

Online Education Strategies Used in Imam Hossein Hospital in Tehran during the COVID-19 Outbreak

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Abstract

Background: The COVID-19 pandemic has caused many changes in the educational structure of hospitals, so much so that the educational systems tend to use online education. In this regard, the Deputy of Education of Imam Hossein Hospital designed an application to expand this form of education in the hospital.

Objectives: The purpose of this study was to review various software used in online education in Imam Hossein Hospital, to obtain the strengths and weaknesses.

Methods: The present investigation was a scholarly approach study performed in Imam Hossein Hospital in Tehran in several stages during the COVID-19 outbreak (beginning of March 2020). First, the necessary infrastructure was examined through meetings held in the educational deputy of the hospital. Then, a system was created by the deputy by which teachers could upload educational files in different formats. Finally, the files uploaded by the faculty members were evaluated by the observers.

Results: In this study, professors uploaded 234 files in various formats to the hospital website. PowerPoint was the most frequent format in these files, of which 105 (44.8%) were uploaded. 42 (17.9%) files were sent as images. 27 (11.5%) were multimedia files in different formats. And 17 files (7.2%) were about the evaluation of the residents, which was conducted via Google form. Other files in total 43 (18.3%) included other formats. The average score of the educational files uploaded by the faculty members was 17.79 ± 3.26 .

Conclusion: Since medical education is mostly based on students' clinical practice, the lack of an exclusive platform in this area is quite noticeable. The present study showed that professors at first do not necessarily choose the best platform for providing online education, but the most familiar software available. This trend, however, may change with experience. Therefore, it is better to suggest the best platform for professors from the very beginning of online education.

Keywords: Distance Education, COVID-19, Teaching hospital

Background

Although online education is not new, it has recently received more attention due to the outbreak of the COVID-19 crisis. The first cases of COVID-19 were identified in China in December 2019. (1) When the Chinese city of Wuhan was quarantined, perhaps few people in the world thought COVID-19 would spread around the world. In Iran, the first reported case of COVID-19 was on

February 19, 2020, which was diagnosed in two patients living in Qom, and after that, the disease spread to other cities such as Tehran and Isfahan (2). The epidemic in Iran caused widespread changes and restrictions on personal relationships, shut down many places, and canceled all the classes in universities. As a result, the use of online education has expanded in Iran as well as in many other countries. Different countries use various platforms depending on

their conditions, such as Adobe Connect, Skype, Google Class Room, Google Drive, Power Points, Zoom, Model, Microsoft Class Note, WhatsApp, Webinar, Microsoft team (3). There are also more advanced technologies for medical education, such as the use of Microsoft HoloLens to teach anatomy and other medical disciplines. Using this technology, the doctor can view a 3D image of any organ in humans in the online world from any angles. It means that different parts of the body, such as blood vessels, nerves, muscles, and internal organs of the human body without any limitations, can be seen in the context of Augmented Reality (4-6). The type of software and technology used is highly dependent on the familiarity of the people, the available Internet bandwidth, the educational capabilities of the software, cost, and the availability of the necessary technology and the place of teaching. Although all of the above-mentioned cases can be applied in online education in hospitals, the main problem is the educational facilities of hospitals. On the one hand, in most cases, the hospital classrooms are scattered, or some classes may not be ready for educational services via the Internet. On the other hand, teaching the students and clinical residents in hospitals can cause more serious problems because the professors and medical students are among the high-risk groups. Also, the classrooms are mostly located in inpatient wards, which also increases the risk for medical professors and students. More importantly, these classes are often small, so there is high-density for students and professors in these environments. To solve this problem, the Deputy Minister of Education of Imam Hussein Hospital decided to expand online education like many universities and educational centers, so the professors were required to provide part of their teaching online. To achieve this goal, two important things were unknown to the deputy of education. The first one was the physical and human infrastructure of online education, and the second one was monitoring the quality of teaching and achieving the desired result. The following questions were asked about the first part:

Is there the necessary infrastructure in the hospital? Is there enough internet speed and bandwidth? What is the appropriate software or software for holding online classes? What are the features of each software, and do these features have the ability to meet the teaching needs? Is using web-based software and space rental a priority or buying dedicated servers? What are the financial costs of using the software, and is there a specific budget for these cases? To what extent are hospital physicians taught to have online classes and work with the software? Is there enough reception from doctors and students for this type of education? Do these types of software have the necessary standard in terms of information security? Do students and residents have the necessary equipment to make the best use of this type of education?

