

Virtual Grand Round in Medical Education: A Literature Review Based on Medical Universities Experiences

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Abstract- This study tries to review the experience of universities in detecting patterns that have been followed in holding Grand Rounds by them and achieving the set of factors needed to hold this event with high quality. In this literature review study, 268 titles of English articles were collected between 1960 and 2021 in the international databases of Cochrane, ERIC, PubMed, Scopus, Science Direct, Embase, and Web of Science. The keywords included "Grand Round," "Medical Grand Round," "Virtual Grand Round," and "digital Grand Round." Based on the PISISMA diagram guide, after "quality review," eight articles remained in the study. Traditional content analysis methods were used to extract data, which was then inductively classified as a four-phase-ADDIE model, which includes Analysis, Design, Implementation, and Evaluation. In other words, the ADDIE model is used as a guide in determining the quality status of the virtual grand design of other studies. The analysis is always one of the main phases of the ADDIE model, so the information in this main theme was essentially divided into two sub-themes: "teaching facilities" and "conditions," in which all the measures are taken to assess the feasibility of the course were included. In the "implementation" theme, just one article described the complete format of holding a virtual grand round, emphasizing the teaching method, case type, and presentation platform. In the "evaluation" theme, all eight articles evaluated the results of the virtual course in some way using student perspectives. A deeper review of the experiences showed that no specific and complete instructional design model was used to design and implement this program. In this review, it was found that the documented experiences regarding holding this program in virtual mode are very limited. Besides, the lack of applying an instructional model effectively makes the citation challenges.

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Introduction

It has been a long time since a large "traditional" Grand Round (face-to-face) was held, which was the main basis of medical education. These rounds send physicians and students to learn more about interesting patients and complex diseases and to strengthen their skills in treating similar cases. Rounds are a vital way to teach and impart medical knowledge. With the spread of science and technology, Grand Rounds also joined the Jirga of events suitable for virtual events (1,2).

The impact of new technologies on the field of medical education is inevitable, especially in the direction of the 20-year vision seems inevitable. But to use this

system, the organizational structure of universities must transform. Also, for e-learning in educational affairs, it is necessary to create conditions such as strong infrastructure; development of necessary educational standards, evaluation of educators and students, appropriate culture building and change cultural writing of the society in the field of education, investment, and government and private sector participation in this field will be provided (3).

There are many experiences in holding Grand Round in different universities of the world that can provide suitable information for holding this event in a virtual way with quality, although the number of experiences recorded and published in this regard is small.

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Since medical science educational events ultimately relate to the life, death, or recovery of patients, it seems that virtual innovations in holding them or inventing new methods should be done with caution. On the other hand, in recent years, stakeholders' expectations about the level of responsibility of those in charge of medical education have increased, and more serious demands are being made to improve the knowledge and skills of medical graduates (4).

One of the factors that reinforce this precaution is the review of published studies by other universities that have had the same experience. This study tried to review the experience of universities in holding a virtual Grand Round to achieve the set of factors needed to hold this event with high quality (5).

Materials and Methods

Search strategy and selection criteria

In this systematic review study based on PRISMA guidelines, 268 titles of English articles were collected based on studies published between 1960 and July 2021 in the international databases of Cochrane, ERIC, PubMed, Scopus, Science Direct, EMBASE, and Web of Science. In this search, all possible combinations of these words with Boolean AND, OR operators were used. It should be noted that in order to ensure the retrieval of all documents and to make the results of the retrieval of scientific products in the field of Grand Round prevalence comprehensive, all the mentioned keywords were selected with the help of MeSH Medical Subject Title. The words included "Grand Round," "Medical Grand Round," "Virtual Grand Round," and "digital Grand Round," and all possible combinations of these words were used with AND, OR. The search strategy was: ("Grand Round") AND ("medical") OR ("virtual") OR ("digital").

In order to select articles and extract data, first, all articles that contained the desired keywords in the title were included in the study. All quantitative and qualitative studies conducted in English from 1960 to July 2021 examined the virtual, electronic, and Grand Round system. Thus, 268 articles were obtained. From this point on, according to the PRISMA diagram (6,7) shown in figure 1, articles presented at conferences, seminars, and letters to the editor, irrelevant items, duplication of studies, and inaccessibility of the full text of the study were deleted. References of the included articles were backward-tracked, and Google Scholar was searched to identify extra potentially relevant articles. So,

45 articles entered the "quality review" process. In the quality assessment, the existence of sections such as article title, first author name, year of publication, place of study, the full text of the article, and specific method of study, collection, and analysis of the information was noticed, published in a peer-reviewed journal and written in English. Thus 37 articles were deleted, and 8 articles remained in the study. All the steps shown in the PRISMA diagram were performed by three authors. In this way, first, two authors reviewed and screened the articles based on the exclusion criteria and compared the results with each other. Any discrepancies were resolved through discussions, inviting the third author to discuss and reach an agreement on the final decision.

