

Table 1
Twelve-Month Longitudinal, Asynchronous Faculty Incubator Curriculum

Month	Topic	Objectives: The learners will ...	Activities: The learners will ...
1	Developing an Educational Philosophy	<ul style="list-style-type: none"> Analyze their current curriculum vitae and discuss its strengths and weaknesses Determine and refine their educational philosophy 	<ul style="list-style-type: none"> Draft their educational philosophy Create a five-minute elevator pitch of their educational philosophy Learn to effectively use the online platform (Slack^a) Analyze topic-specific journal articles
2	Team Collaboration	<ul style="list-style-type: none"> Use online tools to work collaboratively in an asynchronous fashion Analyze articles that were written using collaborative tools and determine how to best use these tools in their own practice 	<ul style="list-style-type: none"> Evaluate a specific online collaborative platform Develop a longitudinal project as a small group Analyze topic-specific journal articles Develop the Direct Teaching category of their Educator's Portfolio (optional)
3	Education Theory	<ul style="list-style-type: none"> Describe 10 theories in education Apply the theories to their practice 	<ul style="list-style-type: none"> Write a book chapter describing one educational theory Perform a literature search on the topic of their longitudinal project Analyze topic-specific journal articles Refine the Direct Teaching category of their Educator's Portfolio (optional)
4	Consulting for Educators	<ul style="list-style-type: none"> Perform an educational consult incorporating educational theories Succinctly explain educational theories in a simplified manner 	<ul style="list-style-type: none"> Perform a simulated educational consult based on provided case scenarios Refine the longitudinal project study idea based on the literature search Analyze topic-specific journal articles Refine the Direct Teaching category of their Educator's Portfolio (optional)
5	Instructional Technology	<ul style="list-style-type: none"> Discuss and apply different technologies for academic research Engage in digital scholarship 	<ul style="list-style-type: none"> Explore and use different technologies Analyze and create an annotated bibliography of the articles identified in the literature search for their longitudinal project Analyze topic-specific journal articles Create the Curriculum Development category of their Educator's Portfolio (optional)
6	Competency-Based Medical Education	<ul style="list-style-type: none"> Critically analyze competency-based medical education Discuss the consequences of educational interventions 	<ul style="list-style-type: none"> Review selected competency-based medical education literature and apply this to their current role Draft an abstract of the longitudinal project Identify capacity constraints and strategies to increase their personal efficiency Analyze topic-specific journal articles Refine the Curriculum Development category of their Educator's Portfolio (optional)
7	Peer Review	<ul style="list-style-type: none"> Critically analyze and peer review education scholarship Discuss key elements of a successful peer review 	<ul style="list-style-type: none"> Peer review a rough draft of a scholarly paper Respond to peer review comments from the Block #3 book chapter Analyze topic-specific journal articles Refine the Curriculum Development category of their Educator's Portfolio (optional)
8	Study Design in Education Research	<ul style="list-style-type: none"> Critically analyze and create effective research using different study designs Discuss the benefits and challenges of different study designs 	<ul style="list-style-type: none"> Develop a sample educational study based on a recent curricular intervention Continue data collection for the longitudinal group project Analyze topic-specific journal articles Draft the Advising and Mentoring section of their Educator's Portfolio (optional)
9	Program Evaluation	<ul style="list-style-type: none"> Discuss and apply the Kirkpatrick^b levels of evaluation Discuss qualitative and quantitative measures of program evaluation 	<ul style="list-style-type: none"> Draft a sample study design to evaluate program effectiveness Continue data collection for the longitudinal group project Analyze topic-specific journal articles Draft the Educational Administration and Leadership section of their Educator's Portfolio (optional)
10	Grant Writing	<ul style="list-style-type: none"> Identify the grants available for education research Write a 2- to 3-page letter of intent for a grant application (this may be a simulated or real grant) 	<ul style="list-style-type: none"> Create a list of potential grants available for education research Continue data collection for the longitudinal group project Analyze topic-specific journal articles Have another member evaluate their Educator's Portfolio (optional)