Also, the following questions are often asked about the second part:

How to monitor the holding of classes? How should the information about the classes be sent to the deputy of

education? What should be considered in online education? What person or group should do the evaluation? On what are the evaluation and scoring criteria based?

Objectives

The purpose of this study was to review various software used in online education in Imam Hossein Hospital, to obtain the strengths and weaknesses of these educational platforms according to the needs of the hospital, and to provide appropriate solutions to improve online education. This study can also help identify weaknesses in monitoring the quality of online education and its appropriate contexts so that the quality of online education in the hospital could finally be improved.

Methods

The present study was conducted via a scholarly approach study during the COVID outbreak (beginning of March 2020) in several stages in Imam Hossein Hospital in Tehran. In the first stage, several sessions were held with the members of the hospital's educational deputy. Given the conditions of this pandemic, the deputy prioritized online education. After conducting preliminary studies, several sessions of discussion and review and consultation were held with the professors and computer engineers who were familiar with online education. In these sessions, the strengths and weaknesses of the available software, as well as hospital facilities, were evaluated. Finally, due to the present status, the lack of experience, and limited opportunity, it was decided that the educational groups provide and use the best software following the country's constitutions, and be relevant to the educational materials of the group. This subject was officially announced to all groups in a meeting with the educational deputies of the groups. The study population included all faculty members of the hospital and physicians who were the medical staff. The faculty members who could not participate in online education due to illness or long leave were excluded from the study. Six people were selected to monitor the online education performance of the clinical groups. Each invigilator was responsible for 2 to 3 teaching groups. Also, regarding the evaluation and monitoring of the quality of online education in the first stage, we decided to launch a new section on the website of the Deputy Minister of Education. The address of this system is <http://edu.ehmc.ir>. The design and production of the online education system module were based on the ASP.net technology of Microsoft Company by the software engineer of the hospital's educational deputy. Google Drive storage space was used due to the need for file storage. Google Drive storage is created by Google to store files, providing up to 15 GB of free space (7). Faculty members can access this group's dedicated panel by entering this system and going to the online education system sub-section. Finally, a special panel was created for 19 departments in the hospital. These groups included orthopedics, obstetrics, ophthalmology, sports medicine, internal medicine, pediatrics, anesthesia, pathology, general surgery, radiology, radiotherapy, psychiatry, emergency medicine, neurology, neurosurgery,

cardiovascular department, clinical pharmacy, infectious diseases department and ICU. To enter the group panel, there is a unique username and password for each group. In this section, it is possible to register the group, the title of the class, the organizer, the target group, and the date and time of the class. Faculty members can upload files up to 100 MB in Word, PowerPoint, Excel, PDF, MP3, ZIP, Gif, JPG formats. It is possible to report the uploaded files separately by the educational deputy of the center to analyze and evaluate the results in the designed website. After completing the website, the professors of the groups were asked to upload the content on this website, separately. For monthly uploading, each group was given a specific time, so activity reports could be uploaded until the fifteenth of the following month. After uploading the files, all the documents were extracted by the computer engineer of the educational deputy, and the information was delivered to six supervising professors in Excel format. The Excel file contained all the uploaded information, and by clicking on the file address, the desired file was displayed to the observer. The observing professors reviewed all the uploaded files and assigned the necessary quality scores according to the quality of the file, the type of file, and the method of teaching provided to minimize mistakes and also prevent the observers from applying personal opinion. A similar evaluation form was designed for all observers. These observers had to look at this in four sections: the type of uploaded file, the presence of questions and answers in the files, the quality of the summary of educational materials at the end of the session, and the conformity of the presented materials with the curriculum of the educational field. A score of 1 to 5 was considered for each section.) and the selected professors, based on the designed form, assigned their desired score to these items, and then the grade point average for each person was considered as the final grade of the teaching. According to the evaluation form, the minimum assigned score was 4, and the maximum was 20. At the end of the study, the professors were asked to give their opinions regarding the strengths and weaknesses of the platforms. These comments were summarized, and the advantages and disadvantages of the software were measured to reach a single result and promote online education in the hospital.

