



The Case for Instructional Teams in the New Era of Online Medical Education

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Abstract

After a period of “emergency remote teaching” precipitated by COVID-19, academic medical centers are moving into a second, more mature phase in online education. This article offers guidance to institutions planning for this second phase. In it, we advocate a reorientation towards “instructional teams;” outline typical roles and skill sets on instructional teams; discuss the hardware, software, and space required to develop high-quality online courses; and describe common pitfalls experienced by instructional teams along with strategies to avoid them. Our objective is to help institutions hoping to develop high-quality, sustainable online programming to set realistic and informed expectations, allocate resources intelligently, hire appropriately, and work productively.

Keywords Online education · E-learning · Distance education · Instructional design · Instructional teams · Instructional technology

The COVID-19 pandemic brought sudden and massive disruption to the educational mission of academic medical centers [1–3]. Courses, seminars, workshops, and small group sessions moved online en masse and faculty unfamiliar with online education scrambled to adapt their teaching. This sudden transition to what has come to be called “emergency remote teaching” [4] introduced a host of technological, pedagogical, and logistical challenges [5–8]. For example, in a 2021 cross-sectional, web-based study of 3286 medical students from 12 countries, Stoehr et al. found that 78% felt that their medical education lagged behind current capabilities in online learning and 42% reported difficulty with engagement with online content. Furthermore, two-thirds cited concerns about online learning contributing to social isolation and lending fewer opportunities for interaction with fellow students [1]. Despite the challenges, there were silver linings. During COVID-19, many faculty overcame initial trepidations and developed a comfort level with virtual

teaching than they previously lacked [3–9]. Moreover, an international conversation was launched about the role of online learning in academic medicine [3, 5, 9–11].

We are now entering a second phase in the transition to online learning (also called “remote learning” or “e-learning”). The educational changes wrought by the pandemic are stabilizing and becoming normative, begging the question of how institutions can thoughtfully and deliberately build the appropriate capacity and expertise to sustain high quality online education and, if desired, expand their online presence. The time is ripe to move from the stop-gap online instruction necessitated by the pandemic toward an institutional investment in robust, socially connected online education, grounded in the learning sciences [12]. This is particularly important in academic medical centers, which have been slow to adopt online education and develop the necessary institutional capacity to support it [1, 13].

This article provides guidance for institutions preparing to launch new online programs or expand existing ones. We hope to encourage a shift in mindset from one in which individual faculty are solely responsible for designing instruction to one in which teams of professionals with unique and complimentary expertise, i.e., “instructional teams,” work collaboratively to build online courses. We will (a) define what an instructional team is and describe its typical composition; (b) describe the hardware, software, and space instructional teams need to develop online courses; and (c) identify a set of strategies to help instructional teams avoid

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common pitfalls. Our goal is to help institutions set realistic and informed expectations so they can hire intelligently, allocate resources appropriately, avoid collaboration breakdowns that can derail projects, and plan in ways that ensure robust, engaging, and meaningful online learning.

We wish to note that we are acutely aware of the budgetary constraints many institutions face and we recognize that our recommendations may not be feasible for some institutions. To address this, we have provided several suggestions for low-budget workarounds. However, we maintain that it is valuable for individuals tasked with this work — regardless of institution — to also see a more ideal scenario. This will allow them to assess institutional capacity more realistically, make stronger arguments for budget allocations, strategically stretch limited resources, and avoid making time-consuming and costly miscalculations.

What Questions Should We Be Asking About Online Learning?

The research literature on online learning, both in and beyond health education, has expanded exponentially in the past decade, exploring, among other things, the outcomes of specific online programs, courses, and modules [14–17], tools and platforms [18, 19], effective and ineffective online teaching techniques [20–25], the challenges of online teaching [5–8], methods and frameworks for assessing online learning [26], instructor and student satisfaction with online teaching and learning [1, 26, 27], and research-based principles and frameworks for online learning [28–32]. Moreover, hundreds of studies have demonstrated that the outcomes of well-designed online learning are comparable to or, in some cases, superior to in-person learning [33–37].

With the question of *whether* online learning works resolved, more nuanced (and interesting) questions remain, for instance: What kinds of online learning work best, for whom, and under what circumstances? These questions, in turn, beg another critical question: *What people, skills, and resources are needed at academic institutions to support and sustain the development of high-quality online courses and programs?*

Certainly, one critical component of this support is faculty development [38–44]. However, while faculty development programs can help faculty master some aspects of online teaching (e.g., course design principles and tips for facilitating synchronous class sessions), such programs are rarely equipped to teach faculty how to create interactive multimedia content and engaging asynchronous materials, nor do faculty have time to master these skills [45, 46]. Instructional teams, on the other hand, bring diverse skill sets to bear on online course development, thus allowing for the creation of more innovative and engaging programs

— programs that integrate multimedia, employ asynchronous learning in innovative ways to take full advantage of the flexibility and convenience that are online education's forte, and build a sense of community and connection over distance [13, 45–55]. A team approach to online program development is not uncommon in other disciplines [45–52], yet it remains uncommon in academic medicine [13, 53–55]. Moreover, the infrastructure required to support online program development has not been adequately delineated in academic medicine [13].

