The Outcome of the Online Virtual Classes during COVID-19 Pandemic: A Study in the Female Campus of the Faculty of Medicine in Rabigh-King Abdulaziz University

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Abstract

Background: COVID-19 pandemic has affected the educational process greatly in the academic year 2019–2020. Therefore, this warranted an urgent and effective shift and intervention toward the online teaching practice. Aim: We have aimed in this study to assess the impact of the necessary shift of the educational process of the basic sciences toward the online distant learning in the female campus; Faculty of Medicine in Rabigh, King Abdulaziz University. Subjects and Methods: Promptly shift toward the online teaching practice through virtual classrooms for the 2nd and 3rd year students was accomplished during the second term of the academic year 2019–2020. Following that, we analyzed the efficacy of this shift qualitatively through focus group discussions with the students and the staff members. For objective assessment, we analyzed and compared the students’ results of the second term of the academic years 2018–2019 and 2019–2020 regarding the same modules. Results: The results of the students were not negatively affected during the pandemic hit. Conversely, the results improved in the basic science modules, and no significant difference was found in the clinically-oriented genetic module. Conclusion: The significant move toward the online virtual classrooms did not affect the teaching and learning process negatively. Contrarily, the online teaching and learning practice have proved to be a decent alternative if applied on a sound basis during emergencies and thus is promising as an adjuvant method in the educational process in the ordinary circumstances.

Keywords: COVID-19 pandemic, learning management system, online learning, virtual classroom

Introduction

The COVID-19 has spread widely initiating a global pandemic that has led to many disturbances in numerous aspects of our everyday life, including the teaching practice in the higher education at the end of 2019.1,2 Many authorities have shifted toward online learning practice to overcome the absence of the face-to-face conventional learning due to the necessity of social distancing during such times.2-3

The electronic learning (E-learning) encompasses a variety of technology-based learning, including distant learning and online learning. Most of the institutions use E-learning as an adjuvant way not as a substitution to the conventional methods.4,5 It became mandatory for the universities to introduce this type of learning due to its availability regardless the spatial and temporal factors, the possibility of implementing a variety of assessment methods and online examinations and assignments, and most importantly, it is a way that allows the staff members’ development. Additionally, the widespread usage of technology by the current generations is an important factor to be taken in consideration. Thus, the higher education authorities should be aware of the positive factors in the online educational practice.5-7

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The virtual classroom is a form of the technology-enhanced learning (TEL). TEL refers to the application of technology in the teaching and learning process. This technology can be applied either locally in the campus or remotely through online sessions.[8] The online facilities like blackboard provide an excellent tool to communicate and interact with the students. It allows organization and providence of assignments, quizzes, discussions, enrollment, and online examinations.[9,10]

The focus of the digital technologies applications in higher education is usually on the students rather than the instructors. Furthermore, the role of an instructor is crucial in the learning process and more attention should be paid to the teacher to allow more adaptation to the new technologies.[4]

The motive and the novelty behind this study was the need to assess the outcome of the prompt implementation of the online teaching practice on the pillars of the educational process; the instructors and the students in the female campus of the Faculty of Medicine in Rabigh, King Abdulaziz University. In addition, and to objectively assess the outcome, we aimed to compare the results of the second term, when the COVID-19 leads to sudden changes in the planned teaching curricula and timetables, with the preceding year regarding the same modules.

**Subjects and Methods**

**Study population**

This study is a comparative study, which contrasts the impact of the urgent implementation of the virtual classes during COVID-19 hit on the students’ grades with the results of the preceding year. The population of the study was the 2nd and 3rd year students in the female campus of the Faculty of Medicine in Rabigh, King Abdulaziz University in the academic years 2018–2019 and 2019–2020.

**Implementation of the study**

**Steps taken by the university and faculty authorities**

1. **Providing a prompt online system:** Urgent implementation of the virtual classrooms through blackboard-ultra collaborate system (BBCS). The lectures were discussed to the students through the BBCS and students were allowed to communicate with the staff members through chatting or voice facilities during the lectures. The staff members were encouraged to use online interactive methods like questions and polls through BBCS to ensure the attentiveness of the students to the contents of the lectures. The attendance of the students was also calculated via the BBCS.

2. **Alternative communication methods:** To compensate for the absence of face-to-face contact with the students through the office hours in the faculty, many parallel channels were applied to establish good contact with students. Among these channels, using the social media applications such as WhatsApp by creating groups was applied by the lecturers to allow receiving questions and discussing them with the students. Moreover, private chats, when needed, were allowed to help solving any problems facing the students in the learning process. Another channel for communication was through emailing of the lecturers.

3. **Psychological support:** To assure the students and support them psychologically during the peak of the pandemic and overcome such abrupt changes in the life settings and the learning resources. The staff members were encouraged by the responsible authorities to aid the students and provide them with psychological support by encouraging them to study well and listen to them regarding the problems facing them and providing prompt solutions.

