dental laboratory technician and dentist: work authorization for fixed partial dentures. *J Prosthodont.* 2006;15(2):123–128. doi:10.1111/j.1532-849X.2006.00086.x
16. Alde RJ Dental Relationship Management System. Patent Application Publication. US 2018 / 0285801 A1. 2018.
17. Dickie J, Shearer AC, Ricketts DN. Audit to assess the quality of communication between operators and technicians in a fixed prosthodontic laboratory: educational and training implications. *Eur J Dent Educ.* 2014;18(1):7–14. doi:10.1111/eje.12050
18. Tulbah H, AlHamdan E, AlQahtani A, AlShahrani A, AlShaye M. Quality of communication between dentists and dental laboratory technicians for fixed prosthodontics in Riyadh, Saudi Arabia. *Saudi Dent J.* 2017;29(3):111–116. doi:10.1016/j.sdentj.2017.05.002
19. Gajbhiye O, Pande N, Banerjee R, Radke U. Comparative evaluation of quality of communication between dental practitioners and dental lab technicians in Nagpur region. *Contemp Res J Med Sci.* 2018;1(1):50–57.
20. El-Masri S. Design of web content management system for dental laboratories. *Int J Comp Sci Iss.* 2013;10:82–89.
21. Leith R, Lowry L, O’Sullivan M. Communication between dentists and laboratory technicians. *J Ir Dent Assoc.* 2000;46(1):5–10.
22. Ahmad I. Digital dental photography. Part 1: an overview. *Br Dent J.* 2009;206(8):403–407. doi:10.1038/sj.bdj.2009.306

Clinical, Cosmetic and Investigational Dentistry

Dovepress

Publish your work in this journal

Clinical, Cosmetic and Investigational Dentistry is an international, peer-reviewed, open access, online journal focusing on the latest clinical and experimental research in dentistry with specific emphasis on cosmetic interventions. Innovative developments in dental materials, techniques and devices that improve outcomes and patient satisfaction and preference will be highlighted. The manuscript management system is completely online and includes a very quick and fair peer-review system, which is all easy to use. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <https://www.dovepress.com/clinical-cosmetic-and-investigational-dentistry-journal>