This article aims to (a) provide greater clarity about the people, skill sets, and resources needed to create and maintain high-quality online programs so that (b) academic medical centers can plan more effectively in order to (c) create, grow, and sustain a meaningful online presence. To the extent possible, our recommendations are grounded in the research literature on online learning in general and instructional teams more specifically. However, as this scholarship is still nascent, particularly in academic medicine, we also rely on the authors' extensive experience in the following areas: online course and program development models and practices (MN, CS, CP, IC), the learning sciences (MN, CS), online teaching (MN, CS, CP, TR), instructional design (CP, IC), video production (NV), medical education (CS, MN, TR), and faculty development for online teaching (MN, CS, IC).

What Is an Instructional Team?

Among online learning experts, there is widespread recognition that faculty require far more support to develop online courses than they generally receive [52]. As Puziferro and Shelton write: “no one person is capable of discharging all of the expertise levels and roles inherent in the creation of an online course” [52, p.119]. A growing literature points to the value of building online courses and programs collaboratively, in a team of people with specialized knowledge and skills [13, 45–55]. While different terms have been used for these teams [55], we prefer the term “instructional teams” as it includes faculty and teaching assistants as team members and collaborators while delineating other critical roles.

On instructional teams, faculty provide subject matter expertise, but other team members bring technical, design, and production skills that are not typically within an instructor's skillset [50]. These team members help to create engaging multi-media content, build interactive asynchronous learning experiences, and provide pedagogical know-how specific to the online environment, which has distinctive constraints and affordances. We believe this team approach is particularly helpful in academic medicine, where faculty juggle heavy clinical, teaching, administrative, and research

responsibilities and have little time to master complex new skills for online course development.

It should be noted that not all types of online course development require the skills of instructional teams. When in-person class sessions or seminars are simply replaced with virtual classes and seminars, instructional teams are generally not required. Moving a lecture or discussion to a synchronous meeting platform (e.g., Zoom) is not difficult. However, this approach requires learners to be present at a set time and thus does not take full advantage of the convenience and flexibility online learning can offer. It also risks the peril of “Zoom fatigue” [7, 8]. Thus, when institutions are looking to create new programs, rapidly scale-up online offerings, or take greater advantage of asynchronous learning, we recommend they consider a team approach.

What People and Skills Are Needed to Develop Online Programs?

The appropriate composition of an instructional team depends on a number of factors, including the material and human resources available at a given institution [53]. At minimum, instructional teams require people in the following roles:

Subject matter expert (SME): SMEs are usually, though not always, faculty. They bring a deep knowledge of the content, including key concepts, examples, cases, and applications. They understand the knowledge, skills, and motivations of target learners and have experience designing and teaching in-person courses.

Instructional designer (ID): IDs bring an understanding of the learning sciences and course design principles. They have experience developing synchronous and asynchronous online instructional activities and assessments. They also possess a broad familiarity and comfort with educational technologies. IDs work closely with SMEs to create an engaging and meaningful experience for learners. They recommend tools and strategies to enhance student engagement or facilitate course management and build instructional materials using content provided by SMEs. IDs frequently function as project managers, helping to ensure that course development projects stay on a timeline. Depending on the scale of the project, instructional designers can work with multiple subject matter experts simultaneously. IDs also work to ensure that courses are accessible to all learners and compliant with the 1993 Americans with Disabilities Act [32, 56], though other members of the instructional team can also assist in that capacity.

In addition to these two central roles, instructional teams may (and often do) require the following:

Multimedia producer (MP): MPs have technical and creative expertise in areas such as video or audio production and access to the specialized tools (software and hardware) for doing this work. Some may have skills in specific areas such as graphic design, motion graphics 3D animation, or web development, but these are not standard. MPs generally work very closely with the instructional designer.

Instructional technologist (IT): ITs manage courses within the learning management system (LMS, e.g., Canvas, Blackboard, Moodle, D2L) and help to provide real-time technical support and training for the LMS and other digital tools. ITs differ from IDs in that their training and orientation are primarily technological, not pedagogical. Because ITs are not deeply involved with course content, they can assist a fairly large number of faculty, even an entire department.

Teaching assistant (TA): TAs help with the management and teaching of the course, often playing a role in developing assessments, grading, running recitations, facilitating small group work, managing the logistics of class sessions, and even helping the primary instructor teach. TAs can play a valuable role in online course development and delivery as they are sometimes more comfortable with digital technologies than faculty.