Data categorization and analysis

We developed a data table template using Microsoft word. Characteristics of the articles, including authors, publication year, publication type, educational setting, and virtual Grand Round program design.

Once the virtual Grand Round program design data (direct text describing any action to design and hold the program) were collected, conventional content analysis was employed to inductively generate categories from the extracted data and to develop definitions of the instructional design categories according to 4-steps-ADDIE model.

A look at the history of the instructional design indicates that the term was first used in military and commercial contexts and later used in various fields, including education. Among the various educational design models, a model called ADDIE is very popular (8). The reason for this popularity is that the ADDIE model considers all theories of epistemology, behaviorism, and constructivism and covers different perspectives on learning; it is called a general model. This model can be used for any type of learning, both traditional and electronic. The model includes 5 steps: Analysis, Design, Development, Implementation, and Evaluation. The content analysis involved assigning a label to the extracted text data (code). The following guide was used for coding. In this way: 1- Any actions related to information are gathered about the audience, learning needs, budget, constraints, and so on. In short, the educational designer is faced with the following questions labeled as analysis steps. 2- Any activities related to choosing the most appropriate educational environment according to the goal were labeled as the design step. 3- Any actions related to selecting or providing the required media and educational materials and deciding on group

E-learning and medical grand round

or individual activities are among the activities of the development stage. 4- Any actions to ensure the acquisition of training criteria and final evaluation to

assess the output of the training course and check the validity of the program of the activities of the evaluation stage.

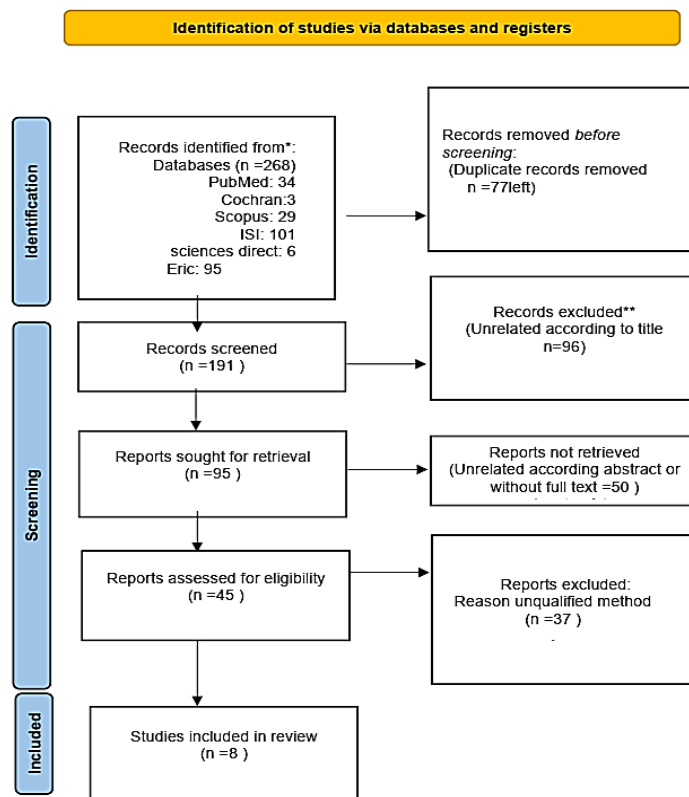


Figure 1. PRISMA 2020 flow diagram for new systematic reviews, which included searches of databases and registers only

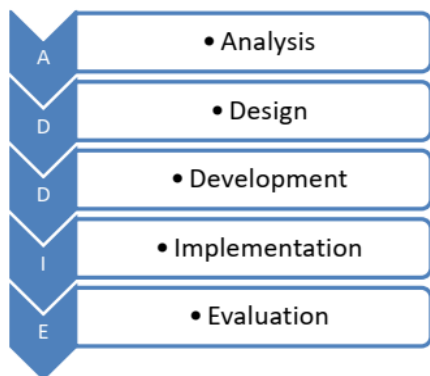


Figure 2. Steps of ADDIE instructional design model

Results

Following PRISMA's instructions, 8 of the 268 papers remained in the study (9-16). The results of the review of the remaining articles are given in table 1. As mentioned in the methodology section, to check the requirements of the virtual Grand Round program, a guide called ADDIE

educational design model was used, and thus different articles based on the authors' names, the educational field in which the Grand Round was held and the degree of compliance of the Grand Round program with The ADDIE pattern was analyzed.