(Table continues)

Table 1
(Continued)

Month	Topic	Objectives: The learners will ...	Activities: The learners will ...
11	Scholarly Dissemination	<ul style="list-style-type: none"> • Discuss potential outlets for dissemination of scholarly outputs • Describe pearls and pitfalls of various outlets for scholarly dissemination 	<ul style="list-style-type: none"> • Create a listing of educational conferences, journals, blogs, or other repositories that accept medical education scholarship • Analyze collected data for the longitudinal project • Analyze topic-specific journal articles • Have a different member evaluate their Educator's Portfolio (optional)
12	Work-Life Balance	<ul style="list-style-type: none"> • Discuss strategies for successful work-life balance 	<ul style="list-style-type: none"> • Finalize and submit the longitudinal projects • Revise and finalize their Educator's Portfolio (optional) • Analyze topic-specific journal articles

^aSlack Technologies, San Francisco, California.

^bKirkpatrick Partners. The Kirkpatrick model. <https://www.kirkpatrickpartners.com/Our-Philosophy/The-Kirkpatrick-Model>. Accessed May 24, 2018.

writing a chapter for a book on the practical application of education theories) throughout the year.

Faculty mentors

Incubatees benefited from two types of mentors: core and guest mentors. Core mentors (n = 8) served as the primary instructors, responsible for fulfilling the curricular objectives and supervising projects. The core mentors led the various asynchronous discussions (e.g., journal club) and helped to advise various incubatees in their longitudinal project groups using both synchronous meetings (e.g., via Google Hangouts) and asynchronous methods, including e-mail and Slack, a closed social media platform (Slack Technologies, San Francisco, California). We recruited core mentors from various geographic locations, based on referrals from Faculty Incubator leaders (T.M.C., M.G., L.M.Y.) and ALiEM board members. Although their experience in medical education varied, all faculty members had published at least 10 peer-reviewed articles, which was important to us considering our focus on education scholarship. We initially recruited core mentors without offering any incentive, but after they agreed to participate, we offered each core mentor a small teaching honorarium.

Guest mentors (n = 10), recruited on the basis of their subject matter expertise (e.g., expertise in one of the curricular topics), were interviewed by core mentors during live, recorded presentations, during which incubatees could ask questions via Twitter or Slack in real time. We archived the presentations for future viewing by those who could not attend synchronously.

Funding and costs

The annual tuition was \$1,500 per incubatee, providing an operating budget of \$45,000. We secured one sponsor, the Council of Residency Directors of Emergency Medicine, which allowed us to subsidize the costs for some incubatees. We used the funds for operating costs and events/materials. We allocated approximately 25% of the budget to teaching honoraria for core mentors.

Curriculum and online platform

To facilitate learning, core mentors acted as central members of a CoP, engaging the incubatees and encouraging them to discuss issues and exchange ideas. The goal was for incubatees, as initially described by Lave and Wenger³ and extended by Dubé and colleagues,⁷ to develop their identity as legitimate members within our virtual CoP.

We housed our virtual COP on Slack, a communication platform with capacities beyond organizing an e-mail group or listserv; rather, Slack allowed scholars to engage in various forums, private discussions, and direct messaging (see Figure 1). For instance, core mentors used the forums to host a weekly journal club, highlighting influential articles relevant to the monthly theme.

Initially, the Faculty Incubator depended heavily on faculty member scaffolding. Core mentors facilitated conversations and engaged incubatees through planned question prompts (see Figure 1), as well as through questions based on trends in the discussions. By the second week, incubatees began posing their own questions, requesting assistance, or

seeking advice. This increased initiative eventually led to incubatees providing each other with insights or advice and helping one another solve problems across geographic borders and time zones.

