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POLICY BRIEF

Medical Education Quality in the COVID-19 Era: A Policy Brief on Lesson Learned and Recommendations

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ABSTRACT

Following the COVID-19 pandemic, numerous studies have been conducted to evaluate the quality of medical education in Iran, with a particular emphasis on virtual training. The results of these studies varied. A review of evidence suggests that the pandemic has affected the quality of medical education. Quality management of medical education during critical conditions such as the COVID-19 pandemic is far from what occurs in routine medical education processes. In order to prevent a decline in the quality of education during crises, it is necessary to adapt educational structures flexibly, particularly in healthcare delivery settings such as hospitals and comprehensive health centers. This policy brief proposes several recommendations in the area of learning environment, educational governance, developing and supporting learners and supervisors, delivering programs and curricula and developing a sustainable workforce. These recommendations can be implemented both before and during a crisis. In addition to all these suggestions, the key policy recommendation is to create and implement an Education Incident Command System (EICS). The design of an EICS is warranted to keep medical education processes active and preserve the quality of medical education before, during, and after a crisis. The EICS operates with command, control, and coordination of key players in medical education in response to emergency situations by facilitating flexible changes in medical educational processes.

Keywords: Medical Education, Quality, COVID-19, Policy Recommendations, EICS

Introduction

The COVID-19 pandemic has impacted the university education system worldwide, including in Iran (1). The rapid spread of the disease, its high contagion rate, and the necessity of adhering to social distancing guidelines led to the closure of universities by government mandate (2). Iran healthcare system, particularly the universities of medical sciences, proposed various solutions to control the spread of the disease in society. These solutions included implementing quarantine measures, developing educational protocols, and planning public education initiatives (3). Universities in Iran were closed from April 2019 to June of the same year, transitioning to virtual education thereafter (4). Medical science education in Iran plays a unique role as it is integrated with the healthcare delivery system (5). Ensuring the health needs of society members relies heavily on an efficient healthcare system with skilled providers at all levels of service, necessitating

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high-quality training (6). One challenge stemming from social distancing policies is a potential decrease in educational quality (7). Ensuring the quality of education and research has always been a priority for university systems, prompting continuous efforts to enhance higher education quality and achieve educational objectives (8). Figure 1 shows the process of measures and solutions and how the medical education system of Iran is facing the COVID-19 pandemic.

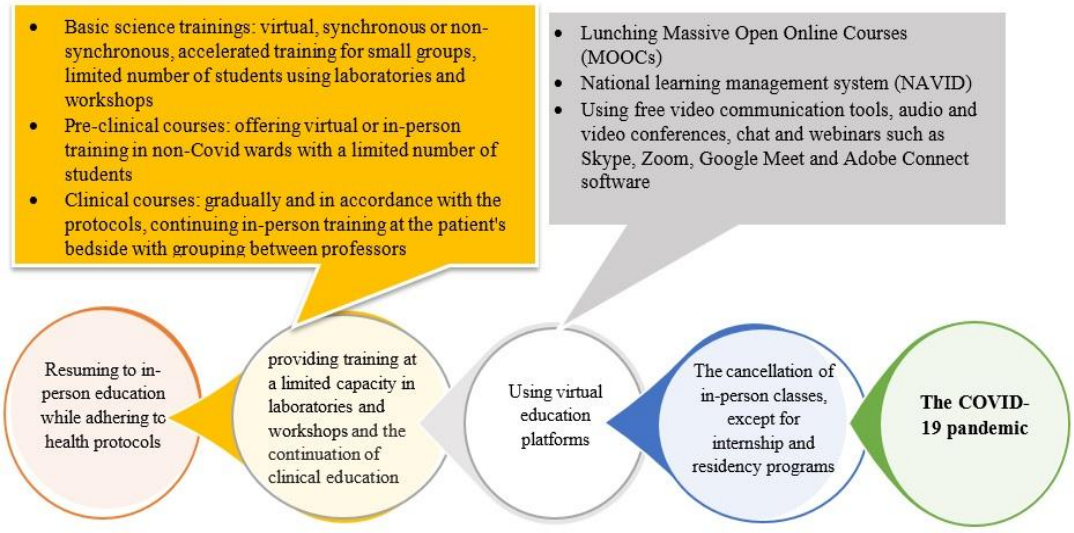

Figure 1. The process of exposure and actions of Iran medical science education system during the COVID-19 pandemic

