Digital information and communication technologies as a support to the Internship in Dentistry

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ABSTRACT

This study aimed to apply the Digital Information and Communication Technologies (DICT) as a support to the teaching in the training ground of Dentistry through an open virtual teaching environment (VTE), that meets the needs of the internship. An evaluation system has been developed that has analyzed many aspects of field learning. A portfolio of activities was implemented as an educational strategy in the VTE and categories and criteria for its analysis were elaborated. The most used tools in the VTE were the portfolio, the discussion forum and the logbook, according to the students' opinion. Approximately 80% of the students and 100% of the tutors stated that the insertion of the VTE favored the teaching-learning process. The digital tools created were considered to be learning facilitators by the evaluated students and tutors. DICT has contributed to the improvement of undergraduate courses, involving students and teachers more intensely, integrating them into communication strategies, often already used in diverse contexts outside the university. It was possible to characterize the analyzed students as being the majority female, single and childless. In addition, most students only study. The students evaluated the performance of the tutors as positive. No difficulties experienced by students and tutors with the use of the VTE were reported. The use of these technologies focused on the curricular components of the course involved, prioritizing synchronous and asynchronous access to content, student autonomy and the dissemination of a digital culture. The adequacy of teaching methodologies allowed for improvements in the academic performance of students, teachers and tutors and stimulated the process of permanent education, facilitating teaching-learning in the Internship in Dentistry.
Descriptors: Health Education. Educational Measurement. Education, Distance.

1 INTRODUCTION

Since the 1950s it was sought to offer, in the courses of the health area, experiences which would provide the teaching-service integration. However, this theme, despite being debated for more than half a century, is still current, since teaching and health services are dynamic, always in the change process[1].

The Dentistry course has as one of its greatest challenges the consolidation of the supervised internship as a real impact strategy in the transformation of professional training, in the context of a comprehensive curricular structure that includes both the clinical practice of specific disciplines and experiences aimed at the education-services-community integration[1-3].

This teaching-service relationship is complex, depending on many local factors. On the one hand the university, which has few teachers dedicated to internships, the number of students often being incompatible with the number of teachers, resulting in inadequate supervision; on the other hand, the service network, which cannot always accommodate all the trainees in one place, making it difficult to adapt the timetables between field tutors, students and teacher supervision. In addition, there is often a lack of clarity in the definition of teacher and tutor assignments for teamwork and evaluation of activities developed[2-3].

In this perspective, the present study sought to implement the use of Digital Information and Communication Technologies (DICT) in the teaching-learning process in the In-Service Internship of the SUS I of the School of Dentistry of the Federal University of Ceará (UFC). Thus, a virtual teaching environment (VTE) was used as a pedagogical and social practice, as a language for representing knowledge and, therefore, structuring in the curriculum.

In this context, an educational portfolio was implemented, in the VTE, as an object of study for scholars. The portfolio is understood as a facilitating instrument for the construction and reconstruction of knowledge, allowing student reflection on local reality, identifying problems and analyzing them critically. The search for knowledge, creativity and written production are encouraged so that the student trains his/her own formative course accompanied by the teacher, who will evaluate this journey[4].

VTEs are also widely used as a means of evaluation, since they focus the attention of all (students from the same group, teachers and tutors), making the work of trainees important and facilitating the exchange of experiences between groups. Despite the widespread use of VTE in several areas of knowledge, it is still rare to use this active methodology in Dentistry courses. In the literature it is also possible to observe the inexistence of this experience in the stages of Dentistry courses.

The objectives of this study were to create an VTE and evaluate the teaching-learning process in the curricular stage of the Dentistry Course, in addition to characterizing the sociodemographic and training profile of the students; analyze whether there were benefits to the teaching-learning process with the use of the VTE; to evaluate the performance of tutors, according to the opinion of the trainees, and to identify possible difficulties experienced by students and preceptors with the use of the VTE during the teaching-learning process.