Knowing the roles and skill sets typical of an instructional team can help institutions:

- Assess their human resources more accurately and identify skill gaps. For instance, while IDs are responsible for helping SMEs develop instructional materials, there are a host of other tasks critical to the success of online programs that fall outside their purview, for instance, branding, marketing, website development, faculty development, program assessment, and day-to-day program administration, including scheduling, enrollment, etc. Other arrangements will generally need to be made for these tasks.
- Reduce role confusion and set more realistic expectations of what any one team member can do. For instance, it is generally *not* realistic to expect an ID to produce video, develop websites, or generate program branding, even though some talented individuals are capable of doing so.
- Write more appropriate job postings. Note that job titles are applied inconsistently in this area of work. For instance, IDs are sometimes called “learning designers” or “learning engineers,” while MPs are sometimes called “video producers” or “media production specialists.” Moreover, the title an individual uses may not correspond accurately to the skill set required. Some ITs call them-

selves instructional designers, for example, despite lacking expertise in course design. Thus, knowing the skills required for each role will help institutions vet applicants more effectively.

Our advice for institutions trying to make hiring decisions for online program development is to begin by identifying the number and type of courses you hope to produce. If you wish to develop entirely new online courses complete with asynchronous engagement, you will need at least one ID. If you are looking to launch an entire program, particularly on a tight timeline, multiple IDs will be necessary. If your vision includes polished, branded, professional-looking videos in a range of styles (for example, video case studies, motion graphic animations, or skill demonstrations), you will need one or more MPs. Because these sorts of determinations can be difficult to make at the outset of a project, you might want to start by hiring a single ID and draw on that person's expertise to assess additional needs. For institutions with limited budgets for whom a team approach is not feasible, our suggestion would be to enlist faculty SMEs who are drawn to technology, media, and design. It will be easier and more enjoyable for them than for faculty less comfortable in these areas.

What Space, Equipment, Hardware, and Software Are Needed to Develop Online Programs?

In addition to recognizing the human resources and skills needed to produce high-quality online courses, it is important to recognize and budget for the kinds of space, equipment, hardware, and software needed for online course development.

Multimedia instructional materials (e.g., videos and podcasts) are becoming an increasingly central part of teaching and training, especially online [57, 58]. Centralized resources for media production (e.g., institutional teaching centers) are sometimes but not always sufficient to meet production needs. Where they are not, some schools and departments have invested in building recording studios of their own, either "one button studios [59]" designed for faculty to use themselves or more sophisticated and versatile studios with designated staff. In either case, institutions interested in multimedia production will need to provide equipment: at minimum, cameras, lights, microphones, and backdrops; for more elaborate projects, teleprompters, equipment to smoothly capture moving shots, and a variety of "sets" for panel discussions and other speaker configurations may be required.

Whether or not institutions are ready to build studios, they will need to allocate and budget for computers with sufficient processing power to run editing software, adequate screen size for post-production needs, and sufficient hard

drive space. Both SMEs and IDs are likely to need licenses for web-based tools to enhance learner engagement. Some such tools are free or inexpensive (e.g., Microsoft Flip [60], Padlet [61], Google JamBoard [62], Figma [63]), but some represent a more significant investment, particularly the specialized authoring software that IDs use to create interactive lessons, such as Articulate 360 [64]. Video producers and graphic designers also need licenses for creative and editing software such as Adobe Creative Cloud [65], Final Cut Pro X [66], and DaVinci Resolve [67]. When video or audio are produced, transcription software or a budget for third-party transcription services are necessary for ensuring these materials are accessible to all learners.

For institutions with budgetary constraints, our advice would be to use free and inexpensive software where possible and enlist personal phones or university-provided video conferencing software (e.g., Zoom [68], Teams [69]) to record videos and podcasts.

What Are the Benefits and Challenges of a Team Approach?

A team approach to online education allows for mastery and application of specialized skills in key areas, which makes it possible to create more robust and sophisticated online materials, incorporate more asynchronous learning, and take on larger scale and more ambitious projects. Because teams tend to be more comfortable with risk-taking than individuals, they often generate more innovative solutions [70, 71]. On the other hand, coordination of roles can be challenging, and there is potential for breakdowns in communication, with concomitant morale issues when roles are unclear [50, 51]. The power differential between faculty and others on the team, who usually occupy staff positions, can also exacerbate problems. Table 1 describes common pitfalls on instructional teams and recommendations for avoiding them. Anticipating these pitfalls and using strategies to prevent them can help to ensure collegiality and goodwill on instructional teams and preserve motivation for future projects.