Another key aspect of the curriculum was the development of thematically aligned assignments, through which groups of three incubatees worked together to learn about a specific given subtopic and then apply the new knowledge to solve a problem and educate the rest of the incubatees. This approach is based on Kolb's theory of experiential learning⁸ which suggests that learners apply the theories they have learned in simulated or real practice and emphasizes active experimentation. We linked assignments to realistic education problems and challenged the incubatees to create solutions. We did not formally assess these assignments, but we did provide formative mentor/peer feedback to the scholars to support their continued growth. To provide synchronous face-to-face interactions, mentors offered webcam-based office hours during which the scholars could "drop in" and ask questions or for advice or guidance. Interestingly, the uptake of this was poor; incubatees seemed to prefer asynchronous communication (e.g., direct messaging).

Recruitment

We recruited incubatees by posting an advertisement on the ALiEM website and through a concurrent Twitter campaign. Applicants had postresidency experience ranging from 1 to 13 years (median 4 years; interquartile range 2–8 years).

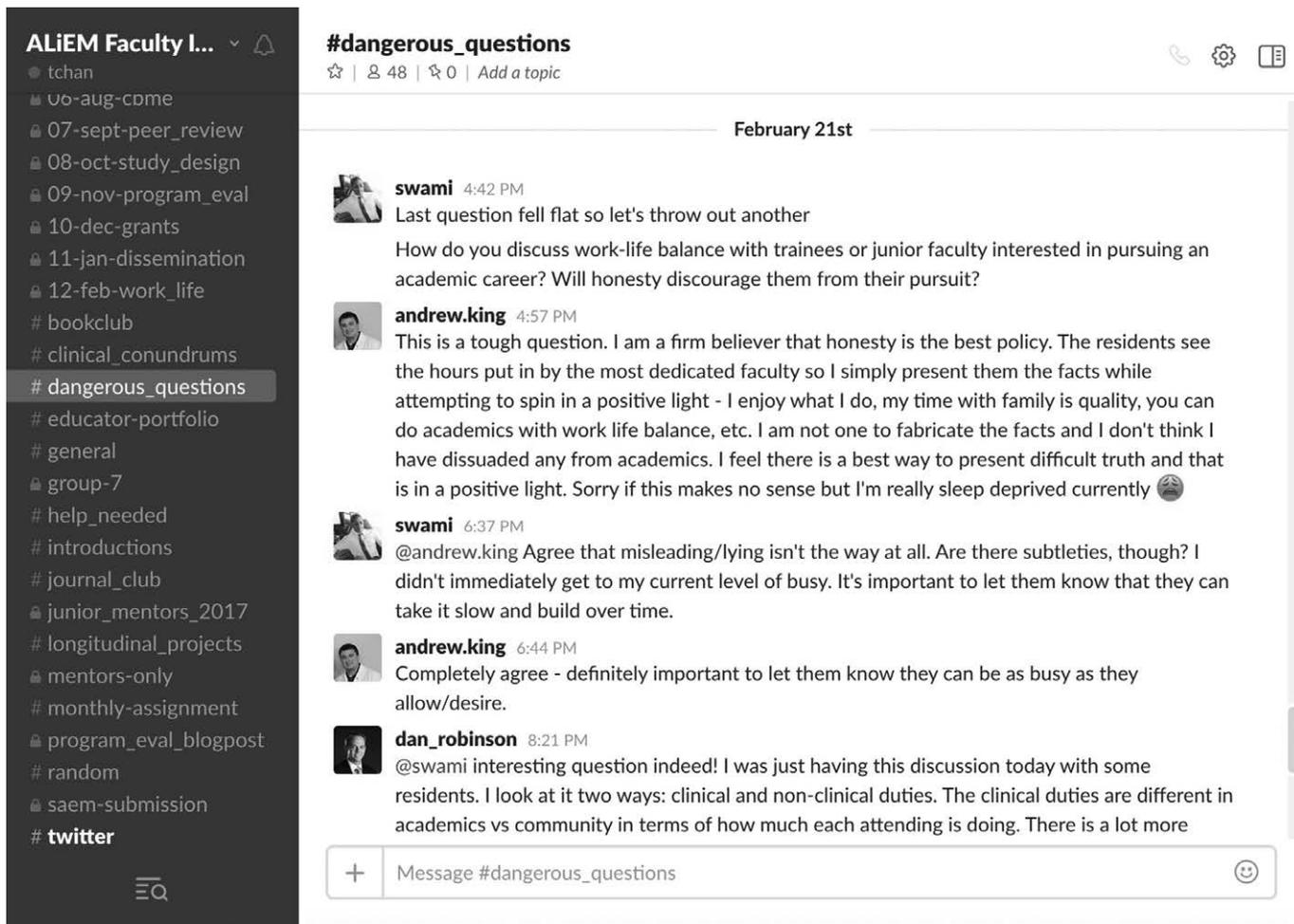


Figure 1 Example of a discussion, conducted via Slack (Slack Technologies, San Francisco, California), among incubatees and core mentors participating in the Academic Life in Emergency Medicine Faculty Incubator, 2016–2017. The participants granted permission to publish the excerpt.

We required applicants to demonstrate that they had prior medical education training (e.g., completion of medical education fellowships, master’s degrees in education, teaching courses run by national organizations, local faculty development courses). We also required the endorsement of their department chair or division chief. We received 35 applications, and after a rigorous review process, we invited the top 30 applicants to participate.

