

Use of web-based educational technology by Brazilian oral health professionals

André Cavalcante da Silva Barbosa*; Carmem Virgínia Cerquinho de Oliveira**; Maria Cecília Neves Gueiros***; Maurício Cosme de Lima****; Márcia Maria Vendiciano Barbosa Vasconcelos*****; Arnaldo de França Caldas Júnior*****

- * Doctoral degree, Substitute Professor, School of Dentistry, Universidade Federal de Pernambuco, Brazil
- ** Dentist
- *** Doctoral student, Postgraduate Program in Dentistry, Universidade Federal de Pernambuco, Brazil
- **** Teaching Staff Member, Education Course, Centro Universitário Joaquim Nabuco, Brazil
- ***** Teaching Staff Member, Dentistry Course, Universidade Federal de Pernambuco, Brazil

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ABSTRACT

The present study aimed to analyze the use of web-based educational technology on the part of dentists, and oral hygienists enrolled in a training course for offering healthcare to disabled individuals and evaluate access to the Internet, duration of the use of technological resources and objectives when using the Internet. A descriptive study was conducted with data collected from the Virtual Brazilian Dentistry Training Environment for Care Offered to Disabled Patients at the Open University Site of the Brazilian Public Healthcare System using an electronic questionnaire available on the site. The sample was composed of 2377 oral health professionals enrolled in the course who agreed to answer the questionnaire. The data were analyzed using descriptive statistics. Little more than half of the sample (54.05%) used more than one technological resource for their connection to the virtual world in their daily lives; 54.56% of the respondents accessed the Internet from their own homes, and 57.21% used a wireless/Wi-Fi system. A total of 58.9% of the sample reported that the new technological resource offers a fair degree of difficulty. The use of digital technology occurs in Brazil. While available, a large part of the population does not appear to use this technology for the purposes of continued education.

Descriptors: Distance Education. Educational Technology. Education in Dentistry

1 INTRODUCTION

E-learning or online learning is a method by which students receive instruction from classes that are given by teachers in online videos and may involve solitary/individual or collaborative/group activities. The form of communication may be synchronous (occurring in real time with all students online at the same time) or asynchronous (enabling flexibility in the choice of study time)¹.

This teaching strategy uses the Internet, which is communication vehicle that has been increasingly employed in the education of health professionals since the last decade. The development of online educational tools enables better learning, making the educational environment more interactive, which is a motivating factor for the use of new learning aids on the part of students².

Despite these motivating resources, e-learning does not necessarily result in an increase in learning compared to a traditional classroom, which also employs print material (books, articles and course packs).³ Indeed, the traditional method in conjunction new technologies (combining learning environments) achieves better results compared to each method separately. However, online learning offers advantages for students who work off campus at community clinics or health professionals who want to participate in e-conferences or take continuing education courses, but do not have time to be physically present at such events or classes¹.

These new interactions in the learning process have emerged through changes in educational technologies that use the Internet. Technology is currently able to offer online environments that can be used to improve teaching and learning in the field of dentistry. These environments are not only accessible but are also robust and significant learning tools.

Students feel comfortable in such environments. However, the benefits of learning in this manner depend not only on the technology but also on collaborations among students and teachers⁴.

One of the benefits of online learning is the potential to change the passive learning paradigm centered on the teacher, making the student the main actor in the process. This student-centered approach is described in the theory of constructivist learning, which is often associated with e-learning, as it envisions active participation in which the learner constructs new ideas/concepts based on knowledge acquired through classes administered in the traditional fashion².

With regard to the teaching resources employed, students have a particular preference for printed material in comparison to digital texts. However, many dental students accept the use of electronic resources to complement the traditional method^{5,6}. Students can currently acquire a large amount of information from an immense variety of sources quickly, easily and without leaving their homes. Using DVDs, digital textbooks and sites with interactive tutorial videos, dental students can learn in a way that is adapted to their own individual studying style⁷.

Thus, the present study aimed to analyze the use of web-based educational technology on the part of dentists, and oral hygienists enrolled in a training course for offering healthcare to disabled individuals and evaluate access to the Internet, duration of the use of technological resources and objectives when using the Internet.

