

Evaluation of the effectiveness of electronic educational course about special care dentistry for undergraduate dental students.

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ABSTRACT

E-learning is increasingly implemented during the COVID-19 pandemic. This wide implementation caused the need to investigate e-learning effectiveness. Therefore, this study was undertaken to investigate the effectiveness of electronic educational course about Special Care Dentistry (SCD) in improving the learning of undergraduate dental students. And measure participants' perceptions towards the course. About 13 undergraduate dental students (n=13) were accepted to participate in the educational course. Learning management System (LMS) of Syrian Virtual University was utilized to host the course. A pre/posttest questionnaire consisting of 50 identical multiple-choice questions was used to assess the knowledge of participants before and after the course. A questionnaire consisting of 26 items was also used to assess the attitude of students towards the electronic course in terms of ease of use and acquired usefulness. Descriptive statistic, Wilcoxon Signed Ranks Test, Cronbach's Alpha Coefficient were used. Significance value of 0.05 was considered statistically significant. The results showed an improvement in the acquired knowledge where the average score of students in the pretest is 13.69 with a standard deviation of 3.816, while the average score of students in the posttest is 86.31 with a standard deviation of 5.345. The learners considered that this course is easy to use and useful. So This study suggested that the e-learning can be effective for improving knowledge of undergraduate dental students.



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1. Introduction

Everyone in the world has the right to live, enjoy good health and have high quality social services and medical care. According to data from the World Health Organization 15% of the world's population are sick and have special conditions [1]. Special Care Dentistry (SCD) is concerned with the improvement of

oral health of two groups of people. The first group includes people who suffer from mental, medical, physical, emotional, and intellectual disorders. The second one includes people in long stay residential care and secure units [2].

In fact, the integration of SCD within university curricula is very limited in many countries and this in turn affects the dentist's ability to provide oral care services for special need patients (SNPs) [3].

The spread of COVID-19 pandemic has imposed many changes in all aspects of life. The education sector was not immune to the effects of this virus the thing that led to the closure of schools and universities in most countries in the world especially the severely affected ones by the pandemic [4].

With these exceptional circumstances, the trend was to increase academic activities around the world using e-learning.

E-learning is a way to increase active learning as the student is considered the center of the educational process. In addition to save time and reduce costs [5].

A study conducted on 2000 students from 11 countries shows that the majority of participants agreed that e-learning was satisfactory in acquiring knowledge, but not effective in acquiring clinical and technical skills [4].

In Syria, the knowledge of undergraduate dental students about oral care for SNPs is limited. Therefore, the purpose of the present study is to assess the improved knowledge of undergraduate dental students before and after their participation in the electronic course about SCD, in addition to measure their perceptions towards the mentioned course.

2. Materials and Methods

After obtaining the ethical approval number 1662/0, on 10 October 2021, from the research committee of the Syrian Virtual University (SVU), a semi-experimental study was undertaken.

Six educational modules about SCD were designed to be delivered in six weeks. The same time was set for both pretest and posttest within a specified hour to be passed by all the participants at the same moment.

The learning outcomes at the end of the course were the following:

- Understanding the principles of oral care for SNPs.
- A comprehensive understanding of the concept of disability and its classification.
- Dealing with various special and pathological cases.
- Acquiring knowledge about the oral effects of various special medical conditions and the basic terms of SCD.

The enrolled participants were added after specifying a username and a password for each of them on the Learning Management System (LMS) at SVU. Randomization was not used in the selection of the sample. 13 dental students from Tartous University participated in the study. The course was designed based on the asynchronous e-learning model. All educational electronic resources were downloaded on LMS website at SVU, so that learners can access them at any time. Students were trained on how to use LMS. As well as to a student guide that was added to the site, which contains notes and explanations on how students can enter, download lectures, inform about the goals and content of the educational course. The pretest questionnaire link (50 multiple-choice questions) was added to LMS website. After completing the pretest, electronic files were downloaded in Power Point format sequentially starting from the first module ending with the last one.

After the students finished reading and studying the electronic files, a posttest questionnaire link (the same pretest questions) was added to LMS.

A questionnaire link was added to measure students' perceptions towards the e-learning educational course. The questionnaire included personal data fields and 26 items that measured the attitudes of the students in terms of ease of use (12 items) plus acquired usefulness (14 items). The questionnaire adopted 5 point Likert scale.

Google Forms and the Statistical Package of Social Science software (IBM SPSS statistic version 26) were used for data collection and analysis. The responses were documented and presented with their corresponding values.

Wilcoxon Signed Ranks Test was used to analyze the average scores of students in the pretest and posttest. This study used a significance P value < 0.05 and a confidence interval of 95%.

Cronbach's alpha technique was considered in the study for measuring the internal consistency and the reliability.