Program evaluation

The Hamilton Integrated Research Ethics Board granted approval for us to conduct an online mixed-methods survey to evaluate the Faculty Incubator after the inaugural scholars completed its first iteration. Using a retrospective pre–post methodology,⁹ we asked the scholars to rate their perceived baseline medical education knowledge prior to starting the ALiEM Faculty Incubator and their perceived final medical education

knowledge upon completing it. We also asked, via open-ended questions, about their perceptions of and experiences with the program.

Outcomes

Participants

In our inaugural year (March 2016–February 2017), we selected 30 incubatees. One of the 30 was from Chile, and the other 29 were from, collectively, 15 different U.S. states. Twenty-nine scholars completed the ALiEM Faculty Incubator curriculum.

Engagement

During the inaugural year, participants (including incubatees, core mentors, and guest mentors) sent a total of 22,665 messages via Slack (62 messages/day; see Figure 2). Of these, 3,036 (13.4%) were via open channels (i.e., directed to the whole network, and open to all individuals to view and read), 5,483

(24.2%) were via groups (i.e., discussions within small groups whose members shared goals, usually group projects), and 14,146 (62.4%) were via direct messages (i.e., between individuals and small groups, hidden from others). Participants also shared a total of 1,081 files during this time. We feel that these numbers are a useful and measurable surrogate metric for engagement within our virtual CoP.

Scholarship

The incubatees each coauthored posts for an open peer-reviewed blog series (“Educational Theory Made Practical” on the International Clinician Educator blog), which was subsequently edited into a peer-reviewed textbook.¹⁰ The scholars also received opportunities to work on scholarly articles, and 21 of the 30 incubatees coauthored a published article or a manuscript accepted for publication. A total of 13 peer-reviewed articles and 1 book¹⁰ resulted directly from Faculty Incubator