2 METHODS

This study received approval from the Human Research Ethics Committee of the *Universidade Federal de Pernambuco* (UFPE)

(certificate number: 40431614.4.0000.5208), although the study involves research in the database of free access to the public in which the subjects surveyed were not identified.

A descriptive study was conducted with the use of an electronic questionnaire administered to Brazilian oral health professionals (dentists and oral hygienists) enrolled in the *Atenção e Cuidado da Saúde Bucal da Pessoa com Deficiência* (ACPD [Disabled Oral Healthcare Training Course]. The participants accessed the webpage of the *Universidade Aberta do Sistema Único de Saúde* (UNA-SUS-UFPE [Open University of the Brazilian Public Healthcare System and Federal University of Pernambuco]) and located the page dedicated to the training course, on which the link to the electronic questionnaire was found.

The sample was composed of 2377 oral health professionals who agreed to answer the questionnaire among a total population of 5599. Therefore, the sample was representative of the population enrolled in the training course.

The data collection instrument was an electronic questionnaire, that aimed to detail the use of educational technologies on the part of Brazilian oral health professionals. It also verifies the principal means of access; difficulties encountered in the use of these technological tools, especially the use of the Internet, duration of use and main purposes of the use of these technologies. This questionnaire is used continuously in the course promoted by UNA-SUS.

After the verification of the answers, the data were analyzed using descriptive statistical methods, with the determination of absolute and percentage distributions. The Statistical Package for the Social Sciences (SPSS) 20.0 was used for the organization of the data and

statistical calculations.

3 RESULTS

Two thousand three hundred and seventy-seven individuals participated in the study: 37.90% from the southern region, 45.39% from the southeastern region and 16.70% from the northern and northeastern regions of Brazil. More than half of the sample (54.05%) used more than one technological resource to connect to the virtual world in day-to-day life. A laptop was most widely used equipment (27.55%).

A total of 54.56% reported accessing the Internet from their own homes, and 39.41% reported accessing the Internet from different locations, such as their own homes, friends' homes, university, work and commercial establishments, such as a cyber café. The most widely used types of Internet connection were wireless/Wi-Fi (57.21%) and a 3G network (18.64%) (table 1).

When asked about the degree of difficulty in using a new technological resource, such as programs, equipment, applications, etc., the majority of respondents (58.9%) reported a reasonable degree of difficulty and 21.5% reported that the use of new technologies was easy. A total of 76.48% and 19.81% reported accessing the Internet on a daily and weekly basis, respectively, and 35.97% reported spending five or more hours connected to the Internet during the week (table 2).

The purpose of using in the Internet was also analyzed. The vast majority of respondents (89.44%) reported using the Internet for more than one purpose, such as work, studying, entertainment, research, and social contacts. The vast majority of the respondents (94.32%) also accessed more than one type of site, such as e-mail providers, relationship sites, social media, search engines, news sites, etc. A total of 71.72% of the respondents reported that more

than one resource captured their attention, such as videos, texts, comic strips, games and podcasts. Those who only directed their attention at videos accounted for 13.96% of the sample and 13.20% directed their attention to reading texts during their use of the Internet (table 3).

Facebook was one of the most used social media, as more than half of the respondents

(58.47%) reported having a Facebook profile. Moreover, 23.72% reported having profiles on more than one site, such as LinkedIn, Twitter, YouTube, blogs, etc.

The use of the Internet for distance teaching was also investigated: 63.95% of the sample reported never having taken an online course (table 3).

