ORIGINAL RESEARCH

Preferences of the medical faculty members for electronic faculty development programs (e-FDP): a qualitative study

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Introduction: Medical faculties are responsible for the training and development of future physicians. Therefore, they must learn the teaching methods. Considering their extensive roles, adult learning theory, and technological developments, the best solution is e-learning. This study extracted the views and preferences of clinical faculties about the electronic faculty development programs.

Methods: Clinical faculty members and medical education and e-learning specialists from medical universities in Iran participated in this qualitative content analysis study during 2017–2018. Data were collected with purposive sampling method by 18 semi-structured interviews and 2 focus groups with 11 participants. The data were analyzed using the conventional qualitative content analysis method. Validity and accuracy of data were provided on the basis of Guba and Lincoln criteria.

Results: Five categories including "Technology infrastructure" (Presentation, Platform, E-Learning environment), "learner" (Features, Motivation), "Program management" (Blending, Interaction), "content" (Design, Application, Organization), and "evaluation" (Learner assessment, Program evaluation) were extracted.

Conclusion: Faculty members prefer to attend e-learning courses that focus on individualization, blended learning, and mobile learning. The best solution is to use the microlearning approach, that is, short pieces of content focusing on a learning goal that can be presented by all electronic devices in the form of any kind of media, and is in fact the learning fingerfood.

Keywords: faculty, medical, clinical teacher, e-learning

Introduction

The essential purpose of the Faculty Development Programs (FDP) is to empower the competencies of faculties in teaching six core competences suggested by the Accreditation Council for Graduate Medical Education (ACGME).[1] FDP can lead to more effective education. It also improves the ability of professors to respond to students' educational challenges.[2] The use of e-learning in medical education,which is increasing today and is expected to become more promising in the future, can accelerate the use of adult learning theory and change the role of teachers as content providers in order to facilitate learning, competences training, and assessment.[3,4] Electronic learning (e-learning) responds to learner needs, is flexible, and allows for individual learning. It also enhances reflection thinking and autonomy in learning.[5] Web-based Continuing Medical Education (CME) programs are growing worldwide and have proven to be more effective than traditional ones.[6,7]

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Many studies have been conducted on the readiness of faculty members, students, and organizations to implement e-learning courses. Most of these studies consider the teacher as an educator rather than a learner. On the other hand, in all of the e-readiness assessment questionnaires, computer skills are one of the essential components, and with due consideration and reflection in the research, it is concluded that good progress has been made since the inception of e-learning. It seems that at present, teachers have at least the average literacy of the computer with regard to academic goals and communication with students.[8,9]

Based on facts like responsibilities and the multiple roles of clinical teachers, adult learning principles, and existing capabilities, e-learning seems to have provided valuable tools for medical education.

E-learning, computer-based learning, and learning in general using modern technology, no matter the name, are an integral part of training in medical profession and are effective in coping with many of the challenges of teaching–learning process.[10]

The significant issue in planning the FDPs is to pay attention to their educational needs and preferences and to enable them to participate.[11] Most studies have been conducted to assess the readiness of teachers for teaching in e-learning courses, while not paying much attention to their readiness and preferences as learners of an electronic course, particularly in the case of clinical teachers of medicine who have broad roles and responsibilities.[12–14] Therefore, this study identified the preferences and desires of medical faculty members for e-learning courses in which they participate as learners.

Materials and methods
Research design
This qualitative study used conventional content analysis approach. The results generated from this method are based on participants' unique perspectives and grounded in the actual data.[15]

Participants and research context
This qualitative study was conducted on the faculty clinicians and medical education and e-learning specialists from medical universities in Iran during 2017–2018. Purposive sampling method was used to obtain cases that were rendered as information-rich for the purpose of the study.

In so doing, the faculty clinicians who had the experience of participating in at least three e-CMEs or e-FDPs were selected. Also, the medical educators and e-learning specialists with experience of designing and managing at least three e-FDPs were selected for participation.