Following the COVID-19 pandemic and subsequent measures, several studies have been conducted to assess the quality of medical science education, particularly in virtual settings. Findings from these studies have indicated that the quality of the medical science education system has been affected by the pandemic. Therefore, it is crucial to analyze the country experience during this period, the effects on medical science education, and the measures taken. By identifying challenges and opportunities, appropriate solutions can be implemented to enhance the quality of medical science education and bolster the system resilience against future crises.

This study utilized a systematic framework to comprehensively examine the effects of the COVID-19 pandemic on the medical education system. This framework enabled researchers to explore the impacts, challenges, and solutions related to facing crises like the COVID-19 pandemic within various educational dimensions.

Medical Education Quality Framework

The framework of the Health Education England (HEE) Quality Framework from 2021 was utilized to enhance the quality of higher health education in order to better prepare for similar crises. This framework introduces six main dimensions as quality assessment in medical science education (Figure 2), as follows:

1. Learning environment and culture
2. Educational governance and commitment to quality
3. Learner development and support
4. Development and support of professors
5. Presentation of programs and curricula
6. Sustainable workforce development

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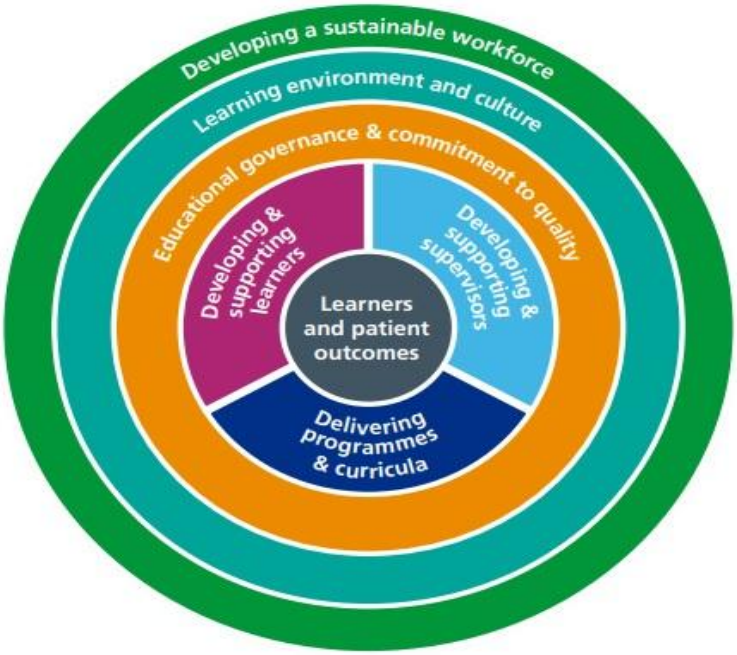

Figure 2. HEE Quality Framework from 2021

Effects and Challenges of Learning Environment and Culture

During times of crisis, it is essential to ensure that learners in clinical and educational settings receive adequate support and supervision to acquire knowledge, skills, and behavioral changes and design related programs and curricula. The effects of the coronavirus pandemic on the education environment can be examined from two perspectives including the physical environment and the virtual learning environment. Table 1 highlights some of the most significant effects and challenges of the education environment and learning culture caused by the pandemic.