Table 1. Frequency of use of digital media according to device used, place of access to technologies and type of connection

Devices used	n	%
Smartphone	37	1.55
Tablet	34	1.43
Ultrabook	10	0.42
Laptop	655	27.55
Desktop computer	356	14.97
More than one device	1285	54.05
Places of access to technologies		
Home	1297	54.56
Work	86	3.61
University	-	-
Friends' homes	32	1.34
Local area network	18	0.75
More than one place	937	39.41
Type of connection		
3G	443	18.64
4G	56	2.36
Wireless - WiFi	1360	57.21
Public WiFi	50	2.10
Dial-up	120	5.05
Does not know	348	14.64

Table 2. Use of digital media according to frequency of Internet use, weekly duration of Internet use and degree of difficulty using new technological resources

Frequency of Internet use	n	%
Daily	1818	76.48
Weekly	471	19.81
Bi-weekly	28	1.18
Monthly	8	0.34
Almost never	52	2.19
Weekly duration of Internet use		
Less than 1 h	198	8.33
Between 1 h and 2 h	522	21.96
Between 2 h and 3 h	409	17.21
Between 3 h and 4 h	393	16.53
5 h or more	855	35.97
Degree of difficulty using new technological resources		
Very easy	66	2.78
Easy	511	21.5
Somewhat difficult	1400	58.9
Difficult	322	13.55
Very difficult	78	3.28

4 DISCUSSION

The findings of the present study demonstrate that the use of digital technologies is common, as more than half of the sample reported using various technological resources in their daily lives, such as desktop computers, laptops, smartphones, ultrabooks and tablets, the most common of which was a laptop (27.55%). The majority of oral health professionals (76.48%) access the Internet on a daily basis. These technological media are often used as educational methods, especially in the field of dentistry^{3,5,8,9}.

With technological advances, access to the Internet has become increasingly popular, offering a growing number of options that facilitate access to the worldwide network of computers wherever a user may be. In the

present study, the Internet was predominantly accessed from the respondents' own homes, but a variety of other locations were also reported, such as a university, workplace, friends' homes and commercial establishments. These findings demonstrate that access to the Internet has become popularized, but remains lower than that found in countries such as Australia, where 72% of homes have access to the Internet⁵ and where university campuses offer free access to the Internet to students. According to Denvir *et al.* (2011)¹⁰ access to the Internet continues to grow. In a survey on the Internet conducted at Oxford in 2009,¹¹ 70% of the homes surveyed had access to the worldwide web, which was a 12% increase from when the study began in 2003. However, the "digital divide" is no longer about physical access to the Internet; it also

involves the individual will to use the Internet as a source of information and the ability to do so¹⁰.

Table 3. Use of technology according to reason for using Internet, most accessed types of sites, Internet resources that draw attention, social media profiles and having taken distance teaching course other than ACPD training course through Internet

Variables	n	%
Purpose for using Internet		
Study	81	3.40
Work	27	1.13
Entertainment	43	1.80
Research	58	2.44
Personal reasons	42	1.76
More than one purpose	2126	89.44
Types of sites accessed most		
E-mail	64	2.69
Relationship sites	0	0
Social media	13	0.54
Search/research sites	36	1.51
News sites	4	0.16
Other	18	0.75
More than one site	2242	94.32
Internet resources that attract attention		
Videos	332	13.96
Texts	314	13.20
Comic strips	9	0.37
Games	15	0.63
Audio (podcasts)	2	0.08
More than one resource	1705	71.72
Profile in social media		
Facebook	1390	58.47
LinkedIn	14	0.59
Twitter	7	0.29
YouTube	8	0.34
Blogs	3	0.12
Others	391	16.44
+1	564	23.72
Took course other than ACPD training course in distance education format on Internet		
Yes	857	36.05
No	1520	63.95

The capacity to use technological resources was evaluated in the present study. More than half of the respondents reported that new technologies had a reasonable degree of difficulty, whereas a small portion reported that the technologies were challenging to use.

Thus, the findings demonstrate that the majority are familiar with the technology and are able to use it without a certain degree of ease. There is a variety of relevant aspects to the skills necessary to using the Internet in an effective manner, including operational skills with regard to managing both hardware and software, search engines as well as the selection and processing of tools. The skill level individuals have is likely related to what they do online, as those who are more qualified tend to occupy a broader gamut of online activities¹².

The majority reported using the Internet for more than one purpose, such as personal reasons, studying, work, research and entertainment. A previous study also reports the use of the Internet for multiple activities, including as a means of social inclusion.⁵ The identification of Internet use patterns can assist in the establishment of educational policies and practices aimed at ensuring that all students are able to develop the necessary skills, confidence, knowledge and support regarding access to the Internet, thereby enabling the maximum benefits from this tool both within and outside of formal contexts of education¹².