The participants included 24 clinical faculties and 5 medical education and e-learning specialists with MD degrees who had, on average, an 11-year work experience in their expertise. Individual interviews were conducted with clinical faculties and specialists were placed in clinical, medical education, and e-learning focus groups in (3-3-0) and (3-2-1) order, respectively. The responders were a fairly representative sample of the faculty members given all the different subspecialties that they represented (Table 1).

Ethical considerations
This study was part of a PhD dissertation in Isfahan University of Medical Sciences with the code of ethics no: IR.mui.rec.1396.3.164. Before the beginning of each interview, the researchers provided the participants with informed consent form, in which the purpose of the research, the duration of the interview, the conditions for the use of interviews in the publication of the study, and some other items were provided, and they signed it after reading and declined if they did not agree. In addition, participants were informed about the research team and how to achieve results. However, to protect their privacy, all the interviews were encoded by the interviewer herself and presented to other researchers by numeric code. Also, in each interview, it was ensured that the contributor was satisfied until the end of the interview. Participants were also assured that they could leave the study at any stage they would like.

Data collection and analysis
Data collection was conducted using 18 semi-structured in-depth individual interviews by the researcher (SH) and

Table I Participants' characteristics

	Gender	University	Administrative responsibility
Male Female	55% 45%		
Type I University Type II University		75% 25%	
Administrative responsibility			25%
Non-administrative responsibility			75%

2 focus groups sessions in which the researcher (NY) was also present. SH was responsible for data collection and coding. SH has been working as a director of staff development unit for several years in the hospital, so she is familiar with clinical settings and clinical teachers and has experience in conducting qualitative research.

The focus groups were used observing that vis-à-vis debates between faculty clinicians and medical education and e-learning professors as specialists would result in more valuable findings. So, it was decided to use this potential.

First, they were asked open-ended questions about their experiences with electronic FDPs and the strengths and weaknesses of these courses, and then they were asked to express their own preferences. Other questions were asked using the participant's comments. Each interview lasted for 30–80 mins, and the focus groups lasted for 120 mins.

To better use the comments and views of the participants, the researcher recorded the interviews with their consent and wrote important and significant points. All of the participants agreed with digital voice recording. All interviews (individual and focus group) were analyzed with the conventional qualitative content analysis method in three phases: preparation, organization, and reporting. These steps are applicable to both inductive and deductive analysis processes, but they are different in method of work.[16]

The preparation phase included selecting the unit of analysis and obtaining a sense of whole. In this study, a complete interview, which could be regarded as a meaningful unit, was chosen as the most suitable analysis unit. First, the researcher (S H) transcribed the interviews and focus group discussions verbatim; then, she listened to the recorded voice files again and compared them with the text. Data analysis started with several readings of the text to achieve immersion and arrive at a general understanding of the content.

The organization phase included open coding, creating categories, and abstraction.[16] So, it was started carefully by reading the text word-for-word. Then, the meaning of each unit was determined and labeled with a code. The codes were compared based on similarities and dissimilarities, and the similar codes were integrated as one category. Abstraction involved emerging and grouping of subcategories and categories with similar meaning to achieve the main goal of research.

Finally, the researcher used the constant comparison to clarify the meaning of each element and once again decide on the categorization of information in the earlier stages and continued this process until satisfactory results were obtained. All of the steps were reviewed at meetings with the rest of researchers; in the case of ambiguity, the interviews were revisited and the bugs were corrected. The validity and accuracy of the analysis process were assured continually.

The reporting phase, as its name suggests, involved reporting the analysis process and the results. After conducting several interviews, the researcher began to group and encode them according to the main findings. By conducting any interview and analysis, the classifications were reviewed and, if necessary, merged or increased. Subcategories were formed according to similar features, and the categories' name showed their contents. A total of 309 initial codes were extracted by considering the overlapping themes and merging them. They were classified into five categories and several subcategories.

Trustworthiness

Validity and accuracy of data were provided on the basis of Guba and Lincoln's criteria.[17] To ensure the credibility of the data, some member-checks were used. In so doing, the extracted codes were shared with several participants and a number of changes were applied to the data based on this procedure.