Table 1. Effects and challenges of the learning environment caused by the outbreak of COVID-19

Theme	Sub-theme	Effects and challenges
Effects and challenges of learning environment	Facilities of medical education (1-3)	- High density of educational spaces, along with a high ratio of students to the area and a disproportion between the number of students and classroom space, as well as improper ventilation, have led to a decrease in the quality and safety of educational spaces. - Admitting patients with COVID-19 in all departments of educational hospitals, lack of protective equipment, and a shortage of COVID-19 diagnostic kits have created an unsafe learning environment for students. - Reduced contact with other patients during internships in clinical environments (due to admitting COVID-19 patients) has led to a decrease in the qualifications acquired by students. - There is a lack of a predetermined strategy to rearrange clinical training environments to allow for the continuation of training activities in the event of biological or other crises.
	Virtual setting (9,10)	- Issues such as disrupted internet lines, weak bandwidth making information upload and download difficult, technical defects, and poor support of learning management systems, are hindering the learning process. - Lack of hardware and software facilities to support effective learning.
Effects and challenges of learning culture (2,9,11,12, 13, 14)		- Poor interaction, communication, and cooperation among students, faculty members, and university staff have been linked to the use of virtual asynchronous education. This has resulted in a decrease in interaction and feedback between professors and students.

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	- Critical thinking and problem-solving skills are being ignored. - The potential for constructive learning from both positive and negative experiences related to patients and users of health services is being eliminated. - There are deficiencies in the opportunity for active participation and sharing opinions among all students. In a high-quality learning environment, all learners should have the chance to provide input and actively participate. - The opportunity for interaction between different specialized professions in the learning environment has been lost.

Effects and Challenges in Educational Governance

Quality in medical science education necessitates the presence of effective, transparent, and comprehensible governance structures. There should be established processes for coordinating, managing, evaluating effectiveness, and enhancing the quality of teaching and learning. However, investigations have revealed that when the coronavirus pandemic hit, there was no single incident command system in place for education. This lack of transparent governance arrangements led to challenges in processes, protocols, and regulations within the field.

Figure 3 illustrates the overlooked arrangements and measures in the governance of medical science education in the country during the COVID-19 crisis across seven dimensions. In the final dimension, universities of medical sciences in various regions struggled to effectively collaborate to ensure students could continue their education or complete courses at their respective universities.

Furthermore, the higher education system encountered a financial crisis due to reduced financial turnover from healthcare systems, decreased revenue from services, and increased costs of care, treatment, personnel, materials, and protective equipment. This financial crisis impacted the capacity of the education system to expand educational opportunities and implement new technologies.