E-mail accounts, search sites, social media and blogs are reported to be facilitating factors in the learning process^{1,5,7}. In the present study, the majority of respondents reported using more than one type of site when connected to the Internet, the most cited of which were e-mail, relationship sites, news sites, search sites and other types of sites.

The ease of access to technological resources was evident in the fact that more than half of the sample reported using various resources, such as videos, podcasts, comic strips, texts and games, with significant numbers for videos and texts. There has been an increasing use of videos in e-learning^{1,8}. In

a study conducted with students at Baylor College of Dentistry,¹ the use of video classes given by professors from the campus was found to assist in improving both knowledge and learning. Texts constitute a widely used resource, whether online or in traditional book format¹. However, one study found that 75% of the university students researched preferred printed texts over e-textbooks⁹. The findings demonstrate the importance of videos for the purpose of learning, but there are divergences with regard to its constant use in an isolated fashion.

Due to the current popularity, the use of profiles on social media, such as Facebook, LinkedIn, Twitter, YouTube, blogs, etc., was evaluated. Facebook was the most cited social media. The reason for posing this question in the study was related to the large number of students who have profiles registered with the site and the fact that the research/professor has begun to explore these new technologies for educational purposes¹³. However, the use of this resource is recent and its real potential in becoming sustainable is not known due to its two-dimensional, non-immersive nature and the limited amount of educational information¹⁴.

Although access to technological information resources is part of the day-to-day living of individuals, when asked whether they had taken another course with this method of studying, the majority of respondents reported never having taken distance education courses. Thus, difficulties are found in the use of educational technology in all fields and in universities. In recent years, factors such as the velocity of information, new skills, the demands of the workplace and easy access to technology encourage the adoption of technology in the classroom and other learning settings¹⁵.

5 CONCLUSION

Based on the findings of the present study, the use of the Internet is constant among the participants and the purposes vary among personal reasons, studying, work, entertainment and research. Access to technological media is not restricted to only one type of device, which demonstrates the greater availability of electronic resources on the part of the sample analyzed.

E-learning as a learning tool was considered relatively easy to use by the Brazilian oral health professionals and most respondents are taking a distance education course for the first time.

RESUMO

Uso da tecnologia educacional *web-based* por profissionais da Odontologia brasileira

O objetivo deste estudo foi analisar o uso da tecnologia educacional *web-based* por cirurgiões-dentistas e auxiliares de saúde bucal cadastrados no curso de Capacitação para Atenção e Cuidado da saúde bucal da pessoa com deficiência (ACPD) e avaliar as dificuldades de acesso à internet, o tempo de utilização dos recursos tecnológicos e os seus objetivos. Foi realizado um estudo descritivo dos dados coletados em Ambiente Virtual da Capacitação da Odontologia Brasileira para a Atenção e o Cuidado da Pessoa com Deficiência - ACPD, no site da Universidade Aberta do SUS (UNASUS-UFPE), por meio de um questionário eletrônico disponibilizado no *site*. A amostra foi composta por 2.377 profissionais cadastrados no curso e que se disponibilizaram a responder o questionário. A análise dos dados foi realizada por técnicas de estatística descritivas. Constatou-se que pouco mais da metade da amostra (54,05%) utiliza mais de um recurso tecnológico para sua conexão com o mundo virtual no dia a dia e 54,56% dos participantes relataram acessar a *internet* da própria residência. A rede *Wireless/Wi-Fi* é utilizada por 57,21% do total da amostra. Quanto ao grau de dificuldade encontrado pelos participantes ao utilizar um novo recurso tecnológico, 58,9% relataram ser

razoável. O uso da tecnologia digital já é uma realidade no Brasil. Porém, sua utilização para fins de estudo, embora disponível, parece não ser utilizada por grande parte da população.

Descritores: Educação a Distância. Tecnologia Educacional. Educação em Odontologia

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Correspondence to:

André Cavalcante da Silva Barbosa

e-mail:andreccb35@gmail.com

Rua Hermílio gomes, 215

52031-020 Campo Grande – Recife/PE