Analysis

The first step in designing an educational program is educational situation analysis and need assessment. This step was considered one of the main themes of content analysis in this systematic review. In this theme, Yeung shows that the needs of students and professionals before the program were considered (9). He claimed that a virtual Grand Round is necessary for students to be informed about the diagnosis and treatment of common skin diseases in other countries and to be aware of various socioeconomic, cultural, and moral aspects of diagnosis and treatment in the dermatology setting. In the other article, Knaus cited the occurrence of the coronavirus pandemic as one of the factors influencing situation analysis (10). The authors of this article launched a virtual

nationwide lecture series for their trainees to fill the educational gap in this course. Virtual lectures gave students living across the United States and Canada the opportunity to learn more from professor surgeons living at different universities.

Epstein's analysis of the educational situation also showed that dentistry education requires integrating a patient's electronic health record (EHR) information into the minds of students working in different parts of a dental internship and having to set up a treatment plan for the same patient. In this article, he shows how holding Grand Round sessions for a patient, combining her information with each other, and achieving a better picture of her condition (11).

Design

In this theme, 2 sub-themes of Conditions and Meeting management were extracted.

In the condition sub-theme, an article in the dental setting explicitly addresses the conditions of the program. A review of the required components of holding a virtual Grand Round showed that the main components are (11): Relationship Focused content, Faculty collaboration, and Student assessment.

In the meeting management sub-theme, three articles discuss how to manage Grand Round meetings. Knaus's article, which is dedicated to holding a virtual Grand Round in the surgical setting, defines the roles of training session organizers. In this article, the video-conference platforms which were experienced by the planner were introduced (Zoom (San Jose, Calif.), WebEx (Milpitas, Calif.), Skype (Palo Alto, Calif.), and FaceTime (Apple, Inc., Cupertino, Calif) (10). Epstein's article lists the actions before, during, and after the virtual Grand Round sessions in the dentistry setting, thus well explaining the process of holding sessions. He also recommended the Zoom platform as a suitable communication platform in the Grand Round virtual plan (11). Yeung's article refers to the criteria for determining disease cases. This article addresses complex characteristics such as complexity, being influenced by socioeconomic conditions, being influenced by ethical and doctrinal considerations-culture (9).

Implementation

In the implementation theme, an article on the implementation process, including the duration of the meeting (60 minutes), discussion components (45 minutes presentation and 15 minutes Q & A), organizers, and a bit of educational objectives, is explained (12).

Evaluation

In this evaluation theme, a student assessment sub-theme has been extracted, which is discussed in the Epstein article, so that students are asked to upload their reflections from attending the meeting in the Grand Round system (11).

Challenges and benefits are another Evaluation sub-theme. Hu's paper addresses the challenges of having a virtual Grand Round site as a place to upload information to each case (dermatology case bank) (13). Being user-friendly and having easy access to information are some of the challenges that have been mentioned as points of interest in virtual Grand Round sites. On the other hand, the exchange of views between members in a space other than simultaneous virtual meetings through the virtual Grand Round site and the possibility of searching the web by connecting the virtual site to the search of reputable engines are among the benefits mentioned in this study.

There are four articles in the program evaluation sub-theme. Hakimi's article shows that faculty members agree to continue the virtual Grand Round sessions and encourage others to attend (14). In this article, short interviews and questionnaires have been used to receive the opinions of faculty members. With the help of an 8-point questionnaire with 5 points Likert scale, what students think about the scientific content presented in the virtual Grand Round is shown (12). The interesting point of this questionnaire is its division into 4 areas of habitual action, understanding, reflection, and critical reflection, which are mentioned in detail in the article. In Xu's article (15), through a short questionnaire, students' opinions about using this virtual method to present Grand Rounds are collected, and in Lewkonja's article, a Likert scale questionnaire is collected to receive teachers' and students' opinions about satisfaction with using virtual Grand Round the Corona pandemic era (16).