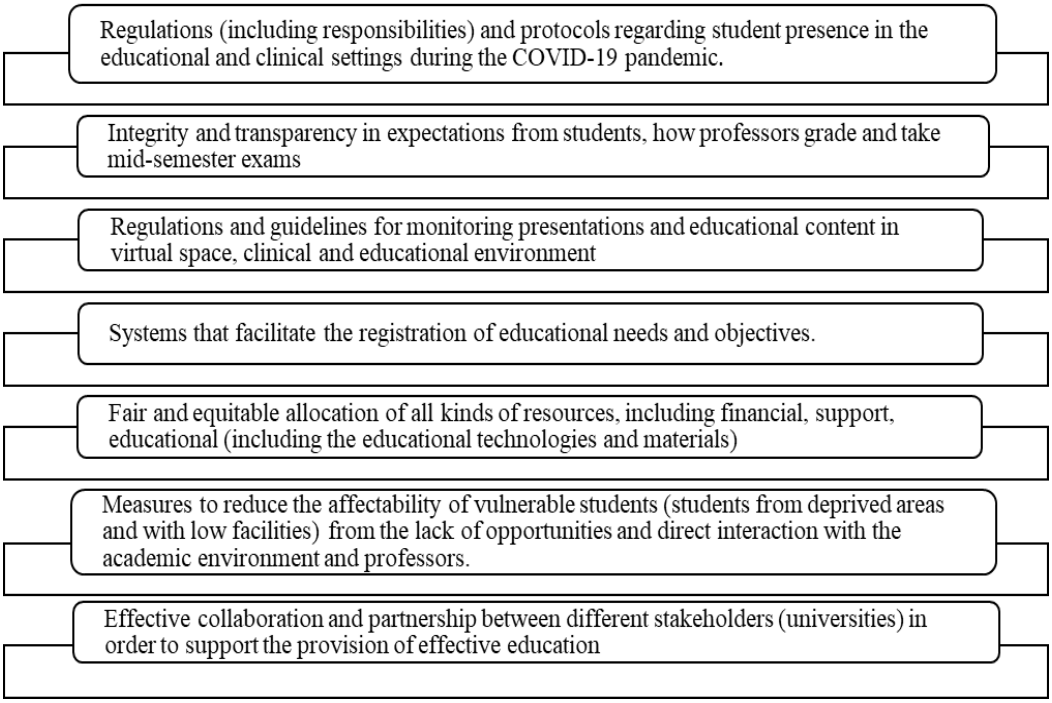

Figure 3. Neglected arrangements and actions in the educational governance of Iran medical sciences in the face of the COVID-19 crisis

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Effects and challenges in supporting learners

When supporting learners, training service providers must ensure that learners receive appropriate supervision and support in both clinical and theoretical settings. This supervision and support aids in their acquisition of the necessary knowledge, skills, and behaviors outlined in the curricula/programs. Table 2 outlines the most significant effects and challenges stemming from the COVID-19 in supporting learners.

Table 2. Effects and challenges caused by the outbreak of COVID-19 in supporting learners

Themes of effects and challenges	Effects and challenges dimensions
Weakness in providing services to support the physical and mental health of learners (3,4,13)	- The extension of the study period, uncertainty about the future and how to continue studying and graduate, the inability to travel to the place of study or return home for students quarantined at the place of study, led to their withdrawal or suspension and lack of proper academic progress. - The fear, stress, and anxiety of students, especially those in bed, about getting infected with Corona and the spread of various rumors needed to be managed to reduce stress and dispel rumors. - Students' anxiety about not having enough necessary skills to enter the workplace resulted in them feeling insecure about their future careers. - Insufficient support for holding compensatory courses and retraining for students facing crises.
Impact on equity: Lack of necessary arrangements to ensure that all learners have access to learning opportunities (4,13, 15)	- Failure to accommodate non-native students in dormitories. - Inequality in students' access to learning facilities, especially hardware like laptops, computers, and general internet access. - Grouping students, providing intensive training with a small number of students, and reducing exposure to other patients were effective in improving the quality of education received. - The need for structured educational resources to meet the new educational needs arising from the corona pandemic. - The costs of participating in virtual classes and downloading educational materials for students and professors.
Weakness in monitoring learners to identify their support needs (3)	- The educational system weakness in identifying students with problems and supporting them promptly. - Long working hours, low salaries and benefits, and prioritizing the treatment of COVID-19 patients among residents. - Postponement of students' graduation.

Effects and Challenges of Supporting Professors

In this area, it is crucial to ensure that faculty members are carefully selected, properly trained, and regularly evaluated. They should also receive adequate support, resources, and time to deliver effective instruction and clinical supervision, along with opportunities for professional development (13, 4). Figure 4 illustrates the effects and challenges of COVID-19 on the field of supporting professors and lecturers.