2 METHODOLOGY

The research was approved by the Research Ethics Committee of the UFC (protocol 542.042, CAAE: 18207613.1.0000.5054) and the subjects who agreed to participate signed the Informed Consent Form.

This is a descriptive, cross-sectional study with a quantitative approach, conducted at the Dentistry Course of the UFC. Data collection

was carried out by a single researcher, using a structured questionnaire, divided into five categories of analysis: sociodemographic profile, training profile, evaluation of the TelEduc VTE, evaluation of the teaching-learning process and evaluation of the tutor. The instrument was distributed to students and tutors on the last day of the internship, at which time a final seminar was held on the activities developed in each field.

The validation of the questionnaire was carried out in a pilot test with 10 students of the discipline, in order to analyze the understanding of the instrument as a whole and of each item in isolation. The students who participated in the pilot test were excluded from the final sample. It was defined as a study field the In-Service Internship of the SUS I (ESSUS I), performed in 4 Units of Primary Health Care (UAPS) in the 9th semester of the Dentistry Course of the UFC, counting on 03 supervising teachers, 04 field tutors – dental surgeons of the health service, with 40 vacancies per semester and a three-hour workload, equivalent to 48 hours per week of field activities.

Active students and tutors in two semesters participated in the research. Students should be regularly enrolled in ESSUS I and have participated in TelEduc distance activities in order to be included in the sample.

Implementation of a Virtual Learning Environment for university use, using Internet technologies in the educational process and attending to the peculiarities of the Internship

TelEduc is free and open-source distance learning *software* through which courses can be conducted via the Internet, developed by the Nucleus of Informatics Applied to Education (NIED) of the State University of Campinas (UNICAMP), available through Virtual UFC, by the Open University of Brazil. Its development has taken place since 1997 in a participatory way,

that is, all its tools have been idealized and projected based on the needs of users, besides having support for multiple languages in order to meet the demand for international use of the environment. It has characteristics that distinguish it from the other environments for distance education available in the market, such as ease of use by non-computer specialists and a concise set of functionalities[5].

Pedagogical management and administration of the VTE

For the execution of the project, meetings and workshops of pedagogical training of teachers and tutors with a pedagogue were necessary, as well as the training of teachers, tutors and students to use the VTE.

The technical support for the management of the VTE was carried out by the Multimedia Research Laboratory of the Faculty of Education/UFC, which has a solid patrimony in knowledge and technology and counts on the work of monitors to clarify doubts in the *online* system.

Evaluation system

It was sought to use the principles of formative evaluation, which can be understood as *"a continuous evaluation practice whose main objective is to improve ongoing learning, contributing to the monitoring and guidance of students throughout their training process"* [6]. This method of evaluation provides important information about the teaching-learning process: to the teacher, who will be informed about the real effects of his/her actions; and the student, who will have the opportunity to know his/her difficulties and possibly recognize and correct his/her own mistakes.

An evaluation system was implemented in ESSUS I that made possible the intervention in the different aspects of learning, and the

students' final grade was composed of the following criteria and categories of analysis: attendance and participation in face-to-face meetings, attendance and participation in distance activities and grade of the portfolio.

The participation in the distance meetings was evaluated through the results generated by the InterMap and Acessos tools, which analyzed the quantitative of the records of the interactions. InterMap maps the interaction and participation of course members[7] and the Accessos tool generates reports on users' access to the course and each of the TelEduc[5] tools. Continuous distance evaluation could be carried out by analyzing the records of participation in the course and was especially important in the context of distance education, because it allows the student's perception of the student's behavior and helps to identify problems[8].

A system was also implemented to evaluate the educational portfolio, containing categories and criteria of analysis based on the cognitive, productive, attitudinal and relational dimensions that students should develop during the internship (organization of knowledge, competence to evaluate their own performance, organized elaboration concepts and development of skills and abilities, among which the reflexive practice was highlighted).