To establish dependability, two experts in qualitative researches, e-learning, and faculty development reviewed codes and categorizations; to establish confirmability, an external observer experienced in qualitative research verified and validated data collection and analysis processes. For transferability, an attempt was made to capture all details, from sampling to collecting and analyzing data, as much as possible.

Results

The participants of the study included 29 faculty members in various clinical fields (for example, nephrology, echocardiology, pediatrics, emergency medicine, obstetrics gynecology, etc.). The initial codes were classified into five categories, and each was subdivided into several subcategories (Table 2).

Technology infrastructure

Technology infrastructure refers to foundational technology services, software, network, equipment, development, facilities, and structures.[18]

Table 2 The main categories and subcategories

Categories	Subcategories
Technology infrastructure	Presentation platform E-learning environment Learning tool
Learner	Features Motivation
Program management	Blended course Interaction
Content	Design Application Organization
Evaluation	Learner assessment Program evaluation

The inclusion of e-FDP in LMS

The faculty members referred to Learning Management System (LMS) as a platform for the provision of e-courses and enhancing learning with social media. Different definitions of LMS are provided by experts; Juliana Dobre 's definition covers all aspects:

> A set of software platforms delivered to users by instructors through Internet and by the use of various hardware means, having as purpose the delivery in the shortest time possible a high level of knowledge into a domain assuring in the same time a full management of the entire educational cycle, including data and information.[19]

> Your course should be included in the LMS … in this way, all activities are observable, it shows the rate of a person's presence in the system, the number of times they have turned to the system … It is highly pursuable (P.1 with 18 years of clinical teaching experience (CTE) and 13 years of administrative position. (AR)

Social media and the social network are usually used interchangeably, but in fact, the social network is a subcategory of social media. Social media are web-based communication tools that enable people to share ideas and information through the building of virtual networks and communities.[20] The most popular social media in 2018 include Facebook, YouTube, WhatsApp, Facebook Messenger, WeChat, QQ, Instagram, LinkedIn, Skype, and more.[21] The faculty members emphasized these networks due to their capacities, facilities, and their simplicity and convenience of use. A number of younger faculties recommended these social media as e-course supplemental platform.

Social networks are very useful for conducting educational discussions and collaborative learning. I think it's nice to use the capacity of these social networks to empower professors. (P. 8 with 5 years of CTE)

E-learning environment should be personal and user-friendly

Regarding the e-learning environment, the faculty members talked about personalized learning and ease of utility. The physicians who participate in the FDPs or CMEs have various experiences, so, designing just one program does not appear to be suitable. Today, the one-size-fit-to-all strategy has changed to personalized learning. The faculty members exactly referred to this point in their interviews and mentioned lack of attention to this as one cause of dissatisfaction with the e-CME.

> You enter a continuous education course … you see that you already know all the materials presented in it. The design of the courses ought to leave a chance of selection for the participants …. (P. 4 with 20 years of CTE and 9 years of AR)

They also pointed to individualization and personalization in teaching methods:

> It is easier for me to read the text myself than to listen to someone explaining it to me. I won't understand the text unless I see it. …. The learning styles are different and each person learns the materials in their own way. (P. 6 with 24 years of CTE)

Most participants mentioned user-friendliness of the courses as the precondition for entrance into the e-FDPs.

> The program should be user-friendly and very simple. It should not require much data manipulation, such as the social networks that are learned easily by most users …. (P. 2 with 12 years of CTE)

> "The course must be easy to work with. The faculty members do not look for things that are hard to learn". (FG2. medical education specialist, with 8 years of work experience)

Mobile learning has more adherents

Mobile learning allows continuous access to the learning process. It can be on mobile digital devices like phone, laptop, or tablet. With this new strategy, learning happens anywhere and anytime.

