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Medical Education Adaptations Post COVID-19: An Egyptian Reflection

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ABSTRACT

BACKGROUND: Coronavirus (COVID19) appears to be an inflection point that is forcing a disruption in medical education.

OBJECTIVE: The study aims to explore how medical schools in Egypt responded to COVID-19 pandemic regarding teaching and learning/assessment for undergraduate students.

DESIGN: A mixed method exploratory 2-phase study was conducted. Data was collected through a questionnaire and focus groups.

RESULTS: The responses of the participants were categorized according to main themes; University preparedness, Role of faculty in the transition, Role of ME units/Departments/National/Regional bodies in the transition, Role of Egyptian Knowledge Bank, New teaching methods/strategies, New assessment methods/strategies and Projection into the future. The staff level of preparedness for that unexpected shift was evaluated as optimum to high and a good leadership support was reported by 70% of them. They reported conflicting views about the proper role of medical education units but reinforced the idea of Egyptian Knowledge Bank's crucial role in this transition. Additionally, 64.1% of the participants identified a clinical skills teaching challenge and 76.3% of them reported absence of alternative methods for summative assessment. Finally, there is a communication problem with the students that leads to their detachment.

CONCLUSIONS: Individuals moved faster than bodies and relied on support existing outside the universities when catastrophe happened. Many recommendations emerged including the need to integrate online learning into the curriculum at favorable percentages.

KEYWORDS: COVID-19, online learning, new teaching and assessment methods, medical education

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Introduction

It is the big moment of online learning and medical education is about to be revamped in response to the Coronavirus (COVID-19). This pandemic appears to be an inflection point that is forcing a disruption in how to teach medicine. "Social distancing" is now an essential element of global recommendations to mitigate the community from the spread of the novel coronavirus. Therefore, almost all educational institutions are forced to close and send their students home.¹ The panic in the educational institutions is palpable, and many are confused by how to proceed in the wake of COVID-19. Despite the decision, the use of online learning was on national level as directed by the Ministry of Higher Education.

Online learning requires a great deal of resources and careful planning. Moreover, it requires a huge change in mindset of the students and faculty to play new roles in the educational process.² Another major challenge for medical educators in the online context is how to replicate the experience of clinical encounters.³ Despite the advantages and challenges of online learning, it may be an excellent option in education, particularly when there are hindrances to traditional learning

situations. All these efforts may succeed in maintaining the learning process. The main target was to offer the students an alternative that is satisfactory for their progress. However, it is not clear yet if it has impacted the process negatively or positively due to the demands of this context of learning.⁴

One of these demands is that teachers cannot reap the benefits of online teaching approaches if they are not trained on how to convert traditional methods to online learning and do not understand the available technologies.⁵ Additionally, the reality is that some subjects are much harder to transfer online. Online learning requires significantly more motivation and attention while the screen creates an emotional remove that makes it difficult to have a dialogue or feedback without feeling as if you are speaking into a void.⁶

Accordingly, it is obvious that COVID-19 is a global disruptor of medical education and has impacted the Medical Education in Egypt and the whole world.⁷ However, it is much less clear what are the responses of the institutions to this pandemic, what were the positive and negative sides of it, how the awareness and adaptation of new methods may impact medical education in the post COVID-19 era. All these inquiries



warrant further research that may help institutions to figure out their next steps or provide a road map for other institutions to follow. Some institutions have taken the initiative and document their innovative solutions in the pandemic time however; there is a need for further studies and wide range screening of the situation in Egypt during the COVID-19 era. Thus, the current study aims to explore how medical schools in Egypt responded to COVID-19 pandemic regarding the teaching, learning and assessment for undergraduate students.

Methodology

A 2-phase mixed method exploratory study was conducted.

Phase 1

A survey was prepared on Google forms and disseminated to a convenient non-probability sample of the medical school faculty through various social platforms. The social platforms represent various official, non-officials groups and web pages that include most of the faculty and medical education community members. All members of the Egyptian medical schools had a chance to be included in the study. The survey contained several sections investigating about the preparedness, implementation, and perceptions toward the planned change. The rating scale differs according to the sections. It included a 5 point rating Scale, binary questions and open ended questions <https://forms.gle/vkRfvMvK7rozvyyA9>.