The Evaluation System was guided by the principles of formative evaluation and the definition of competences, which is the set of knowledge, skills, attitudes and behaviors manifested in the performance of certain activities through actions observable by the other participants in the process[8]. Chart 1 shows how students' final grades were cataloged and chart 2 contains the criteria and analysis categories of the portfolio.

Chart 1. Composition of the final grade of students regularly enrolled in the In-Service Internship of the SUS I, with the use of DICT

% Frequency	Attendance and participation in face-to-face meetings (0-30 points)	Attendance and participation in distance activities (0-20 points)	Portfolio (0-50 points)	Final grade (100 points)

Chart 2. Composition of the final grade of the portfolios of students regularly enrolled in the In-Service Internship of the SUS I

Organize the student's knowledge (0-10 points)	Improve skills/abilities: linguistics, participatory observation, reflective practice and other (0-10 points)	Provide participants the development of competence to evaluate their performance (0-10 points)	Facilitate orderly elaboration of concepts (0-20 points)	Total (50 points)

Statistical analysis

Data were tabulated in Microsoft Excel and exported to Statistical Package for Social Sciences (SPSS) statistical *software*, version 17.0, in which all analysis were performed considering a 95% confidence level.

Absolute and percentage frequencies of the presented data were calculated, which were analyzed using Fisher's exact test or chi-square test, depending on the indication. The number of children and the age of the interviewees were analyzed using Student's t test (parametric data, normality verified by the Kolmogorov-Smirnov test).

3 RESULTS

Sociodemographic profile

The study population was composed of 72 students (95%) out of a total of 76 regularly enrolled in the internship and 4 tutors (100%) involved.

The students' profile was the average age of 23.5 ± 1.7 years, with 66.7% (n=48) female, 95.8% (n=69) singles, 97.2% (n=70) had no children and 76.4% (n=55) lived with their parents. Most of the students (95.8% - n=69) reported only studying. In relation to the field tutors interviewed, the average age was approximately 35 years, all being married and female.

It was verified that 97.2% of the analyzed students had computers at home to carry out activities at a distance. However, approximately 48.6% stated that this computer is not for individual use, that is, it is shared with the rest of the family.

Regarding the type of internet used, 84.7% of the students used broadband, facilitating the activities requested in TelEduc. As for internet access to carry out these activities, 91.7% of those surveyed stated that they use the internet at home and only 4.2% say they access the internet in college. The cross-referencing of the variable have a computer at home, with type of internet and access point allowed to statistically prove that students who have computers access the internet through broadband and more frequently at home, which favors the use of learning teaching methodologies distance (table 1). All tutors who were part of the stage have a computer at home, with broadband internet access.

One of the quality indicators of a discipline with distance support is the infrastructure, where computer labs stand out. In this sense, the Faculty of Pharmacy, Dentistry and Nursing of the UFC offers a computer lab with 24 computers and internet access. The Dentistry Course of the institution also provides a technical support room with seven computers with internet access, a printer and two tables for meetings, which provided pedagogical support. There was also technical support for the management of the VTE, which was done by the Multimedia Research Laboratory of the Faculty of Education/UFC.

Training Profile

Most of the students interviewed (95.8%) participated or had participated in a university extension project, showing a statistically significant difference in relation to other activities they performed, such as monitoring, research, non-compulsory training, extracurricular and distance courses.

As for the tutor's training profile the results showed that 50% (n=2) of the tutors had already taken some distance course. However, only 25% (n=1) of field tutors had experience with distance learning, since it showed the importance of training before the beginning of activities in the VTE.

The Virtual Teaching Environment

The tool of TelEduc which has made the bigger contribution to the learning according to the students was the portfolio, differing significantly from the others. However, in the tutor's opinion, it was the discussion forum that

contributed most to the teaching-learning process of the students (75%, n=3).

Evaluation of the teaching-learning process

Most of the students considered TelEduc a learning promoter (83.6%, n=56) (table 2).

All tutors have affirmed that the evaluation strategies have facilitated the understanding of the individuals, and have considered that TelEduc has favored the teaching-learning process.