> Most teachers do not work with the computer; rather, they work with the mobile sets. They check their e-mail and other electronic affairs with their cell phone. Many

individuals check their mobile at bedtime and at specific parties. (P. 7 with 12 years of CTE)

Faculties with some experience in e-learning recommended Web 2.0-based courses. On Web 2.0, there is no hardware limitation, rather, all the electronic gadgets such as mobile phones, Internet TVs and digital cameras, etc. try to connect together. In the Web 2.0, people can get connected, receive data, and add content.

> You'd better design a web-based course, that's to say, they should be in a way for the users to be able to enter it by both mobile and laptop … since some users prefer computer-based courses, yet, most faculty members work with the mobile set more easily and welcome it more. (FG2, e-learning specialist with 5 years of work experience)

Learner

Special attention paid to the audience features and their motivational strategies by designers of FDPs is among the issues addressed by the participants of this study.

Clinical teachers see themselves busy with several responsibilities

The clinical teachers have highly extensive roles: medical expert, communicator, collaborator, manager, health advocate, scholar and professional role.[22] Clinical teachers believed that the months spent in the clinical setting by a clinical faculty member are the most stressful and busy times of their life.

> The clinical faculties are greatly busy and are usually in shortage of time. On the other hand, they are always rushed and restless …. I was in a training session last week, the nurses contacted me saying that my patient has been acute, despite my interest, I left the class; On the contrary, when they sit in a meeting or class and find it boring and unattractive, or if they find no new issue in it, they stand up and leave. (P. 14 with 7 years of CTE)

> The faculty members differ greatly in their free time. Anyhow, they have little free time … Often, we are in a hurry and under time pressure because we have different responsibilities all of which are important and cannot be ignored …. E-course designers should pay attention to our constraints. (P. 15 with 4 years of CTE)

The intrinsic and extrinsic motivators are both important

In designing and conducting education courses for adults, designers should consider aspects such as personal experience,

learning readiness, learning orientation and learning motivation.[23] Motivation can be either intrinsic or extrinsic. The faculty members enumerated factors such as certificate, CME privileges, and the authorities' obligation as extrinsic motivators. They also referred to intrinsic motivators such as provocation and excitement by attracting attention via real stories and examples that are based on professional needs, satisfaction with constructive feedback or displaying personal progress chart, and creation of self-confidence by showing the personal learning path and the total path of the course.

> If the course is effective in faculty members' professional life and is designed attractively and properly, they'll surely participate in it. Of course, it demands the extrinsic motivation, too, such as empowerment or continuous education privileges, certificates, etc. (P. 17 with 12 years of CTE)

A number of participants believed that curriculum designers should be aware that even the difficulty of the questions in electronic courses is also a motivator, which may be positive or negative.

If the learners can answer the questions, they will gain greater confidence and like to continue the course. Of course, extremely easy items may induce a feeling of vanity and futility in the learner. Hence, the educational designers have a delicate role in all of their designing activities; especially, they ought to observe the standard indices in developing tests of various types.

> One of the participants said: The amount of privileges given for participation is greatly important in faculty members' welcoming of the program, yet, I believe that everything is related to the program itself; some e-courses give easy exams so that when individuals answer these items, they are motivated to continue the path and reach the end. (P. 16 with 6 years of CTE)

Program management
An entirely online course is not effective

A hybrid or blended approach integrates face-to-face and online learning to improve educational outcomes. The professors participating in the study stated that blended courses have superior efficacy compared to e-courses.

> Fully electronic courses will probably fail. Blended courses should be used and they ought to be interrelated … (P. 5 with 3 years of CTE)

> One of the participants described his/her experience about the importance of face to face classes: … The face to face

sessions should be designed in faculty development programs; in this way, the faculty members can both correct their problems and feel that they are supported and not left alone in a virtual space. (P. 18 with 17 years of CTE)

One of the questions asked in this regard to be answered by the faculty members was: "What's the best arrangement of e-courses and conventional courses in developing a blended program for medical faculty to encourage them to participate in these programs?" The answers to this question aid the instructional designers in the selection of the blended model.

