IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 17, Issue 2 Ver. 8 February. (2018), PP 65-69
www.iosrjournals.org

Technology acceptance model in the use of a patient management software in a dental school in the Philippines

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Abstract
Background: *The technology acceptance model (TAM) has been used to gauge the use of information technology (IT) in healthcare. Incrementally, dentists and dental students of developing nations have been using IT through patient management software.*
Materials and methods: *With a response rate of the participants at 100%, composed of 90 junior and senior dental interns, selected through purposive sampling, this cross-sectional survey gauged the perceived ease of use and perceived usefulness of a dental patient management software in a dental school in the Philippines. This survey utilized a standardized questionnaire after the participants were made to use the software.*
Results: *The dental students perceived the dental patient management software to be quite useful (wm=5.99) and extremely easy to use (wm=6.22). A significant relationship also exists between perceived usefulness and perceived ease of use of the patient management software (0.45322).*
Conclusion: *The dental students perceived the dental patient management software to be useful and easy to use in the dental infirmary of this dental school. TAM is also implicated to be a useful model and a determinant of the dental students perceived ease of use and perceived usefulness of the IT healthcare device. This study supports and contributes to the TAM in the healthcare setting.*

Keywords-*dental education, dental school,patient management software, Philippines,technology acceptance model*

Date of Submission: 05-02-2018 Date of acceptance: 19-02-2018

I. Introduction

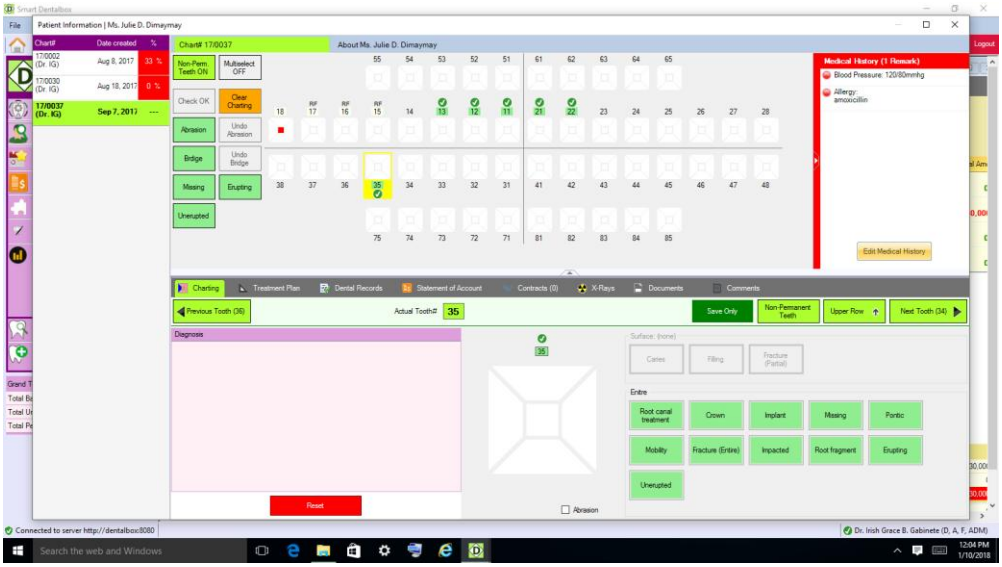

Figure 1. A screenshot of the Smart DentalBox. A dental patient management software capable of dental charting, treatment planning and diagnosis, SMS communication, and financial computations.

Dental charting, patient appointments, and documenting dental history has been done through paper and pen for over 15 decades.[1] The Allport's Registering Dental Ledger has been acknowledged as the foundation of the present dental registering ledgers with diagrams of teeth.[1,2] While these computer-based patient management software have been widely used by dentists in developed countries, there have been accounts of use in the developing countries as well. Despite these developments, there are still impediments that hinder the wide-ranging integration of digital and electronic technologies in the dental offices of these nations.[3] These problems can stem from technical, physical, or psychosocial in nature which can include patient-dentist relationship, patient anonymity, and software incongruities. For dental schools, the equipment cost and the need for further technical training were regarded as leading reasons of impediments in the use of these technologies. As with the dental health care professionals, dental students deem that information technology (IT) heightens patient satisfaction, differential diagnosis, dental record quality, treatment planning, and cross-professional interaction.[3-6]

