Using Hackathons to Transform Complex Educational Problems Into Innovative Prototypes

Alisha Brown, MD (@aecbrown)
Joshua Jauregui, MD (@joshuajauregui)
Anne K. Chipman, MD, MS (@akchipman)
Jonathan S. Ilgen, MD, MCR (@jon_ilgen)

The Challenge

Solving complex educational problems, from curricular reform to improving the clinical learning environment, requires creative thinking to generate innovative solutions.[1–3] Participant time and investment often are barriers to meaningful engagement, particularly in residency training programs.[2] "Hackathons" offer a novel structure to tackle complex program challenges by employing the concepts of design thinking[4] to engage residents and faculty in collaborative educational problem solving.

What Is Known

Hackathons are events in which individuals work in teams for short, predefined periods to propose solutions to challenging problems. Initially used in the technology industry to propel innovation, hackathons have been adopted in academic settings for rapid-fire idea development.[3] The goal is to create a collaborative atmosphere in which participants explore new ideas, experiment with possibilities, and strengthen bonds within their community.[3] Each team works toward a deliverable solution, then pitches their ideas to a panel of judges. The winning teams are awarded prizes. The approach is meant to generate fresh ideas and new prototypes that can serve as catalysts for program evolution.[2] We outline the key elements needed to implement a successful, small-scale hackathon in a residency program or graduate medical education committee using the annual program evaluation as an example (TABLE).

How You Can Start TODAY

1. Gather a repository of complex problems that need attention in your residency or fellowship program.
2. Obtain a commitment from leaders that "results" will be considered for program changes.
3. Identify existing forums in which a hackathon format is feasible.
4. Cocreate hackathon objectives, questions, and scoring rubrics with stakeholders.
5. Invite judges and team participants outside of your usual working group to offer fresh perspectives.

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Rip Out Action Items

Successful hackathons have:

1. A thought-provoking question that piques participants' interest and lacks an obvious solution.
2. A collaborative culture that encourages creativity, experimentation, and participation.
3. Diverse participant teams to leverage the power of divergent perspectives.
4. Scoring rubrics emphasizing deliverables that are innovative, feasible, sustainable, and relevant.

What You Can Do LONG TERM

1. Develop action plans for hackathon deliverables that will lead to program changes.
2. Formulate working groups to take ideas forward after the hackathon has concluded.
3. Revisit hackathon proposals to spark innovation and encourage evolution throughout the year.

Resources

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All authors are faculty in the Department of Emergency Medicine, University of Washington. **Alisha Brown, MD,** is Acting Assistant Professor and Assistant Program Director; **Joshua Jauregui, MD,** is Assistant Professor and Associate Director, Medical Education Research Fellowship; **Anne K. Chipman, MD, MS,** is Acting Assistant Professor and Assistant Program Director; and **Jonathan S. Ilgen, MD, MCR,** is Associate Professor and Associate Director, Center for Leadership and Innovation in Medical Education.

Corresponding author: Alisha Brown, MD, University of Washington, Department of Emergency Medicine, 325 9th Avenue, Box 359702, Seattle, WA 98104, aecbrown@uw.edu

TABLE
Exemplar: A Hackathon Applied to the Annual Program Evaluation

Hackathon Elements	Example: Annual Program Evaluation
The Question Prior to the event, organizers develop a high-quality question that will serve as the stimulus for the hackathon. It should: • Inspire participant engagement. • Be relevant to the program/organization. • Lack an easy or obvious solution. • Require varied stakeholder perspectives. • Lend itself to a deliverable.	1. A program survey identified a need to focus on resident wellness. 2. Resident and faculty stakeholders were queried to gauge which issues had the greatest relevance and value. 3. A "*How might we . . .*" format was used to promote ideas for questions,[1] which led to "*How might we* ensure that residents feel valued within our program?" 4. The question was piloted to ensure clarity and workability. 5. At the hackathon, we provided participants with background for how and why this question was chosen.
The Culture The right tone is critical for hackathon success, as the activity's richness comes from the diversity of perspectives. This exercise should be fun and engaging, with participants feeling liberated and inspired.	1. Hackathon leaders emphasized that creativity was central to the exercise and that consideration should be given to all ideas, even if ideas seemed improbable. 2. A code of conduct, introduced at the start of the hackathon, included the key elements of respect, experimentation, and collaboration (see online supplemental material).
The Teams Teams are built with an intentional eye toward contrasting perspectives as a means of generating and sharing new ideas.[1,4]	1. Teams, constructed in advance, represented diverse ranks, genders, ages, and backgrounds.[2] 2. We prompted participants to learn others' needs and existing workarounds for the problems being discussed.[4]
The Judges and Scoring A diverse judging panel scores each team's "pitch" using a predefined rubric developed by stakeholders aligned with hackathon priorities.	1. Five judges were preselected (residents, administrators, interprofessional colleagues, administration leaders) and coached on how to provide feedback to all teams. 2. Prototypes were scored on innovation, sustainability, feasibility, creativity, and relevance to the community.
The Pitch and Award Hackathons are output-oriented events. • Each team formulates a deliverable or prototype. Teams present their pitches using props, drawings, and/or music. • Awards for the winning team incentivizes participation. Awards can be material, monetary, or professional development.	1. Each team's 5-min pitch to the judges included their proposed solution(s) and root cause analyses. 2. The winning team's pitch used role-play to highlight the challenges of being an intern. They proposed the concept of a "gift shift" in which a senior resident covers an intern shift as a surprise day off for the intern. Team members were awarded institutionally branded water bottles.
The Follow-Up Posthackathon, leaders develop action plans for how the proposed ideas will be explored, providing evidence to participants that their ideas are respected and valued.	1. We identified several initiatives to take forward and investigate during the ensuing academic year. 2. We recommend pilot testing 1 to 2 creative and operational solutions, with working groups responsible for assessing progress and brainstorming new ideas.