I think because arranging the time is very difficult for clinical faculty members, as each of them has numerous duties and responsibilities, it's better to present the content electronically; yet, if any faculty asked for conventional classes, they should be held for them since some individuals are more interested in a specific issue and like to learn more and more …. (P. 16 with 6 years of CTE)

It should not be the case that we leave the course unfinished or lose its related privileges or the content remains deficient if we don't attend in the face to face classes. (P. 2 with 2 years of CTE)

Interaction impacts on learning
The rate of interaction in an e-course is one of the issues to be considered in its development.

A participant explained that The communication methods must be clearly identified and convenient at the same time. If we faced a problem, we should be able to put it forth and the course instructor or the support team should be responsive. (P. 13 with 16 years of CTE)

A participant noted the collaborative learning: There must be an opportunity to share experiences between the professors who attend a course so that they can learn from each other. (FG2 clinical teacher with 9 years of CTE)

One of the faculties stated the types of interactions in e-FDPs designing. Given the characteristics and time limitations that medical faculty members have, they need to have both synchronized and non-synchronized interactions in e-courses since they may not be able to get online at a specific time …. (FG1 medical education specialist with 10 years of work experience)

Content
The importance of content development in e-learning was emphasized in two focus group sessions in addition to

individualized interviews. The analysis of the results is presented below in three subcategories.

Content should be short and attractive
Issues such as content selection, content promotion, content presentation media, and content interactivity were addressed in the content designing process.

The content is better to be brief and attractive. It should not include trivial obvious points. It should maximally last 3-4 min …. Truly, we don't have either time or patience … we want to go directly to the main points …. (FG1 clinical teacher with 11 years of CTE)

One of the participants commented that the content should be short, but comprehensive and complete: You can convey a maximum of a few points in each content, so you should prepare your contents very briefly and comprehensively. (P. 14 with 7 years of CTE)

Participants' experiences indicated that the content in any medium should be attractive and not long. We can use real films, animations, faculty's lecture voice, or text; it makes no difference. The important point is a creative and innovative presentation of content. Professors are very busy, so, the content should be conveyed in the shortest time possible. (FG2, medical education specialist with 8 years of work experience)

A significant finding in this subcategory was unwillingness of faculty for electronic games:

Not games, it is not at their level … .not electronic games … .they are not at all interested in games … they don't have any time for it. (FG1, clinical teacher with 8 years of CTE)

Nonetheless, they all agreed on developing brief attractive contents, the use of various types of media, and interactive content as far as possible.

Content should be shareable and accessible
This finding referred to features such as transferability, applicability on different tools, and simplicity of use, which are highly important in the participants' perspective.

The professors' views showed that the use of social networks in addition to LMS can make learning richer. So, they emphasized that the content could be transmitted and shared. The content should be attractive and easily transferable. If it is like this, it easily shared between faculties

and is even discussed by them. (FG2, clinical teacher with 8 years of CTE)

… The content must have the ability to be installed on laptop, mobile set, etc. and should be easily usable …. (FG1, medical education specialist with 13 years of work experience)

Content organization should be selective

Considering the presence of curriculum development experts in the focus group sessions, there was much debate on content organization that has many different models. However, analyses demonstrated that most participants talked about the selective and linear models of organization and preferred the organization with the selective model.

A participant said: The faculty member ought not to have received the contents one by one or sequentially; rather, they should be free to turn to any content that they need. (FG1, e-learning specialist with 5 years of work experience)

Another professor, who had more experience in e-CME, said: Content organization in faculty development programs from the known to the unknown has no meaning, since the individuals who participate in these courses have many different experiences. (FG1, clinical teacher with 12 years of CTE)

The results of delegations in focus group sessions and interviews approved the necessity of designing a content format for any e-FDP on the basis of type and goals of the course and characteristics of the participants. In fact, this finding is closely related to the subcategory of personalized designing of e-learning environment.

Evaluation

Evaluation is one of the most important stages in any educational system. Learners' evaluation shows the rate of their access to goals. Program evaluation is performed to determine the effectiveness of the educational program.