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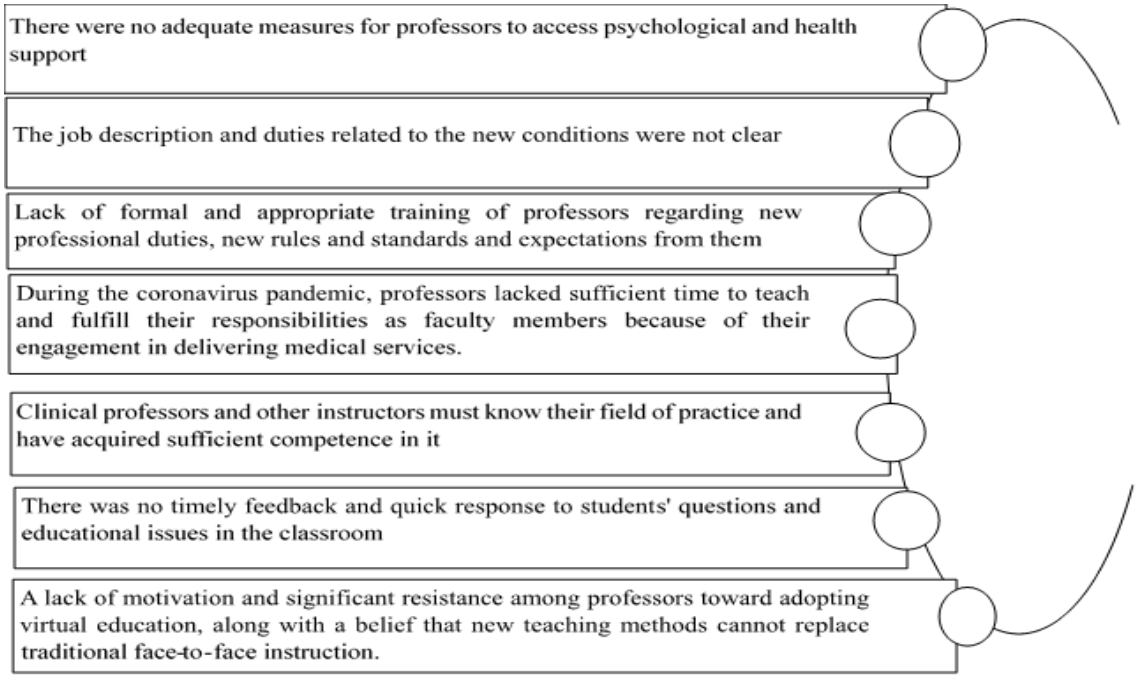

Figure 4. Effects and challenges of COVID-19 on supporting professors and educational coaches

Effects and Challenges in Programs and Curricula

In this area, it is important to ensure that programs and curricula (including assessments) are developed based on the requirements of regulatory bodies, universities, or educational service providers. Programs should be adapted to new care models and developments resulting from the COVID-19 pandemic. Professors (both in clinical and basic sciences) should have sufficient freedom and flexibility to deliver education in accordance with the curricula (6,16,17).

The most significant challenges and effects of the COVID-19 pandemic on programs and curricula are illustrated in Figure 5.

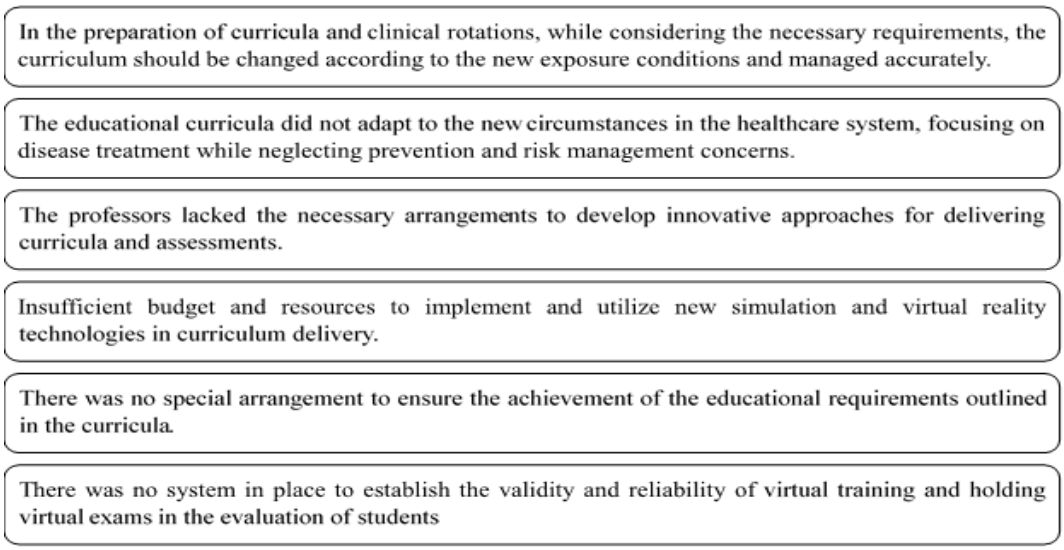

Figure 5. Effects and challenges of COVID-19 on curricula

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Effects and Challenges in the Development of a Sustainable Workforce