Discussion

Online medical education is here to stay [72]. Thus, a serious consideration of the skills and infrastructure needed to build and sustain robust online programs is in order. We have advocated for a team approach to developing online programs in academic medicine, one in which faculty members' content expertise and teaching experience is enhanced by team members with other critical skills (e.g., in instructional design, multi-media production, and instructional technology) in the service of creating more ambitious, creative, and

Table 1 Common pitfalls on instructional teams and recommendations for avoiding them

Pitfall	Description	Recommendations
Lack of Strong Leadership	<ul style="list-style-type: none"> • Non-faculty members of instructional design teams generally lack the institutional power to command action on their own • Consequently, online course development projects can flounder without involved leadership 	Institutional leaders should: <ul style="list-style-type: none"> • Vocally champion online initiatives • Incentivize faculty participation • Provide clear and consistent communication throughout the project • Explicitly confer decision-making power on non-faculty team members where appropriate • Publicly recognize effort and achievement in the online space
Role Ambiguity	<ul style="list-style-type: none"> • When roles and responsibilities are unclear on instructional teams, key tasks can fall through the cracks • When key tasks are not completed, it can cause stressful, last-minute scrambling for the instructional team and ultimately poorer experiences for learners 	All members of the instructional team should: <ul style="list-style-type: none"> • Communicate clearly about the roles they do and do not play • Point out possible gaps and concerns • Take responsibility for the quality of the learning experience
Perceived Lack of Respect	<ul style="list-style-type: none"> • If instructional designers (IDs) are heavy-handed in their recommendations and/or fails to respect faculty knowledge of the subject and student population, Subject Matter Experts (SMEs) can feel alienated and disrespected • When SMEs do not show regard for the skills and expertise of other members of the instructional team or fail to return emails and provide needed materials, these team members often become alienated and demotivated 	IDs should: <ul style="list-style-type: none"> • Defer to faculty expertise on content issues • Provide guidance on how to successfully translate this content to the online environment SMEs should: <ul style="list-style-type: none"> • Seek to understand the work of other team members • Defer to their expertise where appropriate • View the work as a collaboration
Erroneous Expectations About Course Development Timeline	<ul style="list-style-type: none"> • Faculty are often unaware that online course development must begin far earlier than in-person course development (starting 6 months before launch is typical) • An early start is critical to allow time for the team to create instructional materials, edit video and audio, build courses in the hosting platform, and conduct accessibility checks 	Institutional leaders should: <ul style="list-style-type: none"> • Explain the timeline to faculty as necessary for distributing work across the team and ensuring quality courses • Frame the frontloaded nature of the work as a benefit for faculty as well as the rest of the team (more work now, less work later) IDs should: <ul style="list-style-type: none"> • Share a project timeline with the team, designating deadlines and deliverables • Educate SMEs about the time needed for phases of the project with which SMEs are less familiar
Demands on Faculty Time	<ul style="list-style-type: none"> • A principal challenge on instructional teams is the availability and responsiveness of SMEs • SMEs—particularly those with clinical responsibilities—are often pressed for time and may fail to meet deadlines or respond to messages from instructional team members • This can derail project timelines and impose considerable stress on team members whose work is dependent on these deliverables 	Institutional leaders should: <ul style="list-style-type: none"> • Recognize the work required to produce high-quality online courses • Provide faculty with protected time whenever possible • Consider pairing senior faculty with junior colleagues who have subject matter expertise but (potentially) more time • Stress to faculty the importance of responding to team members in a timely manner

engaging courses — courses that embody research-based learning principles and best practices gleaned from the rapidly evolving literature on online education and courses that motivate and connect, rather than isolate, our students.

We contend that institutions should examine the personnel, skill sets, space, hardware, and software needed to develop high-quality online courses. Doing so will allow institutions, regardless of resources, to assess institutional capacity, stretch resources, inform arguments for budget

allocations, and plan more effectively for the future. Finally, we have drawn on both the research literature and our own experiences to outline some of the challenges instructional teams encounter and identify strategies to ensure positive, successful collaborations.

We acknowledge as a limitation that our understanding of the appropriate composition of instructional teams and the software, hardware, and space required to build good online programs is colored by the structure of our institution and the

nature of the online programs we have developed. However, we believe others with experience developing online courses and programs would agree in broad terms with our recommendations, even if we part ways on some of the details.

Conclusions

The initial disruptions to education caused by COVID-19 are stabilizing. This leaves us at an inflection point: Where do we go next? How can we use distance learning modalities most thoughtfully? And how can we develop the institutional infrastructure to design and sustain the very best online courses? Despite the uncertainty, these are exciting times in medical sciences education. With an expanding understanding of the affordances of online education, we are positioned better than ever to use all learning modalities (in-person, hybrid, fully online) thoughtfully and innovatively to reach learners where they are. We believe that institutions will need to invest in institutional teams to fully reach this potential.

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Declarations

Conflict of Interest The authors declare no competing interests.

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