Learner assessment should be both formative and summative

The participants believed that the assessment should be both formative and summative. Of course, they looked at formative assessment as one of the effective learning tools.

A participant pointed out that: There should be some quizzes on each part of the content to enable the learners to review their own learning and turn to the content again if necessary or study some complementary sources. (P. 10 with 21 years of CTE)

Another one stated that the learner's assessment should be in the course: Surely, if they are going to give us a certificate or degree, there should be a summative exam at the end of each course. I think such an exam makes the course more formal and the participants gain more confidence in it. (FG1, clinical teacher with 11 years of CTE)

Program evaluation

Program evaluation is the process of examining a program's values and competency. Although many clinical faculty members have not passed the special courses on medical education, instructional design, and curriculum development, their attention to program evaluation signifies the importance of this issue in promoting program quality.

A participant pointed out that: I believe that the best thing is to have a general evaluation of each electronic course. This evaluation pinpoints the problematic areas of the program …. (P. 6 with 24 years of CTE)

The professors believed that the educational designers should use the teachers' experiences to improve the quality of educational programs. Opinion survey forms should be definitely used in any faculty development program because the faculty members have some teaching experience themselves; additionally, they can give some expert comments on them as they have used it and have been involved in it for some time. (P. 17 with 12 years of CTE)

Discussion

This study aimed at discovering the clinical faculty members' preferences for e-learning. The participants enumerated 5 main categories and 12 subcategories as the following: "technology infrastructure (presentation platform, e-learning environment, learning tool), learner (features, motivation), program management (blended course, interaction), content (design, organization, application), and evaluation (learner assessment, program evaluation)". The mentioned issues highly cover the steps in educational designing. It can be said that technology and learner analysis, content development, implementation, and evaluation are integrative parts of any educational design model.[24,25]

Technology infrastructure is relatively related to readiness of organizations for implementing e-learning. According to the participants, LMS is suitable for FDPs. Another important point is the position of social media in medical education. Given the content developed by faculty members and the creation of interactivity, social networks induce active learning. Flexibility of online tools provides the

possibility of customized content on the basis of learners' individual needs. The use of social media in education is a progressive context demanding more investigation. The faculty members encounter some problems in the use of social media. Nevertheless, it is clear that social media confer a positive effect on education.[26] The practical experience of the use of social networks in e-learning has brought some problems to surface as follows:

- The learners show great interest at the beginning of the course; yet, this interest and enthusiasm fade away gradually as they face some problems in interactive learning so that they lose the interest for interacting with others.
- Loading of files in social networks is not as easy as LMS.
- The management of electronic course in social networks is greatly dependent on the teacher or course manager.
- Social networks usually do not have an organized official system and there is no possibility of accurate assessment.
- These networks are not compatible or are less compatible with university information system.[27]

The faculty members' opinions about course presentation tool were diverse. Most of them believed that the course should be wholly mobile-based while others believed that it should be computer-based due to some limitations of the mobile such as a small monitor and lack of concentration at the time of its use. A number of faculties with greater experience in designing e-courses recommended the use of Web- 2.0 which can be used with computer and other mobile tools and utilities. There are various studies on the effectiveness of e-courses presented by computer and other mobile tools. A quasi-experimental study on 30 university students in Salamanca University showed that the use of mobile anatomy application ended in better statistical results compared to conventional teaching.[28] Another study conducted in 2016 on the effect of electronic computer modules on students' clinical pharmacology course revealed that the designing of these modules induced a positive effect on the participants' learning and knowledge gain.[29] However, there was no study to have compared the effectiveness of only mobile-based or only computer-based course. Clearly, given the present technological and innovative achievements, it is better to design Web 2.0-based e-courses that are applicable on both mobile and computer.

