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A program to drive innovation and entrepreneurship in academic cardiovascular center incorporating clinical team and patient codesign

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Abstract

Traditional training and funding mechanisms in academic health centers often do not support its faculty, staff, and trainees in evaluating and implementing innovative ideas, necessitating supplemental innovation programming. The University of Michigan (U-M) Frankel Cardiovascular Center partnered with U-M Fast Forward Medical Innovation (FMMI), a biomedical innovation and commercialization unit funded in part by the Clinical and Translational Science Award awarded to the Michigan Institute for Clinical & Health Research, to provide training and resources to advance ideas toward impacting patients. The program recruited faculty, trainees, staff, patients, and family members from multidisciplinary backgrounds. Engaging patients and family members expanded the ideas generated and furthered clinical relevance. Over two years, 11 project teams completed an 11-week, 16-session course on innovation and entrepreneurship concepts that incorporated workshops to progress ideas and develop a pitch for development funding. An increase in knowledge was reported in key innovation topics, such as customer discovery, assessing markets, and intellectual property. Participants reported an increase in project preparation, including obtaining stakeholder support, preparation of a development plan, readiness to apply for funding, and filing invention disclosures. This program can serve as a model for implementing training and funding mechanisms to advance innovative ideas.

Introduction

The development of medical innovations stemming from academic health centers, such as new therapeutics, devices, software, and care improvement processes, can impact patient care within and beyond the originating institution [1–5]. The path to translating ideas to patients can be difficult as traditional education and training focus on patient care, teaching, and research [6]. Programs to nurture innovative ideas through education [7–9], funding [1], and mentorship [10] have demonstrated success, but few have combined all into a comprehensive program. Furthermore, many innovation programs focus resources on faculty [7–9] or trainee [11,12] development and are not inclusive of the full academic health center ecosystem, which includes staff, patients, and family members.

The University of Michigan (U-M) Frankel Cardiovascular Center (FCVC) aimed to contribute to its culture of innovation by enabling its faculty, staff, and trainees to translate innovative ideas to patient impact. The FCVC also hoped to harness the ideas and experiences of patients and family members and incorporate their perspectives in innovation design and implementation. In order to achieve this, the FCVC developed a unique program, called the FCVC/Aikens Innovation Academy (hereafter "Innovation Academy"), that provided innovation and entrepreneurship education, funding, and mentorship to its enrollees.

The Innovation Academy was designed to support innovations with potential to impact cardiovascular care through the creation of new products or care improvement projects. It provided resources for FCVC innovators in three ways (Fig. 1): (i) by creating mechanisms of ideating solutions to relevant problems, (ii) by providing a didactic foundation on innovation concepts and the process of commercialization and a mechanism to practice these concepts, and (iii) by providing funding and mentorship to meet early milestones and bridge to existing innovation and commercialization mechanisms.

The program aimed to serve as an entryway to existing innovation and entrepreneurship resources at U-M. With this in mind, the Innovation Academy was administered with a

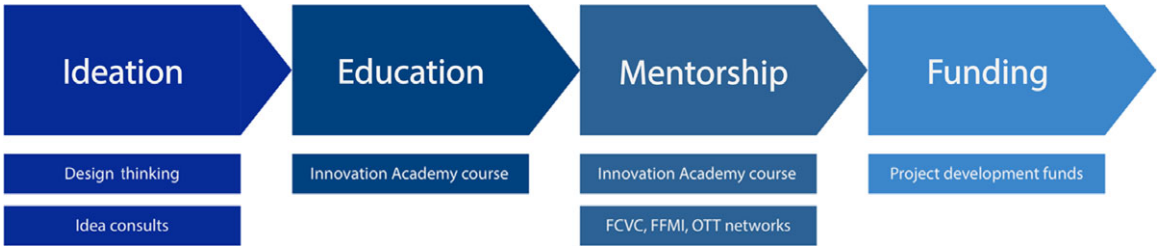

Fig. 1. Innovation Academy Components and Resources. The Innovation Academy comprised ideation, education, mentorship, and funding components to develop early-stage ideas to impact cardiovascular care. FCVC, Frankel Cardiovascular Center; FFMI, Fast Forward Medical Innovation; OTT, University of Michigan's Office of Technology Transfer.

partnership between the FCVC and FFMI, a biomedical innovation, entrepreneurship, and commercialization unit of the U-M Medical School's Office of Research, with support from the University of Michigan's Office of Technology Transfer (OTT). FFMI is funded in part by the Clinical and Translational Science Award (CTSA) awarded to the Michigan Institute for Clinical & Health Research (MICHR).