4. **Equality of chances:** Due to such rapid shift, and because of the possible inability of some students to find the available resources required for online learning practice; the university authorities asked the staff members to disseminate notices to those students who do not have the financial ability to purchase computers and are in need for attending the online lectures to ask for having computers privately and confidentially.

5. **Handling of the syllabuses in relation to time and applicability:** The syllabuses were compressed to fulfill the learning objectives; however, the laboratory training and the clinically oriented disciplines were postponed until after the end of the attack of COVID-19.

6. **Promoting the capabilities of the staff members:** Urgent online workshops and illustrated documents for the staff members and students to illustrate the facilities available through the virtual classrooms and the BBCS were held. In addition, urgent online workshops about innovative online teaching methods were provided to the staff members.

7. **Variability in periodical assessment methods:** Nongraded assignments, quizzes, case presentations, and true or false quizzes were held for the assessment of the students during the modules. The aim of these methods was to ensure their incorporation, interaction, and training for using the facilities of the BBCS before the time of the final examination. These assessment methods were done periodically throughout the period of online practice. The assignments were in the form of topic titles that were assigned to the students and they were allowed to research for a certain period and then submit their assignments. True or false quizzes were also applied as a method of assessment. The case presentations were done through the online classrooms by discussing a case scenario with students to allow the brainstorming and active interaction.

8. **Exit examination application:** Each department according to the theme of the module prepared the exit examination. The students were informed by announcements through the BBCS and the emails about the exact time of the examinations. The first page of the quiz on the BBCS involved the instructions for how to go through the quiz. Each quiz was given an exact time for completion.
and after that it became hidden from the students. To minimize the chances of cheating, the quizzes were prepared to be time-tight (by identifying the time needed to answer each question without giving extra time that allows cheating) and force completion option (by giving only one chance to the students to answer the question and prevent going back to the same question again) were chosen. In order to improve the students’ performances, they were allowed to identify their mistakes at the end of the examination by marking the wrong answers and allowing them to know their marks.

9. To manage any technical inconvenience that could face the students, there was continued communication through the coordinators and the responsible authorities with the students during the examinations through WhatsApp and the mobile phones.

Part (1): Qualitative assessment of the urgent online shift on the students and medical staff in the female campus through focus groups

After 1 month of the sudden shift to the online teaching practice, online focus groups were held with both the staff members (n = 8) and the students (n = 30 and 35 for the 2nd and 3rd years; respectively) to discuss with them the cons and pros of the newly introduced method. The feedback from the students and the staff members included the following: their opinions in the online teaching practice in general, the successfulness of the steps taken by the authorities and the virtual classrooms to achieve the learning outcomes, the period and the number of the virtual classes, the assessment methods, and the effect of the online teaching on the communication and teaching skills of the staff members. The focus groups were done by dividing the students into smaller groups (n = 5–7/each group) and contacting them online through the virtual classrooms. Due to the limited number of the staff members, there was only one focus group for them. The answers of both the students and the staff members were recorded for later analysis. The analysis was done qualitatively by quantifying the most frequently repeated answers of the groups to reach a conclusion and deduce the recommendations.

Part (2): Comparative analysis of the students’ results of the second-term modules in the academic years 2018–2019 and 2019–2020

For an objective assessment of the impact of the online learning on the outcome, we compared the students’ performance in the examinations in the time of the pandemic with corresponding modules in the preceding year. The number of the students ranged between 35 and 40 in both years. We selected three modules that have been applied during the hit of the pandemic in the second term of the year; the microbiology core module for the second year, the neuroscience module for the third year as examples for the basic sciences. We added the genetic module for the 3rd year as one of the clinically oriented modules during the basic science years.

Results

Results of the students in the second term in the academic year 2019–2020 and 2018–2019 were analyzed and compared regarding the core microbiology, core pharmacology, core pathology, and genetic and neuroscience modules using the Student’s t-test.

Part (1) results: The qualitative assessment

Students’ focus groups

On assessing the recorded students’ answers, we found that nearly all the students declared that the number of virtual classes must be similar to the real schedule and should not be minimized. They stated that clear objectives and learning outcomes must be suitable for the teaching topic and learning contents in accordance with the sudden changes that have occurred in the syllabuses. Some of the students mentioned that the virtual class should be simulating the normal descriptive lectures in being interactive to engage the students in the education process. Many of the students requested the addition of individual research projects as a learning method during the pandemic. The majority of the students have spoken about their preference to have the narrated lectures or simulated videos before the time of the virtual classes. However, some of them found that the voice-narrated lectures followed by a group discussion with the instructor during the virtual class is a better method.