Phase 2

The survey results were analyzed and accordingly a focus group guide was created to explore in more depth some of the interesting findings of survey analysis. A purposive sample was then invited to virtual focus groups to identify the lessons learned and challenges of the used approaches/methods and contrast the approaches of different medical schools. Moreover, it aims to explore the future expectations for post-COVID era as well as recommendations for dealing with other crises in the future.

The focus group followed a deductive approach, in the sense that “themes and categories” are imposed on them prior to data collection. Themes and categories were interpretative, constructed by the researchers from data. The main intellectual tool for the analysis is comparison by using a grounded theory approach to qualitative research data. The main leading sentences and questions of the focus group were shaped in the form of leading sentences:

1. One of the strengths of this experience based on your responses, was the involvement of staff in changes, elaborate more on that?
2. The EKB seems to be a very useful resource that was used by many schools, tell us more about this?
3. A controversial issue was the support received from Med EDU units or national bodies. What were your unmet expectations?

4. Living this experience opened our eyes and made us reflect on the way we used to teach, the technology that we used to put in service of learning and the methods and distribution of assessment used. How things will be different after COVID-19 than before it?
5. Alternatives for summative assessment were discussed lately after submitting your responses, how do you perceive the taken decisions?
6. What might have been done differently to have better outcomes?
7. Among the mentioned positive aspects of the experience are better management of large groups, easy shift to E-methods, new skills for teachers, more chances for collaboration. Do you have similar positive aspects in your schools? How do you explain the factors behind these positive aspects?
8. Among the mentioned negatives are unpreparedness, poor planning, resistance from students, missing the students. Do you have similar positive aspects in your schools? How do you explain the factors behind these negative aspects?

Ethical considerations

The participants will be informed about the purpose of the study and its relevance to the field of medical education. Only those who agreed to be involved in the study will be included under the reassurance that participant names and affiliation were to remain highly confidential. Any information the participants included in the survey or focus group were dealt with anonymously.

Results and discussion

A response rate of 80% of the medical schools, 16 Egyptian Medical Schools that belong to public and private sectors, were represented in the study sample. The number of respondents to the survey was 78 faculty while the number of the participants in the focused groups was 25 participants in addition to the study team.

The following sections represent the results and discussion of the survey content and the focus group generated themes as shown in Figure 1:

University preparedness

The approaches used to respond to this pandemic varied among medical schools. Several factors have contributed to this difference such as available infrastructure, number of students, staff, and student's preparedness. Despite these differences, no institution stood still. Indeed, the most important response to the pandemic has been the increased awareness and adoption of currently available technologies in medical education.⁶

The preparedness of universities to respond to COVID-19 consequences was assessed in this study with focus on 6 imperatives; having multi-level contingency plans, leadership support,



Figure 1. Focus group discussion themes.

preparedness of staff, infrastructure, technology, and interdisciplinary collaboration.

More than half of participants (55.1%, 43/78) who responded to the survey evaluated the staff level of preparedness for that unexpected shift in medical education as optimum to high. While almost half of the participants (51.3%, 40/78) rated the school resources and infrastructure as adequate, only (17.9%, 14/78) of them evaluated technology preparedness for this change on the high side. Around 61% (50/78) of the participants responded positively to the survey question about any interdisciplinary collaboration to develop or conduct activities.

Despite an apparent agreement on adequacy of all 5 categories of preparedness, focus group discussions brought some significant issues and opinions discrepancy between the educational leaders and other faculty who worked directly with the change process. Educational leaders described robust plans from top-down while faculty believe that schools were not at all ready for the change and that there was a large degree of chaos and mixed information. The approach of planning described by the educational leaders is in resemblance with Samarasekera et al⁸ who described an organized approach to make best of available infrastructure and staff capacities to plan for the transition.