In this field, in order to achieve the collective effort needed to support and enhance the quality of education and learning, the maintenance, promotion, and development of the workforce should be prioritized. To maintain a stable workforce, universities should focus on improving the following:

- Programs aimed at reducing and preventing student dropout rates in collaboration with various stakeholders
- Counseling and guidance programs to help students make informed decisions and plan their future careers
- Ensuring that learners acquire and develop the necessary qualifications and knowledge to prepare for employment (skills with sufficient depth and breadth)

The evidence shows that COVID-19 has led to a decrease in the skills and competence of students (1,3). Among the most significant effects and challenges brought about by COVID-19 in the development of a sustainable workforce, we can refer to those outlined in Table 3.

Table 3. Effects and challenges caused by COVID-19 in the development of a sustainable workforce

Effects/challenges	Description
Inadequate skills of graduates to enter the workplace	The occurrence of the Corona pandemic resulted in a decline in the professional qualifications of students due to limited contact with patients and a decrease in the quality of theoretical and practical training. Unfortunately, no method was developed to ensure the necessary depth and breadth of skills.
Lack of manpower in special and required disciplines	To guarantee adequate space and resources (pre-clinical, clinical, and theoretical), universities need to have effective coordination and communication to share educational facilities and alleviate overcrowding.
Lack of communication between universities and other stakeholders related to education	The outbreak of the Corona pandemic also caused an increase in students' hesitancy to pursue high-risk specialized fields like emergency medicine in specialized exams, leading some to withdraw from further studies.

Policy Recommendations for Addressing Health Crises in Medical Education

The COVID-19 pandemic highlighted the unpreparedness of Iran medical education system to handle critical situations, resulting in a decline in the quality of education. In order to address similar crises and prevent a decrease in the quality of medical science education, particularly in clinical training, reforms are needed across various areas of the higher health education system. The following recommendations aim to enhance the quality of education in similar circumstances.

Recommendations to Enhance Learning Environment and Culture

Given the limited physical space in many universities and high density of student, professor, and staff, a combination of in-person and virtual training is essential. It is crucial to maintain student-patient contact, especially during clinical rotations. Virtual education has limitations, particularly in clinical and pre-clinical courses, where practical skills are inadequately taught even with advanced simulators. Therefore, the following solutions in the learning environment and culture should be considered in critical situations:

- Implement distributed and distance learning, involving a mix of virtual, individual, and face-to-face training elements to ensure education continuity.
- Conduct professor-supervised consultations via phone or video for medical students and residents, providing feedback online or in-person.
- Organize virtual rounds in medical departments using modern technologies to engage students with patients and doctors.
- Establish virtual hospitals, pharmacies, and laboratories for pre-clinical and clinical training

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using simulation technologies.
- Utilize telemedicine technologies to involve students in service provision.
- Enhance student participation in simulation and clinical skills courses through interactions with instructors, standardized patients, or peer feedback.
- Employ a blend of synchronous and asynchronous virtual training to cater to diverse learning needs.
- Improve physical learning environments by adhering to space utilization standards, enhancing ventilation, and air circulation.
- Develop a strategy to separate teaching hospitals from treatment hospitals during crises to ensure continuous clinical teaching.
- Expand electronic testing facilities by establishing standardized test centers regionally and nationally.
- Design standardized video interviews focusing on communication skills, behavioral abilities, and interpersonal knowledge for student evaluation and selection.

Recommendations to Improve Educational Governance

In this area, there should be transparent and clear governance measures to determine priorities, structure, rules, and policies for the evaluation, management, and improvement of the quality of education during times of crisis. The first and most important recommendation in this area is to predict and design a single incident command system for education, known as Education Incident Command System (EICS), with the necessary authority to make flexible changes in educational structures in hospitals and comprehensive health centers during crisis situations. The proposed structure for this special training incident command system includes five main dimensions including command (management and leadership), planning, execution, logistics, and financing.