With regard to learners, the participants pointed to motivational issues and faculty members' features. Motivation refers to a characteristic that directs our activities and serves as their how and why. There are various theories on learning motivation. The opinions expressed by faculty members highly correspond to ARCS Model (Attention, Relevance, Confidence, and Satisfaction).[30] This model provides a systematic method of learner motivation. Medical teachers are adult learners who, besides their wide range of duties and roles, are expected to show social responsiveness and act professionally in their responsibilities of teaching, research, and leadership.[31] The participating teachers anticipate the e-course designers to pay attention to motivational issues and the wide spectrum of duties and roles. In fact, each e-course ought to be designed by taking the audience into account. The learning process should be self-guided and voluntary, since learning is basically a personal process.[32]

One point referred to by faculties was the designing of blended courses. Blended learning, hybrid learning, and mixed-mode learning are concepts used to refer to the educational approach that integrates face-to-face teaching and computer-assisted learning.[33–35] Norberg et al believe that blended learning enhances the synergistic effect of face-to-face learning and online learning. While it preserves the interpersonal communication in a conventional milieu, it fosters the flexibility of learning.[36] Blended learning has various models including Supplemental, Replacement, Emporium, and Buffet in higher education;[37] Rotation (Station Rotation, Lab Rotation, and Individual Rotation), Flipped Classroom, Flex, Self-Blend, and Enriched Virtual model in K-12 education; and Anchor blend, Bookend blend, and Field blend in corporate training. The most well-known blended learning is the flipped or inverted classroom model. This model is a kind of blended learning in which there is one step in self-directed learning (individual phase) with a pre-classroom study.[38] Various studies have approved the efficacy of this model.[39–41] Nevertheless, the present researchers found no medically oriented study on other models of blended learning. An analysis of the participants' assertions on the arrangement of conventional and electronic classes led us to Flex Learning Model (FLM) and Buffet Model. In these models, learners move in flexible and floating programs among learning activities according to their needs. These models are completely flexible and the learners have a high degree of control on their own learning.[37,42]

One of the findings of the study was the need for interaction in e-learning courses. Moore (1989) introduced three types of interaction in learning: learner–instructor, learner–learner, and learner–content. Many studies have shown that interaction is an important factor for learners' satisfaction, achievement of educational goals, collaborative learning, and positive attitude towards e-learning.[43,44]

Faculty's views about "Technology infrastructure" and "Program management" themes elicit the Wenger's community of practice framework (CoP). Joint enterprise (what it is about), Mutual engagement (how it functions), and shared enterprise (what capability it has produced) are three concepts that Wenger posits contribute to a cohesive community of practice.[45] In other words, learning takes place in the context of communication between individuals and activity in structured communities.[46,47] As the present findings claim, attention to issues such as using Web 2.0 technologies, social networks and interaction are vital in designing e-FDPs.

With regard to content, studies have focused on the use of various media for content presentation including text files, podcast, videos and films, animations, mobile applications, simulation, and educational games. There are not many studies on the effectiveness of various media. The researches available have compared the effectiveness of conventional courses to an e-course using one type of content presentation medium. A large-scale study conducted in Canada on anesthesiologists' inclination for the use of various electronic content suggested that 60% used the podcast and there was no preference for the use of audio or video podcast.[22] Another important point in this study was that the physicians' time preference for podcast was between 5 and 15 mins as they showed no inclination for 45+ min podcasts. The results of this study exactly correspond to faculty members' belief that content as a smaller piece in various formats is preferable. Clinical faculties say they are busy, so short is good. It should be noted that an e-course is not the mere presentation of content with an electronic media. Indeed, interactions should also be given some weight in course designing.

On the basis of faculty members' opinions on content characteristics, it appears that the use of microlearning is a suitable approach to be used. This strategy corresponds to the principles of adult learning, psychological learning theories, and innovative technologies. Microcontent involves small pieces of content centered on a goal that is presentable on electronic tools in any media format.[48]

Educational designers should prepare content in small pieces; in addition, they must adapt the learning process to the learner. In some cases, the learner has many experiences and would prefer to be free in the electronic environment where the user interacts with content. In some other cases, the learner needs more guidance, so the teacher's interaction with the learner is greater. According to the findings of this study, content in e-FDP should be short, engaging, creative multimedia, and based on real experiences.