3. Results

About 13 undergraduate dental students (faculty of dentistry, Tartous University) were accepted to participate between April and July 2021, and completed the online course hosted by the SVU. 53.8% of them in the fourth year and 46.2% in the fifth year.

All the participants completed both pretest and posttest questionnaires. In the pre-test, the average was 13.69/100 points; the range was 6-18 points. In the posttest, the average was 86.31/100 points; the range was 76-94 points.

Table 1 shows a difference between the grades before and after the electronic course. In the pretest the average score of the students was 13.69 ± 3.816 , whereas the average score of the posttest was (86.31 ± 5.345) .

Table 1: students' scores before and after the e-learning educational course.

	N	Mean	SD	Minimum	Maximum
Pretest scores	13	13.69	3.816	6	18
Posttest scores	13	86.31	5.345	76	94
<i>P-value</i>		0.001*			

N: number of participants, SD: standard deviation, * Wilcoxon Signed Ranks Test was used, P < 0.05

All the participants answered the attitude questionnaire, as shown in Table 2.

Majority of the participants found the course easy to use. All of them confirmed that they were trained to use the platform before beginning the course and that a guide was there for all the instructions. 84.6% of them confirmed that they had enough time to access the e- resources. 84.6% of the students did not find the electronic files difficult to deal with.

76.9% of the students found that e-learning is more flexible than traditional learning. Regarding the acquired usefulness, all the participants confirmed that their level of knowledge about the principle of

dental treatments for special need patients (SNPs) improved and their confidence in dealing with patients with special cases also increased after the course had finished. The independence of learning was simulated in 84.6% of the participants, also the self-discipline was improved in 76.9% of them. Although the electronic files sizes were taken into account to facilitate downloading and not requiring high internet speed, 92.3% of participants found the quality of internet was a problem. Cronbach's alpha in this study valued between 0.62 and 0.75.

Table 2: students' attitude towards the course in terms of ease of use and acquired usefulness.

The items (26)	Strongly agree%	Agree %	Do not know%	Disagree %	Strongly disagree%
1-I was previously trained on how to log into the virtual university's learning management system.	4 (30.8%)	9 (69.2%)	0 (0%)	0 (0%)	0 (0%)
2- A student guide was provided for each participant in the course.	4 (30.8%)	9 (69.2%)	0 (0%)	0 (0%)	0 (0%)
3- I didn't know how to access the e-Resources on LMS.	0 (0%)	0 (0%)	0 (0%)	13(100%)	0 (0%)
4-I think the instructions for logging into the course were clear.	2 (15.4%)	10 (76.9%)	0 (0%)	1 (7.7%)	0 (0%)
5- I had enough time to access the e-resources.	0 (0%)	11 (84.6%)	0 (0%)	2 (15.4%)	0 (0%)
6- The quality of the internet connection was a big problem for me.	2 (15.4%)	10 (76.9%)	0 (0%)	1 (7.7%)	0 (0%)
7- The schedule for the course was clearly defined.	0 (0%)	13 (100%)	0 (0%)	0 (0%)	0 (0%)
8- I found it difficult to deal with educational e- resources.	0 (0%)	2 (15.4%)	0 (0%)	11 (84.6%)	0 (0%)
9- Signing in to the course requires a high internet speed.	0 (0%)	0 (0%)	3 (23.1%)	10 (76.9%)	0 (0%)
10- I can communicate with the teacher at any time I need.	0 (0%)	13 (100%)	0 (0%)	0 (0%)	0 (0%)
11- Ease of communication with the technical support system of the Virtual University.	0 (0%)	8 (61.5%)	4 (30.8%)	1 (7.7%)	0 (0%)
12- Difficulty downloading e- files due to their large size.	0 (0%)	0 (0%)	1 (7.7%)	12 (92.3%)	0 (0%)
13- I think e- learning can be Simplified medical education.	0 (0%)	8 (61.5%)	3 (23.1%)	2 (15.4%)	0 (0%)
14- I think e-learning more flexible Than traditional education.	1 (7.7%)	9 (69.2%)	1 (7.7%)	2 (15.4%)	0 (0%)
15-I think that my participation in the course stimulated my independence of	0 (0%)	11 (84.6%)	0 (0%)	2 (15.4%)	0 (0%)