Other recommendations that can be aligned with the EICS system and its components include:

- Determining responsibilities: Universities should have policies that specify the responsibility for provision, access, content production, and the effectiveness of education. Additionally, the responsibility and accountability structure regarding student safety, effectiveness, and quality of education should be clear.
- Establishing clinical training criteria for emerging and re-emerging diseases.
- Establishing effective distance education criteria: Universities, students, and stakeholders should be informed about the features that improve distance education effectiveness, and a set of educational policy documents for distance learning should be prepared.
- Implementing measures to encourage and expand innovation in education methods, such as promoting and supporting successful activities in the field of education.
- Defining possible and available technology options to deliver the right content at the right time to the right person.
- Making arrangements to guarantee equal access for students to educational resources, professors, equipment, and educational technologies.
- Defining communication methods for distance and distributed education between different stake holders.
- Determining the methods of allocation and effective use of educational resources during times of crisis.
- Creating a quality assurance system for evaluations, including final evaluations suitable for measuring the results of training courses.
- Managing costs and resources, ensuring sufficient and appropriate financial, human, and physical resources are defined and continuously monitored.
- Managing data, determining policies for collecting, using, and improving access to data.
- Compiling a comprehensive system of electronic education in two versions for critical situations and normal situations, and communicating it to the medical sciences universities of the country.

Recommendations to Support Learners

- Create facilities to provide private and confidential physical and mental health counseling to students in times of crisis to ensure

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effective learning.
- Define a student support system that analyzes the student's characteristics and conditions, determines the type of support needed, and designs and manages the method of handling it.
- Ensure students have access to appropriate technology and provide continuous technical support.
- Provide individual and social support to students.

Recommendations for Promoting Support for Professors
- Make necessary arrangements to guarantee the skills of professors and lecturers to provide education in new conditions, such as distance education.
- Ensure professors have sufficient time in their career plans to undertake the development and delivery of distributed and distance education, as well as research activities, academic duties, and clinical duties.
- Provide professors access to physical and mental counseling.
- Determine and provide expectations for professors during the crisis, including new roles created as a result of the crisis.
- Create mechanisms to evaluate professors' performance in times of crisis and provide feedback.

Recommendations to Improve Educational Programs and Curricula
- Develop a systematic approach for designing distance education courses or other methods of education that consider contextual conditions, learning and teaching conditions, and academic standards.
- Identify and determine must-learn content to teach the minimum necessary in crisis conditions.
- Base the selection of educational methods, resources, and opportunities on a predetermined process.
- Establish cooperation and coordination among specialized boards and key stakeholders in developing curricula to respond to changes in treatments, technologies, and care methods.
- Develop guidelines and course plans for emergency cases of clinical and pre-clinical training using new medical education technologies.
- Determine the goals and reasons for providing and designing distributed and distance education in the curricula.
- Collaborate with stakeholders in preparing curricula to ensure their connection with current and critical conditions.
- Adapt lesson schedules, learning paths, and workload with compiled curricula to ensure student compliance.
- Create national and international collaborations for sharing and accessing resources to improve the quality of content and reduce costs in medical science education.

Recommendations to Improve Sustainable Workforce
- Make necessary arrangements to guarantee the qualifications of graduates before entering the workplace.
- Develop a fast-track program for early graduation of qualified students in critical situations.
- Provide career counseling, field selection, and determine career paths for learners.
- Apply recruitment strategies, special privileges, and create motivation to register and continue studying in fields with decreased interest due to the pandemic.

Final Policy Recommendation

Dealing with the issue of quality in medical science education under normal conditions differs from dealing with it in critical conditions. Therefore, in order to prevent a decline in the quality of education during crises like the Corona pandemic, it is necessary to be able to flexibly adjust educational structures, especially in hospitals and comprehensive health centers. Most of the recommended policies in the areas examined in this study (learning environments, educational governance, support for learners and professors, programs and curricula, and sustainable workforce) can be implemented both before and during a

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crisis. However, what is very important is the establishment of a specialized incident command system for the field of EICS training that has the necessary coordination, and the continued implementation of these quality improvement policies before, during, and after a crisis in order to restore the system. EICS is a system for managing and organizing crises in the field of medical science education that provides command, control, and coordination in response to emergency situations, and allows for flexible changes in educational structures. Figure 6 shows the components proposed as part of the EICS.