At the institutional level, in one of the private medical schools, the Dean stated that “we have established a strategic committee in early March to plan for the needed actions. Such actions included enhancing the already used LMS, embedding ZOOM, providing the essential IT support, and keeping communication with students.” On the other hand, multiple participants criticized the lack of contingency plans and the delay of the Ministerial decision of assessment that was described as a major problem for many schools thus markedly affecting student attendance. This is consistent with Carney et al⁹ who

recommended practical steps in the planning, development, and implementation of pandemic exercises, as one of the learned lessons, in their study. Ahmed et al⁴ also described the transition as a chaotic one that lifted off a current need for faculty development that was not identified before.

On asking about the leadership support for this transition in the survey, most of the participants (70.5%, 55/78) in the survey agreed that there was good leadership support for the transition and change in the education sector in their schools. This is consistent with Samarasekera et al,⁸ a study which recommended that coordinated leadership and management process are crucial for academic continuity and quality.

“A major concern from students is that they were not informed properly about what is next and how they are going to be assessed and they lost the energy and the motive to set and study.” This was an input from one of the faculty who maintained a close relationship with the students during the transition. Another faculty said: “We would have appreciated a single unified message to be delivered to us and the students at the same time and to stick to decisions regardless of any pressure from students.” In line, Carney et al⁹ also considered that proper preparation of students to understand scenario logistics, their roles, and responsibilities, and what they are expected to accomplish, is important for participant satisfaction and overall success of the experience.

As for the interdisciplinary part, there was some misconception and incoherence regarding the agreement on meaning of interdisciplinary collaboration during the crisis. However, one of the educational leaders stated that “We also used the expertise of technical people from Applied Arts and engineering to create a studio that helped in providing students with interactive and practical sessions. Multidisciplinary teams were created to support transition.”

Role of faculty in the transition

Educational leaders who participated in national curricular reform expressed a high degree of comfort with the staff achievements and capacities. This was unlike what was perceived by faculty at the execution level who witnessed the chaos within the change that happened. One of the focus group participants voiced, "Difficulties were apparent in schools who had not used LMS before and have no experience. But eventually, because they were obliged to, most of the staff were involved and all students as well." Additionally, around half (50%, 39/78) of the survey participants reported that the involvement of faculty in the different educational activities was proper. The majority of the survey participants (62.8%, 49/78) viewed the applied alternatives in this transition as acceptable.

Academic faculty and tutors have a crucial role in guiding and supporting this transition. However, it has been recognized that changes and developments in medical education are putting extra pressure on faculty.¹⁰

One of the focus group participants expressed "Younger faculty started to shift uninvited to online lectures and it was as if the older faculty were lagging behind. Out of nowhere they started resisting all the implemented solutions."

The current study argues that the Technology experiences may directly and indirectly influence the faculty engagement and commitment. Usually when the faculty must adapt for technology, lots of disturbance will be in their minds. This finding is consistent with Shenoy et al study¹¹ that stated the importance of faculty experiences in technology adoption. Moreover, older staff are usually reluctant to adopt new and emerging practices and technologies while the younger ones are more familiar with technologies.⁵ Additionally, face-to-face teaching allows staff to inspire students and have meaningful connections with them; this is limited in distance teaching.⁴

With further investigation about how administration managed the response of older staff to the transition, the answer was "Some schools used DEMOs to train older staff on using some user friendly applications such as ZOOM to enable more engaging methods as lecture recording was not satisfying to all."

Half of the participants (50%, 39/78) in the survey agreed that their schools developed a faculty development program to enable various departments and staff utilizing the alternative methods of teaching. This was in consensus with a comment from one of the education reform leaders "We had invested for some time in preparing faculty through training offered in many areas and when it was time, they performed well."

Therefore, the continuous training of staff may help them to deal with this unprecedented challenge and ensure continuity of teaching. Hundreds of staff members were qualified by the help of various distance learning programs in Health Professions Education as the Joint Master of Health Professions Education (JMHPPE),¹² the Diploma of Health Professions Education (DHPE),¹³ and the regional FAIMER fellowship

program that uniquely spread the medical education science all over Egypt. Other face-to-face programs had contributed to this continuous training as the "Teaching excellence in medical education" program. This training may help them to gain familiarity with the used alternative methods during this transition as stated by Ahmed et al.⁴

In further discussions, participants described a marked difference in level of engagement between the mainstream program and other special programs, which were more successful in the transition as stated by one of the participants "It was a success because it was a continuation of an existing experience. Engagement was almost 95% that is much higher than before." This marked difference in the level of engagement may be because special programs were adopting new teaching methods before the crisis that facilitated the transition while the mainstream program was based mainly on face-to-face teaching. Therefore, the mainstream programs required both teachers and students to spend more time and effort to ensure the success of the experience and gain student engagement in the programs.