In the 1980's the concept oftechnology acceptance model (TAM) was conceived to explain that an increase in the use of IT was dependent on its initial acceptance. In theory, its assessment could be done by probing these personnel about their prospective intents of using IT. TAM in healthcare can be traced back to the late 1990's with studies done in Hong Kong. The initial findings were poor and conveyed that TAM was unsuitable for the physicians' acceptance of health IT.[7-10]

In Cebu, Philippines, there are freeware and paid software alternatives that are available via different software companies. The exact data and demographics on the use of dental patient management software (DPMS) is not available. There are 3 dental schools that currently offer the dental program. A dental school is currently working with a group of European IT experts in testing the Smart DentalBox (SDB).[11] The SDB is a dental practice management device that is capable of scheduling patients, sending short message service (SMS), treatment planning and diagnosis, 2-D dental charting, and medical history recording. (FIG. 1)

This study evaluated the dental students' perceived usefulness and perceived ease of use of the SDB in a dental school in Cebu, Philippines.

II. Materials And Methods

This inquiry into the TAM in healthcare IT utilized a cross-sectional survey method to gauge the dental students' perceived usefulness and perceived ease of use in using the SDB in a dental school in Cebu, Philippines. The SDB is a prototype hardware and software that was installed or wall-mounted in the prosthodontic clinic of the dental infirmary of a dental school. This device is capable of managing patient records, simplified finances, digital charting, automatic treatment plan generation based on charting, comprehensive report creation and patient communication through SMS. The clinic has 12 dental chairs and is located at the first floor of the dentistry building.

The response rate of the participants was 100%, composed of 90 junior and senior dental interns, and was selected through purposive sampling. The instrument used in the study was the Measurement Scale for Perceived Usefulness and Perceived Ease of Use[12,13], which is composed of 12 questions. There are 6 questions that are directed to measure the perceptions on usefulness and 6 questions to assess the perceptions of the ease of use.

The participants were given a one-day seminar to orient them with the process of utilizing the device and software in replacement of the conventional paper dental charts. After 6 months of regularly using the SDB, survey questionnaires were given and data were collected. The survey results were tabulated and subjected to a statistical software package.

III. Results

3.1. Demographic profile of the participants

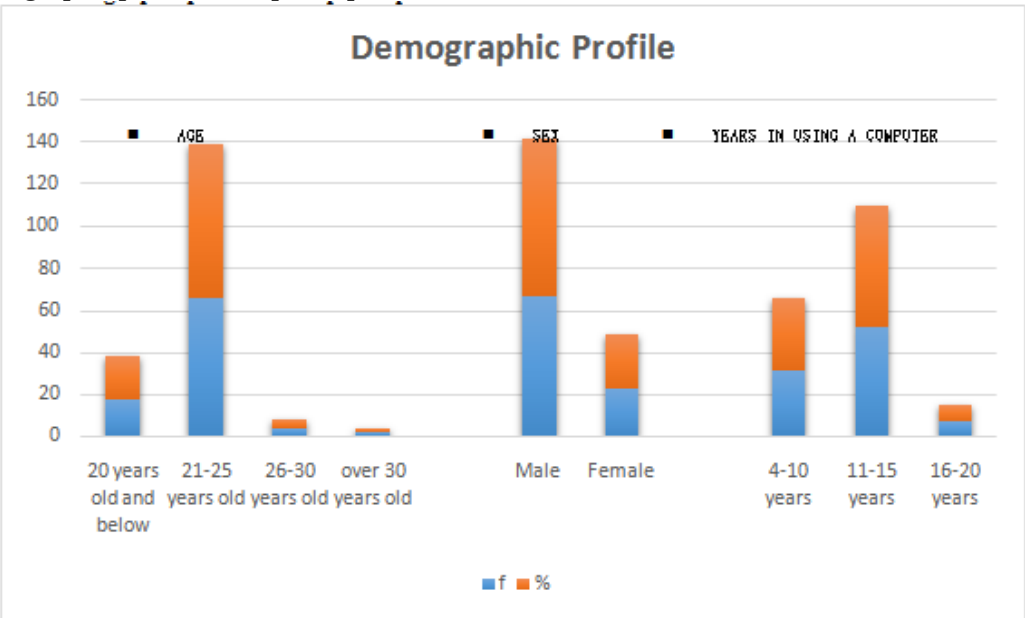

Figure 2. A stacked column graph showing the demographic profile of the participants.