Table 1. Association between the variables have computer at home, second, have internet at home, type of internet and place of access of students of ESSUS I in the Dentistry Course.

	Have a computer at home		
	No	**Yes**	**p-Value**
Have internet			
No	1 (50,0%)	2 (2,9%)	0,084
Yes	1 (50,0%)	66 (97,1%)	
Type of internet			
Broadband	-	61 (98,4%)*	0,032
3G	1 (100,0%)	1 (1,6%)	
From where you access more			
Home	1 (50,0%)	65 (92,9%)	<0,001
At *LAN gaming center*	1 (50,0%)	-	
Family members' home	-	1 (1,4%)	
At college	-	3 (4,3%)	
Other	-	1 (1,4%)	

*p<0.05 – Fisher's exact test or chi-square test

Table 2. Association between the variables opinion of the ESSUS I students of the Dentistry Course on the teaching-learning process and TelEduc as a learning promoter

	Consider TELEDUC a learning promoter		
	No	**Yes**	**p-Value**
The guidelines were clear			
I fully agree	3 (27.3%)	31 (56.4%)*	0.026
I partially agree	7 (63.6%)*	24 (43.6%)	
Disagree	1 (9.1%)*	-	
Time was enough			
I fully agree	5 (45.5%)	39 (70.9%)*	0.022
I partially agree	3 (27.3%)	14 (25.5%)	
Disagree	3 (27.3%)*	2 (3.6%)	
The methodology has contributed to the learning			
I fully agree	-	26 (47.3%)*	<0.001
I partially agree	7 (63.6%)	29 (52.7%)	
Disagree	4 (36.4%)*	-	
Strategies have facilitated learning			
I fully agree	-	30 (54.5%)*	<0.001
I partially agree	8 (72.7%)*	25 (45.5%)	
Disagree	3 (27.3%)*	-	

*p<0.05, p<0.05 – Fisher's exact test or chi-square test

Evaluation of the tutor

The students also had the opportunity to evaluate the tutorship field. According to the majority of the trainees (43.7%, n = 31), the tutorship has always stimulated the activities in the TelEduc VTE, and this result was statistically significant.

Still on the tutorship's evaluation, the students agreed that the teachers has clarified doubts (59.2%, n=49) and has always contributed to the understanding of the contents (54.9 %%, n = 39), results with statistical differences on the other possible answers.

Tutors also had the opportunity to self-evaluate: 50% (n=2) considered that they have frequently stimulated their participation in TelEduc, 25% (n=1) stated that they have always stimulated students, with the same percentage affirming that this motivation has occurred sometimes. However, most tutors (75%, n=3) has considered that they have always clarified the doubts of the trainees.

4 DISCUSSION

Most of the students in this study were females, a reality that has also been observed in some studies[9,10] which proved the predominance of females in Dentistry courses. They were mostly single, had no children and lived with their parents, similar results had already been found[9].

It is fundamental that the institution has a computer lab with access to quality broadband internet, since the success of distance education for semipresential disciplines is in the availability of infrastructure for students who do not have access to the internet outside the university. Thus, the monitoring of the discipline and the accomplishment of proposed activities can be carried out without prejudice, since the students must have free access to consult the internet and compatibility between the quantity of equipment and the number of students attended, so that quality can be guaranteed[11,12].

The training profile of the students and tutors has shown that distance education had not yet been experienced by all. In recent years, there has been an exponential increase in the number of courses offered and enrollments in this modality. However, it is still possible to perceive the resistance of many higher education courses in adhering to this new modality of education, since many authors question its quality and effectiveness, although recent research concludes that the distance education modality can reach levels of quality equivalent or superior to the present modality[13,14,20].

The students believed that the portfolio was the instrument that most contributed to their learning, taking into account the need to deepen knowledge about the teaching-learning relationship, assuring students and teachers a greater understanding of what have been taught and, therefore, higher indexes of quality[15].