Role of Medical Education departments/units and national/regional bodies

Participants in our study were asked to analyze the effectiveness of the role of Medical education departments and units inside the universities during the crisis. Around 50% (43/78) of the participants identified the importance of the role of these units and departments whereas the rest of the participants were skeptical about their role.

Participants from various medical schools and at different levels of decision-making had conflicting views about the role of medical education units. Some senior decision makers think that medical education units were blessed to have qualified people in medical education who supported the transformation. "Without this we could have never been able to reach the staff members and teaching assistants. Their main function is to get where we are getting now. Linking this to technologies and LMSs."

This was confirmed in the focus group where participants reported, "They were doing their best despite the challenges and the uncertainty of the situation." Others mentioned "However, they were working on one pillar which is how to deliver most of the learning materials to the students. This approach may have helped in delivering the content, but we lost the connection with the students."

Accordingly, they have played an important role during the pandemic especially regarding the new teaching skills of the staff. However, they have less emphasis on the students that leads to minimal interaction.

However, others did not agree that the Medical Education units/departments achieved their role in facilitating the transition or preparedness of the staff or students. Staff was expecting from them to provide a road map to facilitate the transient

phase. “We worked as individuals and not at the level of institutions. Staff did not work at the same pace. We used multiple interactive sessions but based on enthusiastic individuals. We needed a clear road map for the process of learning and assessment. Attendance dropped from 75% to 15% because of unclear process.”

Medical education units have existed in Egyptian medical schools for more than 70 years and they have been involved in curricular reform and other activities that improves the educational process. However, the efficiency of their roles has been on a whole spectrum in different universities. While, the first academic department of medical education was established in 2001. Some schools followed the steps and established their own departments.¹⁴ In 2019, the Egyptian government issued a decree that all Egyptian medical schools should have a medical education department and assigned it the role of managing curricular reform in the newly imposed 5-year medical program. These departments have since become an active player in implementation of the designed curricula. The mandate that was assigned to these departments had them involved in the area of education that was cross cutting with many already active units in the schools like the assessment unit, the medical education unit, the quality assurance unit. Managing the hierarchy and establishing functional workflow was important and mandatory to ensure the effectiveness of this role. When the pandemic struck this step was not yet finalized and further role clarity was needed to ensure that the university educational response was up to the expectations of the stakeholders.

The role of national and international supporting bodies was also explored and 38.5% (30/78) of respondents to the questionnaire found the role of these bodies to be useful. When asked to elaborate more on this in the focus group, some participants appreciated the national and international webinars, online workshops and brainstorming sessions conducted by the Regional FAIMER Institute and UNESCO and commended on their value but they agreed that the role of other bodies was very minimal. “We appreciate the support we got from some of them in the form of webinars and training. Some of them were really on top of our needs and were fast to respond to our training needs.”

“We expected guidelines, support, maybe even guidance from these bodies but the truth is we found none” these were the words of one of the focus group participants who highlighted that the role of these bodies needed to be emphasized more and formulated into documents to guide the transition.

National and International bodies fell into 2 categories in their response to the crisis; those who were closely watching the situation and generating guiding content and support as needed and those who fell into a hibernation waiting for the era to end and thus offered very little addition to the situation.

On the other hand, none of these bodies appeared to be ready enough to assume the role that would fulfill the needs of the universities and formal guidance that was expected of them. This can be attributed to the decision-making model adopted

by the government at this point of time. The Ministry of Higher education created a response team that had no representation from these bodies and thus there existed a gap between these supporting bodies and the response in universities.