Experts in program evaluation have postulated that in training and education, evaluation refers to a formal activity administered to determine the quality, efficiency, or value of a program, project, process, goal, or syllabus.[49] Currently, the evaluation of e-learning programs in the field of health is often limited to the amount of enjoyment and satisfaction of participants. However, the effectiveness of these programs at different levels should be investigated.[50] Evaluation of e-learning programs is done through a questionnaire in a variety of areas.[51–54] For example, the evaluation of the Tottori University's e-learning program was carried out through a questionnaire including satisfaction, program content, and systemic issues. The participants were the students and faculty members involved in the program.[5]

Strengths and weaknesses

One of the important strengths of this study was that authors thought like an e-FDP customer, not like a manager and course planners. One of the strengths was the participation of professors with different clinical disciplines in the study including nephrology, echocardiology, ophthalmology, pediatrics, emergency medicine, obstetrics and gynecology, psychology, medical education, e-learning, etc. The use of focus group sessions with individualized interviews was another strength of the study.

One of the limitations of this study was extracting the views of a limited number of professors. If we used other methods such as Delphi, we could gather the views of more professors. However, given our context and extent of the duties of clinical teachers and the likelihood of not responding to the questionnaires with open questions, we concluded that individual interviews could provide us with valuable information. It is recommended that a questionnaire be developed based on the results of this research and validated on a larger population.

Despite the fact that only teachers who were more knowledgeable about e-learning were selected, some of

the professors were not up-to-date and did not have full knowledge of technological advances. This limitation of the study can be due to the limited attention paid to the empowerment of clinical etiquette in electronic learning. According to current generation students who are rapidly adapting to new technologies, it is necessary to take steps to develop faculty members in this field.

Conclusion

Medical education is called on to move towards fundamental changes and modifications due to its present situation. The community expectations, clients, students, managers, and teachers' priorities and preferences are changing constantly. Faculty members are an integral and indispensable component of medical education. They not only affect the teaching-learning process directly but also play a significant role in forming the curriculum and learning environments. To keep pace with these changes, it is necessary to design the needs-based e-FDPs on the basis of the present conditions. The added value of this is faculty members' familiarity with the e-learning milieu. On the basis of the research conducted so far, it seems that medical teachers need finger-food learning given their wide range of duties and responsibilities; indeed, the content ought to be presented in smaller convenient segments with the right of selection. The educational designers and developers are expected to take into account the three principles of personalized learning, microlearning, and blended learning.

Take home message
Practical points in designing e-FDP courses for clinical faculty members

- Mobile learning must certainly be possible with the Learning Management System that is used.
- Social media can be used to further enrich learning experience.
- Any blended learning is not flipped classroom. The professors who participated in this study considered the Buffet or Flex model compatible.
- Benefit all types of interactions in electronic courses: learner–instructor, learner–learner, and learner–content; both synchronous and asynchronous.
- Microcontent should be created; more with less. Microcontent does not replace long-form content, but it can be as another tool in learning toolbox. (This part of the paper is an example of Microcontent)
- Create attractive, high quality, shareable, and accessible content.

- Organize content selectively, non-linearly or step-by-step.
- Design a personalized and user-friendly learning environment.
- Creative and standard course designing is one of the strong intrinsic motivators of learners.
- Formative evaluation is as important as summative evaluation.

Abbreviation list

FDP, Faculty Development Program; e-FDP, Electronic Faculty Development Program; E-learning, Electronic learning; CME, Continuing Medical Education; e-CME, Electronic Continuing Medical Education; CTE, Clinical Teaching Experience; AR, Administrative Responsibility; FLM, Flex Learning Model.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

Informed consent forms were obtained from the participants in written form. Consent for publication was included in the consent for publication form. The Ethics Committee of Isfahan University of Medical Sciences approved the study protocol under approval number IR. mui.rec.1396.3.164.

Acknowledgments

Author contributions

All authors contributed to data analysis, drafting and revising the article, gave final approval of the version to be published, and agree to be accountable for all aspects of the work.

Disclosure

The authors report no conflicts of interest in this work.

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