Based on the results of data gathering, 66 (73.33%) of the participants were aged 21-25, males with 67 (74.44%) outweigh females with 23 (25.56%), and 52 (57.78%) of them have been using a computer for 11-15 years. (FIG. 2)

3.2. Perceived level of usefulness

Table 1. Perceived level of usefulness of the Smart DentalBox

Questions	Weighted Mean	Interpretation
1. Using SDB would enable me to accomplishtasks more quickly	5.82	Quite High
2. Using SDB would improve my clinical work performance	5.96	Quite High
3. Using SDB would increase myproductivity	6.02	Quite High
4. Using SDB would enhance myeffectiveness in my clinical work	5.98	Quite High
5. Using SDB would make it easier to do my clinical work	6.03	Quite High
6. Using SDBis useful in my clinical work	6.13	Quite High
Grand Mean	5.99	Quite High

The grand mean pertaining to the dental students' perception on the level of usefulness of the SDB was interpreted at 'quite high' (5.99). Questions pertaining to the ability of the SDB to aid the quick accomplishments of tasks (5.82), improvement of clinical work performance (5.96), increase of productivity (6.02), enhancement of clinical work effectiveness (5.98), rendering the clinical work easy (6.03), and usefulness in the clinical work (6.13) all scored 'quite high'. (TABLE 1)

3.3. Perceived ease of use

Table 2. Perceived level of ease of use of the Smart DentalBox

Questions	Weighted Mean	Interpretation
1. Learning to operate the SDB would be easy for me	6.08	Quite High
2. I would find it easy to get the SDB to do what I want todo	6.01	Quite High
3. My interaction with the SDB would be clearer andunderstandable	6.08	Quite High
4. I find the SDB to be flexible to interact	6.83	Extremely High
5. It would be easy for me to become skillful at using the SDB	6.14	Extremely High
6. I find the SDB easy to use	6.17	Extremely High
Grand Mean	6.22	Extremely High

Meanwhile, the grand mean (6.22) concerning the perception of the dental students towards the ease of use of the SDB returned 'extremely high'. Based on the individual weighted mean, the participants perceived learning to operate (6.08), ease of manipulation (6.01), and ease of understanding the device (6.08) to be quite easy or 'quite high'. In contrast, questions relating to interaction flexibility (6.83), ability to develop skill in using the SDB (6.14), and ease of use (6.17) scored 'extremely high'. (TABLE 2)

3.4. Perceptions of usefulness and ease of use

Table 3. Relationship between the perceived usefulness and perceived ease of use of the Smart DentalBox

	Critical r value	Computed r value	Decision	Interpretation
Level of usefulness and level of ease of use	0.2164	0.45322	Reject Ho	Significant

The test for significant relationship yielded positive for the perception of usefulness and perception of ease of use of the SDB. (TABLE 3)

IV. Discussion

This study is another inquiry that supports the TAM in IT healthcare.[7,10] The results showed that the use of a DPMS is perceived to be useful by the dental students. In detail, the SDB is perceived to enable the dental student to accomplish the dental charting phase more quickly.[11] It is also identified to improve the quality of their work performance. This will lead to an increase in productivity, enhancement of clinical work effectiveness, ease in doing clinical work, and perception of usefulness of the software in relation to clinical work. While the results yielded sufficient to express the perceived usefulness of the IT device, there are still some room for improvements.[8,9]

Furthermore, the participants in their clinical work thought that the operation or utilization of a DPMS would be quite easy to learn, easy to manipulate, and easy to understand. If a handbook, a manual, or an instructional video is readily available, it would help improve the affinity of these dental clinicians to use a DPMS. On the other hand, interaction flexibility, ability to develop skill in using the software, and ease of use were highly and unhesitatingly perceived by the dental students.[7-11]

To conclusively verify the TAM in the use of the SDB by the dental interns of this dental school, the statistical test yielded significant.[12,13] While the results produced a consequence inclined to the usefulness of the SDB, an in-depth study should be done to measure its actual usefulness and ease of use.

V. Conclusion

The dental students perceived the DPMS to be useful and easy to use in the dental infirmary of this dental school. TAM is also implicated to be a useful model and a determinant of the dental students perceived ease of use and perceived usefulness of the IT healthcare device. This study supports and contributes to the TAM in the healthcare setting.

Acknowledgments

The authors would like to express gratitude and acknowledge the cooperation of the research participants, Southwestern University PHINMA, Softshore Solutions, Inc., and IPX Trading.

Source of funding

This research has not received any funding of any sort from any individual or organization.

Other disclosures

Nil

Disclosure of ethical approval

This study has been found exempt from ethics review by the Institutional Review Board (IRB) of Southwestern University PHINMA. The IRB granted exemption on the basis of the ethical guidelines of the Declaration of Helsinki.

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