Role of Egyptian knowledge Bank

A few survey responses addressed the role of Egyptian knowledge Bank (EKB) in this transition. EKB is the world’s largest digital library granting unlimited resources of knowledge, cultural, and scientific content whether they are basic, applied, technology, human or management sciences. It is exclusively for Egyptians (<https://www.ekb.eg/>).¹⁵

Further investigation for its role and how it supported the medical schools during the pandemic was done in the focus group. Educational leaders perceived the help of the EKB was offered mainly in the faculty development domain. Two years back the Reform of Undergraduate Medical Programs committee worked with EKB on staff capacity building for almost 480 faculty members from various universities.

Participants of the focus groups also pointed at Incision Academy Egypt and Skills Gym from EKB as excellent resources that were used in clinical learning and skills teaching. For assessment of the students in clinical years, faculty members in various universities managed to make the best use of these available resources to create formative assignments. Students were asked to collect certificates of performing certain skills and were asked to record their interactions with the available virtual cases that match their learning needs and to add all of these in their portfolios. Educational leaders think that this should be carried on and supplied with more variety of patient encounters especially in some specialties like pediatrics.

Despite, there was an agreement that the EKB has not yet been fully utilized by students. They added, “Utility of EKB is dependent on how schools were previously using it and how much they motivate students to use it as a resource for learning” said one of the educational leaders. All these responses reinforced the idea of the EKB crucial role in this transition. However, Participants highlighted again that despite all these resources, some students were still detached. This can be due to the absence of communication channels between staff and students, the insufficient student orientation, and lack of follow-up.

New teaching methods/strategies

Almost 84.6% (66/78) of the participants reported that their schools used alternative teaching methods for small groups, large groups, pre-clinical and clinical clerkships. However, 64.1% (50/78) of the participants agreed that there were no alternative methods for skills teaching in the clerkship phase, but some trials of using virtual platforms were used for teaching and practicing procedural and physical examination skills as shown in Table 1. Additionally, 46.1% (36/78) of the

Table 1. Methods used in teaching process.

ALTERNATIVES FOR	APPLICATION	USED FOR
Small group teaching	<ul style="list-style-type: none"> • Zoom • Microsoft Teams • Cisco WebEx 	<ul style="list-style-type: none"> • PBL, TBL, Seminars, and office hours • Peer-assisted PBL • Online flipped classrooms • Online lectures and discussions
Large group teaching	<ul style="list-style-type: none"> • Moodle • Facebook • Telegram • Yammer • Google classroom • WhatsApp • Emails 	<ul style="list-style-type: none"> • Audiovisual recorded lectures • Integrated Lectures
The pre-clerkship phases		<ul style="list-style-type: none"> • Virtual microscopy for practical histology slides • Virtual labs videos and virtual cases on EKB • 3D apps, game for the skill lab skills
The clerkship phase	<ul style="list-style-type: none"> • Zoom • WebEx • Microsoft Teams 	<ul style="list-style-type: none"> • Sharing videos, case discussion • Projects for discussion, e-portfolio • Virtual patients and Incision academy • Videos YouTube

participants stated that the use of these new methods was timely, with appropriate level of synchronization for 42.3% (33/78), fostered a change in the curriculum content for 47.4% (37/78) and accepted by the students as reported by 48.7% (38/78).

The used alternatives for small and large groups were reported in other studies as online Team Based Learning (TBL),¹⁶ Online Problem Based Learning (PBL),¹ Zoom, Skype, Google Classroom.¹¹ This indicated that those methods were appropriate solutions in the pandemic time, and it may be a guide to be used by future generations in similar situations.

Challenging clinical clerkships were noted by the current study as one of the participants also voiced, "Clinical teaching is changing as the current practice is changing. Now we are seeing more online patients and we should envision future practice." This was agreed by previous studies^{3,4,7,17} which indicated that the pandemic presented a set of unique challenges for institutions that are responsible for training the next generation of physicians.

Despite the fact that these methods were appropriate solutions due to the time constraint; it may have caused a disengagement and loss of the interactivity with the students that was reported by the participants on several occasions. This disengagement may occur due to several factors. First, the transfer of materials to online learning may be challenging with some subjects. Second, online learning needs motivation, engagement, and guidance.^{6,17} Together with the lack of trust between students and faculty and the improper orientation of the students as reported in the current study. Perhaps, a proper use of mentorship programs that is already implemented in some faculties may contribute to solving the problem.