Results

All educational groups of the hospital were included in the study. The psychiatry department, with 14 faculty members, had the most members. Sports medicine, and clinical pharmacy departments had the least members with one faculty member. All professors participated in this process. 234 files with different formats from PowerPoint audio to videos and images of online classes were uploaded on this website by educational groups in two months. PowerPoint was the most frequent format with 105 uploaded files (44.8%), and the lowest type of file was related to multimedia files, of which only 27 cases and files related to online evaluation through Google included 17 forms. (The most used platforms, according to the received images, were WhatsApp, Skype, Skyroom, and Adobe Connect,

respectively. Of the 17 online assessments of residents and students performed as standard (with the help of Google Form), almost all were related to the obstetrics and gynecology group. The other groups did not take the exam online or through other types of software and did not have a standard form. Another point was that all the uploaded multimedia files were in audio format, and the educational videos were not seen. After uploading the contents, the results were provided to the supervisory faculty members for review and evaluation. These were the original formats in the Excel file without any changes. The observers' feedback was received on the quality of faculty members, from which important points were obtained. The first case was the lack of a standard because in the same groups, several faculty members had used Skyroom, and other professors had conducted classes only via WhatsApp. The same form was provided to observers, and they could score between 4 as the lowest score up to 20 as the highest score.

Some observers gave high evaluation scores. The lowest evaluation score of the professors who participated in online education was 10, and the highest was 20. The average score was 17.79 ± 3.26 . The highest scores were obtained by obstetrics, ICU, general surgery, neurology and psychiatry groups, obstetrics, general surgery, and ICU groups with an average of 20 and a standard deviation of 0, the psychiatric group with an average of 19.74 and a standard deviation of 0.44, and the neurology group. With an average of 19.62 and a standard deviation of 0.31, they were in the next ranks. The scores in the two groups was the lowest. One group had a mean of 12 and a standard deviation of 4.47, and the other group had a mean of 11.33 and a standard deviation of 2.3. When uploading PowerPoint files, nothing was mentioned about the presentation of these files. Whether the presentation was conducted via Adobe Connect or Skyroom, or by sending PowerPoint (voiced and silent) was not clear for the observers. The results showed to the Deputy of education for Research that the most important change in this process should first be in the field of standardization so that all departments can use the standard context to provide online teaching and evaluate it under the same conditions more accurately.

Discussion

With the outbreak of the coronavirus, the teaching method changed in many parts of the world. Many world congresses were either canceled or scheduled to be held online (8). During this outbreak, the potential of cyberspace was expanded, and various types of software were used for teaching purposes. New technologies such as the fifth generation of communication with the ability to quickly transfer information had a high potential for these cases (9). Various universities and professors around the world became interested in online education for online education, several congresses were held online, and various solutions were explored. There are several methods of online education. One is the use of educational videos, which is quite effective in promoting the ability of medical students and residents (10). The field of online education includes online teaching

through virtual patient, theoretical knowledge, and surgical skills (11). However, the implementation of online education programs can have some problems, including the lack of bandwidth required for the Internet in several places, low upload speed on ADSL Internet, lack of 4G Internet antenna in some places, especially the lower floors of buildings, lack of familiarity with the appropriate software and work with them, lack of necessary facilities in the software, Problem communicating with computer server, and uploading restrictions in terms of file size.