One of the disadvantages reported to be apparent in the online classes was the variability in the instructors teaching practice as some instructors just read the lectures and some used interactive and attractive methods of communication. Therefore, many of the students recommended replacing the common learning methods with newly efficient interactive ones to improve the communication during the virtual class.

Worthy to mention, the students suggested the implementation of the online teaching through the education process in parallel with the real classrooms even after the end of the pandemic.

Staff members’ focus group

The staff member reported that the prompt online shift was an excellent step to overcome the sudden disturbances caused by the pandemic. Like the students, most of them declared their hope to continue on the online teaching practice in association with the usual learning methods. They stated that the virtual classrooms helped them to promote their communication skills, as they were obliged to attract the students’ attention and interaction without face-to-face contact. In addition, they learnt to use a new technology for them, which is the BBCS virtual classes and other related facilities.

The instructors recommended the expansion of the time of the virtual classrooms to allow a good chance for communication with students. They recommended avoiding the narrated lectures availability to the students before the time of the virtual classes to overcome the possibility of the inattentiveness of the students during the lecture. Instead, recording of the virtual class could be a better method to help the students to revise it offline later on.
Regarding the assessment methods, some of the staff members were against the online assessment as it increases the chances of cheating, and hence, it cannot be considered as a valid assessment tool. Others revealed that cheating could be diminished using the appropriate type of assessment tool. They encouraged the application of individual projects, presentations, and concept maps as assessment tools rather than using the multiple-choice question to avoid the loss of the question banks and cheating at the same time.

**Part (2) Results**

**Second year results in the second term**

- Result analysis for the core microbiology module: We noticed a positive shift in the grades of the students from Grade F to Grade A. The percentage of the students who get Grade A in the academic year 2019–2020 compared to the academic year 2018–2019 was increased from 0% to 8%, respectively. The same increase was noticed in Grade B from 2% to 48%, respectively. Grade C shifted from 31% to 37%. While Grades D and F were decreased in the academic year 2019–2020 compared to the academic year 2018–2019 from as follow (Grade D was shifted from 52% to 2% and Grade F from 13% to 2%, respectively); Figure 1. The student number ranged between 37 and 44 students.

**Third year results in the second term**

1. Results of neuroscience module: Regarding the results of the students, there was a considerable improvement (positive shift) in the students’ grades in all grade classes. The students’ grades shift in the academic year 2019–2020 compared to the academic year 2018–2019 from was as following: Grade A, 20% to 57%; Grade B, 51% to 30%; Grade C from 23% to 10%; and Grade D from 5% to 2.5%, respectively); Figure 2. The student number ranged between 39 and 40 students

2. Results of the genetic module: The genetic module showed a double-ended change in the performance of the students. There was a positive shift regarding the percentage of students getting Grades A and B (positive shift), while there was an increase in the percentage of the students getting Grades D and F as well (negative shift). The students getting Grade C showed only a minor change in performance. The shift of grades in the academic year 2019–2020 compared to the academic year 2018–2019 was as follows: Grade A, 10% to 16%; Grade B, 31% to 33%; Grade C, 55% to 56%; Grade D 3% to 6%; and Grade F 0% to 3%, respectively; Figure 3. The student number ranged between 29 and 30 students.

**Discussion**

**A summary of our findings**

In the current study, we aimed to assess the reflection of the urgent online teaching practice on the students and staff members. Unexpectedly, we found improvement in the students’ grades during the pandemic compared to the preceding year in the basic science modules, while the genetic module showed a double-ended shift in the grades. Moreover, both the students and the staff members expressed a positive reaction toward the online learning and recommended the continuation of this method in parallel to the usual teaching practices after the end of the pandemic. Nevertheless, the students recommended better communication and interaction with the instructors by more creative and innovative methods.

**The application of the virtual classes**

The virtual classroom is a shared online space where the learners and the tutor work together simultaneously. Usually, these interactions take place through video-conferencing. The participants have tools to present learning content in different formats, as well as to implement collaborative and individual activities. In this type of interaction, the teacher has a particularly significant role of the moderator who guides the learning process and supports group activities and discussions.\[^{11,12}\]
In the present study, we implement an online system which is connected to the general learning management system (LMS) of King Abdulaziz University. According to the faculty recommendations, the staff members prepared their materials in the form of voice-narrated lectures. However, there was a debate regarding two main points. The first was the proper timing of making the learning material available to the students. The second was the voice narration of the lectures. The reason behind this debate was related to the level of interaction and incorporation of the students during the virtual classrooms. This is because the voice-narrated lectures when made available to the students before the time of the virtual classroom may negatively affect the attentiveness and interaction of the students. However, the urge behind setting this policy regarding the time and form of the learning material for the students was the limited time of the classrooms and the need to positively support the students and help them to better understand the learned material during the disturbances and the psychological stress due to the COVID-19 pandemic. As reported in an earlier study, the application of online classes should not necessarily mean to apply the same courses used in traditional methods, but they can be tailored to be suitable for the E-learning.\textsuperscript{13} The staff members through using open group discussions through chat rooms, problem-based learning, and by applying polls and quizzes during the virtual meetings can overcome these issues by the engagement of the students.\textsuperscript{14,15}