learning.					
16- I think that the assignments required of me had improved my self-discipline.	0 (0%)	10 (76.9%)	1 (7.7%)	2 (15.4%)	0 (0%)
17- I think that the information provided in the course was not useful to me.	0 (0%)	0 (0%)	0 (0%)	13 (100%)	0 (0%)
18- I think that the information provided is modern.	0 (0%)	10 (76.9%)	2 (15.4%)	1 (7.7%)	0 (0%)
19- I think that my participation in the Course increased my level of confidence in expressing opinions and ideas.	1 (7.7%)	10 (76.9%)	1 (7.7%)	1 (7.7%)	0 (0%)
20- I think the information provided was boring for me.	0 (0%)	2 (15.4%)	0 (0%)	11 (84.6%)	0 (0%)
21- I think that my participation in the course increased my confidence in dealing with patients with special cases.	2 (15.4%)	11 (84.6%)	0 (0%)	0 (0%)	0 (0%)
22- I think that my participation in the course has improved my level of knowledge of the principles of dental treatment for people with special cases.	7 (53.8%)	6 (46.2%)	0 (0%)	0 (0%)	0 (0%)
23- I think that the references added to each educational module were not useful.	0 (0%)	1 (7.7%)	1 (7.7%)	11 (84.6%)	0 (0%)
24- I think the feedback provided was Constructive.	1 (7.7%)	11 (84.6%)	1 (7.7%)	0 (0%)	0 (0%)
25- I think the information provided is of high scientific value.	0 (0%)	13 (100%)	0 (0%)	0 (0%)	0 (0%)
26- I think that the information provided is commensurate with the educational objectives of the course.	8 (61.5%)	3 (23.1%)	1 (7.7%)	1 (7.7%)	0 (0%)

4. Discussion

Traditional learning is an essential approach in medical education. However, the shift to e-learning has been noticed in the last few decades [6]. It is significant that undergraduate dental students know how to treat and communicate with SNPs.

Many SNPs can be treated safely by general dentists [7]. Nevertheless, some studies reported that the majority of general dentists have a lack in their experience in SNP treatment [8]. The presence of SCD within faculties of dentistry in Syria is limited. So undergraduate dental students will not acquire the basic knowledge that can allow them to provide high quality oral treatment confidently. The differences in evaluating the knowledge acquired by the participants were assessed by analyzing the average scores of the students in the pretest and posttest using Wilcoxon Signed Ranks Test. Our main goal was achieved, as reflected by the high grades of posttest and the improvement in participants' knowledge. These findings are similar with the findings in other studies where their results showed the effectiveness of e - learning to improve the acquired knowledge for learners in various stages of study, whether for dentists or undergraduate or graduate students [9], [10].

Learners' perceptions towards e-learning is one of the important factors that judge the success of any e-

learning system [11]. So that we design a questionnaire to measure the participants' perception towards the course in terms of ease of use and usefulness acquired. The Cronbach's alpha is commonly used for estimating reliability [12]. And in this study it valued between 0.62 and 0.75, exceeding the level of acceptability. Thus, the validity and reliability of the study questionnaire was confirmed. Depending on the results of this study, the participants considered the electronic educational course about SCD easy to use. Where participants were trained and provided with the necessary instructions on how to use the platform and how to log in. Moreover, the enough time to access the e- resources.

Similar results were found in a study conducted in Indonesia where the students' evaluation of ease of use was positive, they had enough time to access educational resources and the instructions were clear regarding logging in, these were their opinions when they were interviewed [11]. E-learning has challenges especially in the third world countries as lack of infrastructure and the low quality of internet connection [13]. Bad connectivity issues can limit the use of e-learning [14]. A study took place in medical colleges in Jordan showed that 69.1% of the learners have a problem with internet quality and poor services [13]. In our study, 92.3% of the participants also found the quality of the internet connection a big problem.

SCD for the undergraduate dental students has an important role in developing their confidence to treat people with special needs [15].

In the present study, the confidence in dealing with SNPs was increased in 84.6% of participants at the end of the course.

A study done by Mahmoud AL-Balas and another study showed that e-learning allows learners to control the educational process by choosing the appropriate time and place for them to access e-learning educational resources. This process stimulates autonomy through learning especially in asynchronous e-learning [13], [16], [17]. In this context, 84.6% of the participants in SCD course agreed that their independence was simulated at the end of the course.

The results of this study are preliminary, and in the future we will expand the sample size and diversify the target groups, benefiting from these results. Another limitation is that it cannot be ascertained that the student has actually answered the questions of the post-test after listening to the modules without looking at them as the tests can't be controlled by the investigator.

On the other hand, this is the first paper about evaluating the effectiveness of an electronic course about special care dentistry in Syria. The study's interest in the perceptions of the participants is a necessary and important step to enhance the positive points and improve the negative aspects of the course. This course is an initial and positive step to consolidate the e-learning in Syrian Dental Universities.

5. Conclusion

The electronic course about SCD differentiated by its effectiveness and ease of use. The acquired knowledge among the participants was improved. In addition to increase learners' confidence in dealing with SNPs. As a future vision of the project, we aspire to develop other electronic courses on SCD with different levels of complexity, target population and adopting other types of e-learning.

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