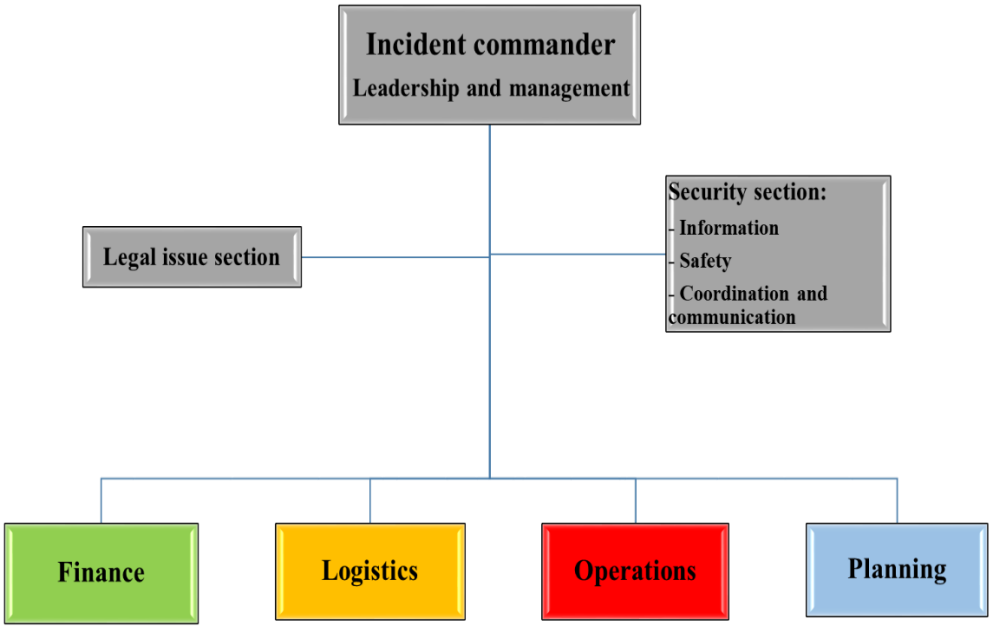

Figure 6. Components of the EICS

The proposed EICS consists of five main parts. The most crucial part is management and leadership, which serves as the command, control, and coordination in crises affecting medical science education. There are two sections related to management and leadership including the security section, which includes information, safety, coordination, communication, and public relations, and the legal issues section, ensuring the implementation of decisions and policies. Another part of this system involves planning activities, where policies, short, medium, and long-term programs, regulations, protocols, and various instructions are prepared. Logistics activities provide suitable facilities and support human, equipment, information, and structural resources on a temporary and permanent basis. Lastly, the financing system ensures the provision and allocation of resources in a fast and stable manner.

Advantages and functions of the proposed EICS system include:

- Responding to critical needs in medical science education of any type and scale
- Being economical by preventing parallel activities in universities
- Allowing individuals and universities to quickly enter a common management structure
- Establishing common standards and protocols between universities and educational centers
- Estimating and measuring educational needs at any scale and type
- Providing administrative, logistic, and financial support
- Utilizing the large capacity of regions and universities for geographical division and program direction

It is recommended that officials, roles, duties, and guidelines for the creation and operation of EICS be prepared, and future planning should be based on that.

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Ethical Consderations

This research was approved by the ethics committee of National Agency for Strategic Research in Medical Education (NASR) based on the approval of IR. NASRME. REC. 1401.031.

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Conflict of Interests

The authors declare no conflict of interests.

Authors' Contributions

Concept and design of the study: M.H and M.N . Data gathering: M.H, M.N, M.H, A.A and Z.F . Manuscript writing: M.H and Z.F . Revision of the manuscript: M.N, A.K and A.A . All authors read and approved the final manuscript.

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