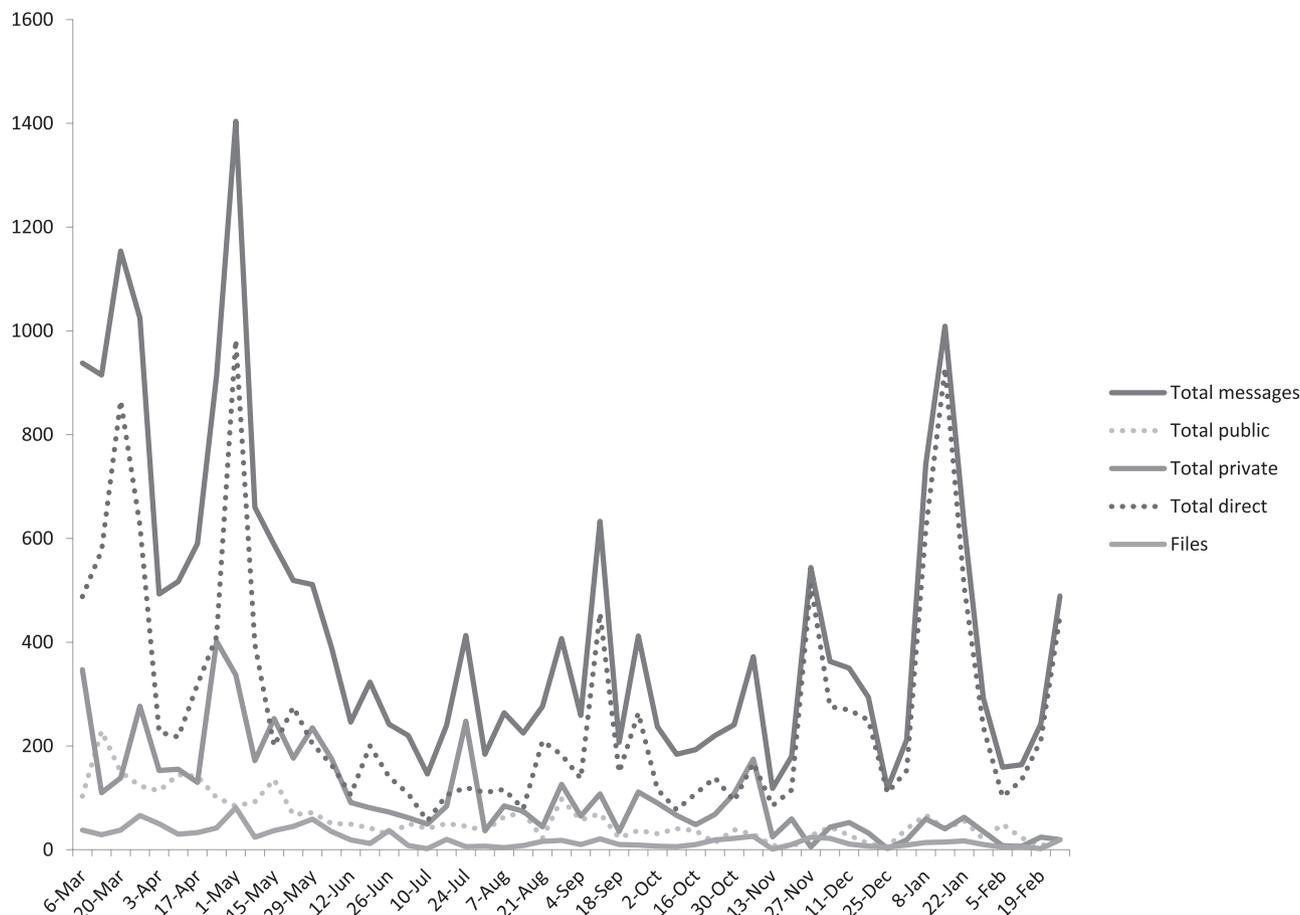


Figure 2 Total engagement of Faculty Incubator participants (incubatees, core mentors, and guest mentors) through Slack (Slack Technologies, San Francisco, California) over one academic year (2016–2017).

assignments. Incubatees also reported ongoing work on local projects (e.g., curriculum design) that they began over the course of the curriculum. Although publications are not the only measures of academic success, these metrics suggest that our program may be useful in fostering scholarly output.

Evaluation results

Of the 30 inaugural incubatees, 24 (80%) completed the evaluation survey at the end of the program.