New assessment methods/strategies

In our study 67.9% (53/78) of the participants reported that their schools used alternative methods for formative assessment

for both pre-clinical and clinical years. However, the majority 75.6% (59/78) reported the absence of alternative methods for summative assessment. Some methods were suggested as online quiz or exam using Microsoft or Google forms or Moodle, Open book exam, and online assignments and research. Online MCQs were strongly recommended by the faculties but at the same time, it was highly resistant by the students. Although, some faculties started to implement some MOOC exams, the students preferred the online projects as reported with some participants.

For students in clinical years, faculty members in various universities managed to make the best use of available resources such as Incision Academy and Skills Gym of the EKB as mentioned before in the EKB section. The clinical teaching as well as assessment, however, were described as the most challenging part of the process.

The Supreme Council for Universities had developed a framework for assessment of medical students in this semester. The main suggested assessment domains were research, online exams, and virtual practical-clinical cases. The suggested grading system was only pass-fail exams with no grading.¹⁸ A plan was done to disseminate this model and to train staff in various universities. Finally, the approved assessment method was the online projects, but it was disappointing to some of the staff. The cause for this disappointment is the unclear picture for the project format, coverage of the module and how it may be assessed as stated by the participants. In addition, staff perception that their effort was not appreciated, and learning may be affected when summative exams are not included since assessment drives learning.

Each school decided the suitable project format in which some schools used individual projects for one or each module. Other schools, adopting PBL strategy, used a problem-solving format. Although each school developed their scoring rubric or checklists, innovation and creativity were fostered and assessed

in all research projects. This matches what was reported by Liu and Carless¹⁹ as a well-designed assignment can guide the students through engaging deep learning experience and divert their attention away from the grades toward creativity and critical thinking. However, it is important to have a framework for designing this project or assignment as suggested by Amin et al.¹⁸

Although, the project was appealing for the students at the beginning but then they started to struggle as mentioned in the focus group. This can be because the students were not well trained or informed about the research project. Still, the clinical year projects were the most challenging and warrants further research. Several challenges were identified in the responses regarding the online assessment as the security, reliability, technical problems, Internet connection, and plagiarism.

The concept of allowing assessment tools and techniques to replace currently existing assessment methods seems to undermine the current challenge. The COVID situation changes the dynamics of teaching and learning all together. This happened in a short period of time that did not allow much adaptation to happen. This requires a new type of reflection in assessment and a new approach that exceeds the search for alternative tools. The whole concept of assessment needs to be revisited together with its place in the curriculum and its role in education.¹¹

Projection into the future and the new normal

More than 80% (63/78) of the participants in this survey perceived that many changes would sustain post COVID-19. From the focus group discussion, many agreed that it might be too early to discuss sustainability in the traditional fashion. This agrees with Ahmed et al¹ who is conservative about the little time available to focus on quality of education when focusing on the rapid transition. Faculty may need to be engaged in a rather indirect process of planning and reflection that will allow them to utilize the realizations of the situation into future planning.¹

However, most of them agreed that next year teaching schedules will be different regardless of the progress of the COVID-19 pandemic. More online content will be added and more interactive sessions will be created.

Moreover, accreditation standards for medical schools in Egypt and in the world will most likely become updated to match the current paradigm shift. New indicators are currently discussed at the national level as well as the Arab Network for higher education accreditation.

On the other hand, others were very oriented to the lessons learned from the COVID-19 crisis when prompted to discuss how they perceive future changes. The following aspects cross cut across most of the focus group participants:

- 1- Capacity building of staff needs more focus, as the stage is open for innovation and validation of the usefulness of the online learning that evolved during the pandemic.

- 2- Mistrust between staff and students emerged during COVID-19 crisis as students are showing an aggressive attitude toward the staff. They are also trying to amputate any new idea or suggestion, especially in the assessment. Student unions have proven to be a strong body. This body should collaboratively work for the improvement of the Medical Education in Egypt and not against it. It is recommended to have supervision from the staff. Ahmed et al⁴ also warned that within the unplanned transition, the focus became on compliance with technical needs and requirements at the expense of student centeredness, engagement, and the educational environment. Finally, the effect of social media on the students, staff, and decision makers needs further research.
- 3- Communication between the decision makers, staff and students is identified as a crucial factor for the success of the Medical Education transition. "The communication was zero in most of the cases."
- 4- Decision makers at the national level need to understand and consider the special nature of Medical Educational institutes when taking decisions that will affect the learning process. They also need to involve medical school administration and leading national bodies in the taken decisions.