In this study, we allocated the choice of e-learning methods to the professors and departments due to the second phase of the COVID-19 outbreak, existing stress, the priority of combating COVID-19, and insufficient knowledge of professors and students regarding the features of all types of available software. Although this method can lead to the prevalence of online education, the rapid operation of the subject, and the reduction of the stress for the professors, it created some problems.

For instance, there was no evaluation standard for all professors. More importantly, the software was not defined for online education, or at least they were not expansively used for this purpose. WhatsApp or Zoom are not fully educational applications. Also, due to the existing situation, it was not possible to train all of the teachers in the field of online education, so they were not completely familiar with online evaluations. In this study, only one group used a standard format such as Google Form. The next problem exists in evaluating the quality of professors' work because when they use a different type of software to provide online content, a similar standard does not practically make any sense, so this can lead to a decrease in the quality of evaluations. The gynecology, general surgery, and ICU groups received the highest scores. After these two groups, the psychiatry and neurology groups had the highest scores. The average score in April was lower than in May in most groups. The reason may either be the Norouz holidays or the lack of experience in providing online education in the first month of this study. Those who scored the lowest reported that they did not cancel classrooms even despite the coronavirus, so they had lower online classroom teaching statistics and lower e-learning scores. One of the reasons for not canceling or increasing in-person teaching in several groups was the possibility of social distancing when teaching.

The most commonly used file format was PowerPoint because the professors and residents were familiar with Office software and that almost all professors have this software in their computers and mobile phones, so it is available to view the PowerPoint presentations easily. In this study, the most used platform was the WhatsApp software because it was convenience, popularity, acceptable security, free or low-cost connectivity, and usability on all three operating systems Android, iOS, and Windows. WhatsApp is social network software that has been used by doctors for educational purposes before the outbreak of coronavirus (12, 13).

Skype was the second most useful platform due to

the low cost, proper video communication facilities, and the ability to share files. Skype software is used for educational affairs and conferences, telemedicine, and telecommunications (14-16).

Skyroom, an Iranian software platform, was the third most popular platform among the professors. Easily accessible in <https://www.skyroom.online>, this platform incorporates desktop sharing, audio-visual communication, slide show, whiteboard, audio, and video files. This software is affordable and provides users with excellent speed and stability. The designed environment is also quite suitable and user friendly. It can also be used in both mobile and computers, and there is no need to install plugins. One of the important advantages of this software is the Persian language support.

Another platform used by the professors was Adobe Connect software. This software had many features, including the ability to share the desktop and the ability to view the platform itself in this mode in a reduced and floating window, the ability to share files. It supports mobile and desktop and can record classes (17). The drawbacks of Adobe Connect include the difficulty of setting up a dedicated server, lack of proper support for the Persian language, and the need to install Flash Player in the browser or install Adobe Connect client software.

Although the high variety of software is very good and useful, they also have some drawbacks. For instance, working with multiple software can be demanding. Also, some types of software are not designed for specific educational purposes, or they are expensive. In the Deputy of Education for Education, considering the opinion of professors and additional studies, we concluded that the use of Skyroom due to being Iranian, easy to use, acceptable facilities, no need for a dedicated server, high speed, and the possibility of creating numerous educational classes have a significant advantage over other similar platforms, although they do not seem to have the necessary ability to conduct online exams now.

Conclusion

With the outbreak of COVID-19, online education has become quite essential. There are various types of software and platforms for online classes. Each of these platforms has exclusive features and advantages.

Medical education is mostly based on clinical education, and unfortunately, there is insufficient experience in online education in this field. Most of the professors are more willing to use PowerPoint software because of its proper and convenient features and that they were more familiar with it in advance. According to the present study, the professors selected the most familiar platform, not the best one, although this trend changed with more experience. Therefore, the Deputy of Education should provide professors with the best platform from the outset for online teaching. We also felt the lack of having a suitable native platform to hold online exams for students. Certainly, in the future, the existing types of software will have significant improvements. With the development of the fifth generation of mobile Internet (5G)

and the prevalence of fiber optics (FTTH), online education will likely be a powerful means of education even in normal situations.

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