TelEduc was considered by students and tutors as a learning promoter. This result was important because the development of autonomy and self-organization is seen as one of the gains for the training of students who participate in courses in the blended mode, since distance activities demand such behaviors, because there is a relaxation of learning in relation to time and space[11].

Virtual learning environments allow the monitoring of the frequency and production of each student, since they consist of a large database that stores the frequency and attendance (date and time of access to the environment, date and time of access to each one of the tools available in the environment), published works, tasks performed and also the

messages exchanged between the participants of a course[16,17].

Therefore, the use of virtual environments offers new ways of acting in teaching, practicing the modality of distance learning in auxiliary courses, contributing in teaching-learning and facilitating communication between teachers and students.

The trainees' perception of the tutor as a stimulator of the VTE activity was relevant, since the effective involvement of the tutor is of fundamental importance, and should be a motivator and incentive of the teaching-learning process. Without the participation and encouragement of the tutor the success of a distance course decreases considerably[18,21]. A training process is necessary so that the trainees involved in the internships can realize their importance in stimulating their trainees in the participation of the distance activities.

5 CONCLUSIONS

The digital tools created were considered to be learning facilitators by the evaluated students and tutors. DICT have contributed to the improvement of undergraduate courses, involving students and teachers more intensely, integrating them into communication strategies, often already used in diverse contexts outside the university.

It was possible to characterize the analyzed students as being the majority female, single and childless. In addition, most students only study.

The students evaluated the performance of the preceptors as positive. No difficulties experienced by students and preceptors with the use of the VTE were reported.

The use of these technologies focused on the curricular components of the course involved, prioritizing synchronous and asynchronous access to content, student

autonomy and the dissemination of a digital culture. The adequacy of teaching methodologies allowed for improvements in the academic performance of students, teachers and tutors and have stimulated the process of permanent education, facilitating teaching-learning in the Internship in Dentistry.

RESUMO
Tecnologias digitais de informação e comunicação como suporte ao Estágio em Odontologia
O estudo visou aplicar as Tecnologias Digitais de Informação e Comunicação (TDIC) como suporte ao ensino no campo estágio em Odontologia através de um ambiente virtual de ensino (AVE) aberto, que atendesse às necessidades do estágio. Foi elaborado um sistema de avaliação que analisou os diversos aspectos da aprendizagem em campo. Foi implementado um portfólio de atividades como estratégia educativa no AVE e elaboradas categorias e critérios para sua análise. As ferramentas mais usadas no AVE foram o portfólio, o fórum de discussão e o diário de bordo, segundo a opinião dos estudantes. Aproximadamente 80% dos estudantes e 100% dos preceptores afirmaram que a inserção do AVE favoreceu o processo de ensino-aprendizagem. As ferramentas digitais criadas foram consideradas facilitadoras da aprendizagem pelos estudantes e preceptores avaliados. As TDIC contribuíam para a melhoria dos cursos de graduação, envolvendo de forma mais intensa alunos e professores, integrando-os às estratégias de comunicação, muitas vezes já tão utilizadas em contextos diversos fora da universidade. Foi possível caracterizar os estudantes analisados como sendo a maioria do sexo feminino, solteiros e sem filhos. Além disso, a maioria dos discentes somente estuda. Os estudantes avaliaram como positivo o desempenho dos preceptores. Não foram relatadas dificuldades vivenciadas pelos estudantes e preceptores com a utilização do AVE. O uso dessas tecnologias focou nos componentes curriculares do curso envolvidos, priorizando o acesso síncrono e assíncrono aos conteúdos, a autonomia dos discentes e a disseminação de uma cultura digital. A adequação das metodologias de ensino, permitiu melhorias no desempenho

acadêmico dos alunos, professores e preceptores e estimulou o processo de educação permanente, facilitando o ensino-aprendizagem no Estágio em Odontologia.

Descritores: Educação em Saúde. Avaliação Educacional. Educação a distância.

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