### Students’ and staff members’ feedback toward the online shift

There was a positive feedback regarding this newly implemented method in teaching practice from both the students and the staff members. These findings could be related to a variety of reasons including the studying at home, which preserves the effort and time passed in traveling or going to the faculty, hence giving the students and the staff members a higher chance to concentrate and study. An earlier study has found that the students’ enthusiasm and eagerness to interact and to be incorporated in the virtual classes were higher than the traditional ones.\textsuperscript{16,17}

### Factors influencing the online learning practice

The application of the TEL is not only a technical issue but it is also affected by the human and social factors. Therefore, the perception of the humans on which the TEL is applied should be enhanced to achieve the intended goals.\textsuperscript{18} In the current study, the staff members became more directed to enhance their communication skills to guarantee a better understanding and integration of the students through the distant learning process. Cheating could be another cause of the better results of the students; however, the forced completion option and the time-tight questions were applied to greatly decrease the chances of cheating. Our results are in accord with Hoffman et al., 2020; they reported that the virtual classroom provides an abundance of opportunities, especially when combined with self-study platforms (LMS) or when used in addition to traditional classroom learning activities. Unlike asynchronous learning environments, the synchronous virtual classroom allows for instant feedback, direct teacher–student interaction, and engaging activities to increase motivation and active participation. Immediate communication favors relationship building within the group, as well as a sense of community. Training in a synchronous virtual classroom creates a positive learning environment and helps the participants achieve the expected outcomes.\textsuperscript{19,20}

One of the cons that faced us is the inability to fulfill all the learning outcomes due to the compression of the syllabuses and the limited time allowed for finishing the modules. However, the problem was overcome by adding extra time for compensation of the missed parts before the beginning of the next year curricula.

### Student assessment during the online shift

Intriguingly, in the current study, we found an unexpected improvement in the results of the students in the basic science modules (microbiology and neuroscience) with a shift to higher degree classes. The previous findings are in accord with a previous study where the students attained better grades in the online learning compared to the traditional learning.\textsuperscript{21} This might be due to many reasons such as the online shift could promote the student’s ability to research, the ability of the instructor to teach and communicate with the students, the homestay preserves more time for the students to study, and the compression of syllabuses and in turn the decreased amount of the learned material. A matter that should be taken into consideration is the increased chance for cheating. Nevertheless, we think that the option of forced completion of the test and the time-tight examinations may compromise this disadvantage. The forced completion test does not give the chance to the students to go back to the answered questions to correct them. Time-tight examinations block the chance for communication with the other students and do not give enough time for students to search for the answers via searching engines or books.

On the other side, the clinically oriented genetic module revealed a noticeable higher shift in Grades A and B and
lowering in Grade C during the COVID-19 period compared to the corresponding term in the previous year. This shift indicates an improvement in the performance of students. Strangely, the same module showed an increase in the percentage of students gaining Grade D and F during the COVID-19 period. We can explain this double-ended outcome by the positive effect of the staying at home and better time to study, in addition to the compression and the decrease of the amount of the studied material in those students who showed improved performance. Whilst, the negative outcome could be related to the absence of clinical training in this module and the inability of students to respond appropriately to the online teaching practice in the clinically oriented modules. Therefore, the E-learning provides a favorable chance to overcome the difficulties met in face-to-face learning due to its availability anytime and anywhere.[3] However, to achieve this goal, the E-learning should be grounded within sound educational approaches.[2]

In the current study, and although the compression of the syllabuses and the delay of the clinically oriented practice to after the COVID-19 pandemic, the staff members did their best to provide vertically integrated medical sciences. This was achieved by sharing practical videos, photos, and three-dimensional software as well as case scenarios and case-based learning problems with the students.

**CONCLUSION AND FUTURE PERSPECTIVES**

Collectively, in the current study, we found that the urgent online shift of the teaching practice is successful and promising. This can be greatly achieved by the proper tailoring of the learning and teaching material according to the available facilities and the allowed time in addition to the training of both pillars of the educational process, the instructors, and the students. The feedback from the students and the instructors is mandatory to pick up the drawbacks and the obstacles and improve them promptly.

The outcome of the E-learning through virtual classrooms is effective, promising when applied appropriately, and it is suitable in overcoming the unexpected abrupt disturbances in the educational process. However, sound, wise, and timely solutions for the obstacles are mandatory.

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**Conflicts of interest**

There are no conflicts of interest.

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