Suggestion for improvement "Be ready for the next crisis"

"COVID-19 is an eye-opening experience" that helped us to identify our area of strengths and weaknesses. It helped us to use our full capacity despite the time constraint to learn new teaching skills, prepare online learning materials and maintain the learning process. However, our strengths were not used in a fully procured way as we lost our connection with the students and decision makers that leads to a different individual scenario in each institute.

COVID-19 was a very gainful experience that without it no radical change in medical education would have happened. Staff would not stretch their capabilities and apply what they are learning. Some weaknesses would remain hidden. Therefore, COVID-19 was the fire for the medical education change in Egypt and the world.

Online learning should be integrated in the curriculum with a fair percentage that it may account for 20% to 30% of the curriculum especially in the early years of medical study. It is important to foster interaction in online learning and provide them with the knowledge, skills, and attitude that are needed for successful online learning. This may prepare students for similar situations or future crises. Others suggested 50% of the curriculum should be taught as online learning that may solve the problem of shortage in faculty. On the staff side, extensive faculty development through training on the various forms of online and electronic assessment as online MCQS and open book exams were highly suggested. Moreover, the training on

assessment modalities in clinical clerkship as virtual OSCE, virtual VIVA and virtual patients was also indicated as a current need.

Open valid and continuous channels for communications between students, staff and decision makers to build rapport and trust. Mentorship would help in building these channels. Intensified efforts should be done for modification of the student attitudes. However, the number of students in each faculty may contribute as an important challenge that needs to be reconsidered in the future.

Lastly, National bodies should develop a road map/action plan with involvement of the student union bodies. This road map should be communicated to higher authorities and decision makers.

Limitations of the study

Although the current study is a descriptive study that uses the perceptions of faculty and administrators regarding the changes that happened in their schools, the findings must be interpreted with caution. The findings might have related to the experiences of the number of the universities presented and therefore cannot be transferred to a larger population. The data collected also needs further analysis to stratify the sample based on the faculty role in the institution. Likewise, it is important to note the sample size in the current study while interpreting the study findings. A recommendation for further study of the discrepancies in the views of different layers of administration and exploration of the medical students' opinion in these themes.

Conclusion

The COVID-19 pandemic changed the dynamics of education without previous warning. This resulted in unmasking many new potentials and helped unmask many shortcomings at the same time. Analyzing the response of universities in Egypt, identified a great potential for government investments that placed in knowledge repositories like the EKB. When the catastrophe struck, it was obvious that individuals moved faster than bodies and relied on support existing outside the universities. However, programs that were including more online content with experience in adapting modern engaging learning methods were at a better position to respond to the crisis.

There is a gap in communication between educational leaders who manage reform in the country and those who implement the strategies.

Recommendations

- More emphasis should be placed on utilizing national governmental bodies that can assist faculty and curricula. This can be done by institutionalizing their role in Medical education.
- Medical Education departments and units need to work on a quick response plan for future management of unexpected events that should contain a valid communication strategy starting with a stakeholder analysis.

- More investment needs to be placed in alternative assessment methods.

Author Contributions

MHS: The author had made substantial contributions to the acquisition, analysis, interpretation of data. He has drafted the work and substantively revised it. Finally, she has approved the final version of the manuscript.

AM: The author had made substantial contributions to the acquisition, analysis, interpretation of data. She has drafted the work and substantively revised it. Finally, she has approved the final version of the manuscript.

NFW:: The author had made substantial contributions to the acquisition, analysis, interpretation of data and approved the final version of the manuscript.

AA: The author had made substantial contributions to the acquisition, analysis, interpretation of data.

RLW: Author had made substantial contributions to the conception, design of the work, the acquisition of data.

SAA: Author had made substantial contributions to the conception, design of the work, the acquisition of data and approved the final version of the manuscript.

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