Now in its third year, we describe the Innovation Academy and the resources required to administer the program in its first two years. As well, case studies are presented describing a physician-scientist pursuing a potential diagnostic in preclinical stages and a patient-provider team working on a care improvement innovation.

Materials and Methods

Program Administration

The Innovation Academy was administered by a program manager, who was an FFMI staff member dedicated to the program that reported to FFMI's Director of Commercialization Education. The Innovation Academy was advised by two FCVC faculty leads (cardiology and vascular surgery), with oversight by an FCVC Director.

Recruitment and Idea Generation

The program was open to any clinical or research (basic, translational, or clinical) faculty, staff, or trainee with a care improvement or product idea with potential to affect cardiovascular care. Recruitment targeted any areas that participate cardiovascular care and research, including cardiac surgery, cardiology, vascular surgery, nursing, molecular and integrative physiology, anesthesiology, pharmacology, and radiology.

Recruitment into the Innovation Academy was accomplished by a combination of one-on-one conversations with faculty, staff, and trainees and, in its first year, a formal ideation workshop. Targeted contacts included but were not exclusive to: faculty with a research appointment, faculty who had submitted a recent invention disclosure, faculty that had applied for commercialization funding available to U-M investigators, trainees that were participating in research projects, and nursing unit leadership that could inform nursing staff that had interest in innovation. The FCVC faculty leads also encouraged colleagues to participate.

In the first year, over 30 consultations were held in the four months prior to the course start date to help program manager understand the ecosystem of who would benefit from the program. In the second year, approximately 12 consultations were held; fewer consultations were necessary to fill the class as the program manager further understood the ecosystem; and the program had established awareness in the FCVC community.

Experience from previous educational programming administered by FFMI, along with instructor feedback, determined that maximum enrollment would be six project teams per cohort to allow for meaningful participation and mentorship. The enrollment process involved a brief online application and meeting with the program manager and course instructor. During these meetings, it was confirmed that the team had a focused idea and, when applicable, had taken appropriate steps with the OTT to protect the invention. At this stage, participants were invited to join the Innovation Academy, referred to the OTT invention disclosure process, and/or connected to a subject matter expert or relevant unit at U-M.

One month prior to the Innovation Academy course start date in its first year, the program facilitated a workshop practicing design thinking methodologies [13–15] while examining patient-provider communication within FCVC units. There were three goals of this workshop: (i) to provide education on design thinking methodologies, (ii) to serve as a patient-centered ideation mechanism for the Innovation Academy, and (iii) to recruit roles that were close to patient care, such as nursing, technical staff, patients, and families, that were not reached by the other recruitment efforts. The program manager reached out to supervisors and managers in FCVC units to describe the workshop and gauge interest. Units that were targeted included cardiac surgery, the cardiac intensive care unit (ICU), the cardiovascular ICU, the diagnostic vascular unit, vascular surgery, and the FCVC outpatient clinic. Interested individuals were asked to recruit colleagues from their units, and identify former patients or family members to participate in the workshop. The program manager worked with the U-M Office of Patient Experience to invite patients and family members. In this workshop, faculty and staff were grouped by FCVC unit with former patients and family members who had received care from the same unit. An expert facilitator led groups through the design thinking stages of empathizing, defining, ideating, prototyping, and testing. The workshop educated five teams comprising 26 participants identifying as faculty, nurses, technicians, specialists, and administrative staff. Participants were invited to join the Innovation Academy.

Education

The objectives of the Innovation Academy course were to (i) teach major concepts of innovation and entrepreneurship, such as value proposition, customer discovery [16], and pitch development and (ii) develop existing ideas through workshops where enrollees applied these concepts to their projects. To accomplish these objectives, the course was designed to include a combination of lectures and workshops (Table 1).