Table 2. The coding theme, Sub-theme, Author/Date, Setting, and Some of the most important details were extracted according to instructional design steps from articles

Coding theme	Sub-theme	Author/Date	Setting	Some of the most important details
Design	Conditions	Epstein A. 2021	Dentistry	Overview with the key components of a virtual educational experience adapted to the virtual grand rounds (VGRs): Communication Focused content Faculty collaboration Student assessment didactic lecture A moderator A question-and-answer session was held immediately after the lecture.
		Knaus WJ. 2021	Surgery	Before VGR During VGR After VGR activities
	Meeting management	Epstein A. 2021	Dentistry	Selecting cases with skin diseases in unfamiliar resource-limited settings and highlighting socioeconomic, cross-cultural, and ethical issues.
		Yeung H. 2018	Dermatology	platform (Zoom)
		Epstein A. 2021 Knaus WJ. 2021	Dentistry Surgery	platform (Zoom, WebEx, Skype, Face Time) Learning more about the diagnosis and treatment of skin diseases in international settings and from various socioeconomic, cultural, and moral aspects.
Analysis	Learner needs	Yeung H. 2018	Dermatology	Being more interested in applying VGR During the coronavirus crisis, they were able to successfully launch a national virtual grand rounds lecture.
		Knaus WJ. 2021	Surgery	These lectures were well attended and gave residents across the United States and Canada an opportunity to learn from master surgeons lectures were also recorded and deposited
	Student assessment	Epstein A. 2021	Dentistry	Integrating a patient's electronic health record (EHR) information into the minds of students working in different parts of a dental internship and having to set up a treatment plan for the same patient
		Epstein A. 2021	Dentistry	Student uploads a post-treatment reflection Providing feedback submission
		challenges and benefits	Hu SW. 2009	dermatology
Evaluation	Program evaluation	Hakimi AA.2020	Facial Plastic and Reconstructive Surgery	Digital photography with the possibility to post clinical and microscopic images with ease Cases are presented with a "teaching point." Faculty survey questions included satisfaction and likelihood of tele-lecture series implementation at the speaker's home institution.
		Wittich, C. M. 2013		An 8 items questionnaire was developed on the basis of the 4 levels of reflection: habitual action, understanding, reflection, and critical reflection. On 5-point Likert scales for student assessment of the content which were presented
		Lewkonja, R. M.		The percent of students who agree with applying technology in the grand round process
		Xu, L.2021	surgerly	Surveys assessed student and faculty concerns about urology applications due to COVID-19 and satisfaction with VGR using a 5-point Likert scale.
Implementation	Process	Wittich, C. M. 2013		The format consists of 45-minute presentations followed by 15 minutes of questions and answers

Discussion

In this review, it was found that the documented experiences of universities regarding holding this program in virtual mode are very limited. On the other hand, a deeper review of the existing experiences showed that in most of the experiments, no specific instructional design model was used to design and implement this program.

It can be said that one of the steps that have been considered more than other sections in the design and

implementation of the virtual Grand Round program is the analysis step. In most of the articles that were reviewed, need assessment was performed as one of the indicators of the analysis stage. In contrast, issues such as budget and cost-benefit were paid less attention to, which is an important indicator in launching and continuing the program.

One of the other steps that were less considered in the articles was the "design," in which issues such as the implementation process, standards for determining educational cases, and the process of storing and

categorizing data and student evaluation were not very clear. Given the innovative nature of the virtual Grand Round, it is natural to use local experiences and lessons learned from previous challenges in the virtual Grand Rounds instead of following specific training design alcoves, but certainly, standard templates can help other people interested in this category to hold similar experiences and lead to a uniform way of holding this event. Another limitation of the design section in most articles is the lack of clear educational goals. In most articles, need assessment has been done but has not been presented as a standard educational objective. This may prevent organizers from estimating the educational impact of the program at the end of the program correctly.

In all articles, to explain the implementation phase, the names of the platforms used in the virtual Grand Round are mentioned, but no information has been reported about the problems of using each platform or their benefits. On the other hand, there was no suggestion, recommendation, or report about the human support systems and software required to hold the event. An article mentioned the need for a support site in order to continue the exchange of views between experts and students, as well as the archiving of the presented cases, which is a valuable comment for universities that want to use this method.

In all 8 articles, there was evidence of evaluation, but unfortunately, the evaluation of the program was only limited to conducting a survey of participants. Therefore, program evaluation has not been reported to lead to comprehensive program improvement. Educational evaluation of students has been reported in some articles but also lacks a clear mechanism.

The Grand Round in medical science education is one of the oldest educational traditions in this field that, like all medical science education programs, can be held in virtual format. Certainly, using the experiences of universities to design and successfully implement this educational program can be the basis for the successful and effective holding of this method. The results of reviewing the articles included in this review study contained valuable information about designing and conducting a virtual Grand Round program (17-19). The two main sections in these articles, which were less prominent than the other sections, were the clear educational goals and a specific method of educational evaluation and program evaluation. It should be noted that holding a virtual program as much as a face-to-face program requires following the principles of instructional design (20). Certainly, in the future, with the increase of

evidence related to the experiences of educational centers regarding the virtualization of medical and educational programs, more detailed and reliable citation studies will be obtained.

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E-learning and medical grand round

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