The incubatees' average self-reported retrospective preparticipation medical education knowledge level was 4.3 (standard deviation [SD] 1.5) on a 9-point scale (where 1 = "Nothing," 9 = "Enough to feel competent and confident working with seasoned educators"). Their postparticipation knowledge level was 7.0 (SD 1.1). The increase in the incubatees' perceived medical education knowledge was statistically significant (analysis of variance $F[1,46] = 52.2; P < .0001$).

Qualitative comments

In their open-ended responses on the evaluation survey, incubatees noted that the ALiEM Faculty Incubator was unique from other faculty development initiatives in several key ways. Several incubatees ($n = 4$) highlighted the unique longitudinal format. To illustrate, one incubatee comparing the Faculty Incubator with other faculty development initiatives noted that "enthusiasm at the [other traditional faculty development] sessions [waned] when participants return home and life gets in the way." Although the Faculty Incubator required a longer commitment, it nurtured relationships, allowing incubatees to create a sense of community. One incubatee observed, "It felt more like a MedEd community than a group of classmates," and another felt the platform made approaching established clinician educators easier: "It can be incredibly intimidating to reach out to powerhouses in the field, but seemed significantly less so in this setting."

Three incubatees specifically noted that the online platform prompted

more interaction on a daily-to-weekly scale, resulting in more engagement. To illustrate, one incubatee felt that the online community served as "a means to fire off and bounce ideas off one another, [which] was novel for me." Incubatees also deemed the diverse mentors involved in the Faculty Incubator a unique facet. One participant summarized this best: "[It is a] Virtual Program [sic] with no geographic ties, bringing together a group of diverse people with different perspectives."

Incubatees also noted that the monthly assignments differentiated this initiative from most faculty development programs. Whereas some participants reflected that the assignments allowed them to learn ($n = 2$) and increased their ability to generate scholarship ($n = 3$), others felt that the assignments created an excessive workload ($n = 4$). Attrition and disinterest affected assignment completion; the absence of a small minority of incubatees made completing some group assignments challenging for the scholars who were

more engaged. Two incubatees found integrating their online responsibilities (e.g., group work, assignments) with the rest of their work and lives to be challenging, and one noted that other synchronous courses tend to provide participants with protected time, away from existing obligations, allowing for a greater focus on learning. One incubatee aptly remarked that the Faculty Incubator is “[m]uch more in-depth and work intensive, but you get out what you put in.”

Next Steps

This initial report is by no means conclusive. On the basis of feedback from the inaugural year, we have revised the curriculum. Specifically, we have assigned fewer mandatory projects and allowed more optional projects in the most recent (March 2017–February 2018) iteration. We have also combined and condensed topics to allow for two wellness breaks (one in July because workload for residency leadership is higher, and the other in December to accommodate holidays). Details of the revised curriculum appear on the ALiEM Faculty Incubator website. We have invited alumni to co-teach during the 2017–2018 cohort.

Further, we realize that Slack engagement statistics may not tell the whole story, especially given that incubatees and mentors also used e-mail and phone calls to facilitate their work. Future research may clarify the optimal duration of the ALiEM Faculty Incubator, ideal cohort size, and associations between the frequency of messaging (i.e., engagement) and curricular topics. Further evaluation might explore the mentors’ experiences in this online program or explore the sustainability of a distributed model of faculty development. We have also planned a longitudinal observational study to determine the efficacy of the initiative in helping faculty members produce educational scholarship.

We look forward to building on our initial outcomes, which provide proof of concept that the ALiEM Faculty Incubator effectively works to engage an international group of early- to

midcareer medical educators in creating an interactive, online CoP.

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Ethical approval: Hamilton Integrated Research Ethics Board granted approval for the study described in this Innovation Report (#2017-2199).

Previous presentations: This innovation has been previously presented at the Society of Academic Emergency Medicine conference 2017 in Orlando, Florida.

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