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Table 1. *Innovation academy course curriculum*

	Topic	Format	Innovation Type
Session 1	Instructor /Team Introductions	Lecture	All
	Case Study (Research Instrument)		
Session 2	Introduction to Intellectual Property	Lecture	Commercial Potential
Session 3	Customer Discovery	Lecture	All
	Stakeholders & Markets		
Session 4	Regulatory Process	Lecture	Commercial Potential
Sessions 5, 6*	Stakeholders	Workshop	All
	Features & Benefits		
Sessions 7, 8*	Customer Discovery Reports	Workshop	All
Session 9	Communicating Innovation, Introduction to Pitch Template	Lecture	All
	Planning & Development Milestones		
Session 10	Equity & Investments	Lecture	Commercial Potential
Sessions 11, 12*	Pitch Presentations – 1st Draft	Workshop	All
Sessions 13, 14*	Pitch Presentations – 2nd Draft	Workshop	All
Session 15	Pitch Presentations – Timed Rehearsals	Workshop	All
Session 16	Pitch Showcase		

*Indicates sessions where class was divided over two days to allow for time for feedback on presentations; each participant only attended one session that week.

The course curriculum was based on an existing commercialization program [8] developed for surgery faculty with two major modifications. The first modification was to adjust the syllabus to support both new product and care improvement projects, while ensuring efficient use of participants' time. To do this, didactic topics were divided into two tracks: (i) general innovation topics (not commercialization-specific) and (ii) those primarily relevant to innovations intended to leave the university as commercially viable projects. Attendance was optional at commercialization-specific lectures as not all participants were interested in details of commercialization. The second modification was to ask participants to perform at least one customer discovery interview outside of class and report on observations (Session 7/8).

During workshops, participants presented stakeholder maps, customer discovery reports, and pitch drafts. They received feedback from both the instructor and fellow participants. The workshops provided individualized assistance with development of the rationale and plan for each team's idea and enabled group learning where participants could see the process applied to other projects.

An important aspect of the course was the development of a 10-minute pitch. Pitches typically focused on asking for development funding or support from department leadership to execute on the idea. A pitch template was provided that required presenters to describe the problem being solved, customers/stakeholders, solution, value, market, competition, intellectual property, regulatory strategy, business strategy, and relevant milestones. During sessions where participants presented iterations of their pitches, discussion focused on the rationale for the proposed innovation and the necessary milestones and resources needed to advance the idea. The pitch showcase served as the course finale, where participants presented their pitches in a forum open to FCVC leadership and other faculty, staff, and trainees.

Participants attended one of two workshop days; dividing the class allowed for in-depth feedback, practice, and discussion while limiting participants' time commitment. The class reunited for the final pitch practice and pitch showcase. The course was held two evenings each week from 5:30 to 7:30 p.m. to accommodate clinician schedules. Dinner was provided. The course environment was collaborative and encouraged cross-team feedback, questions, and resource sharing. This was accomplished through the small workshops, by arranging desks in a "U-shape" when possible to allow participants to face one another, and, when applicable, by deferring questions from the instructor to other participants who happened to be subject matter experts.

Course instruction was provided by an experienced biomedical innovator and Mentor-in-Residence in the OTT. Importantly, the instructor had more than 23 years of experience in building life science companies, including cofounding six biotech startups that often originated in academia, as well as expertise in product development, intellectual property management, business development, and venture financing. This offered course enrollees expertise in biomedical innovation and entrepreneurship that could not be found elsewhere at U-M.

Mentorship

Throughout the course, teams were offered mentorship and connection to the innovation and entrepreneurship ecosystem at U-M. The course instructor offered time to advise teams outside of class on such topics as pitch development, customer discovery, and intellectual property. When applicable, teams were directed toward the MICHR Investigational New Drug/Investigational Device Exemption (IND/IDE) Investigator Assistance Program (MIAP) for project-specific regulatory support, guidance, and education. FFMI staff members with roles in translational research funding and business development also consulted with teams to strategize future milestones and funding sources.

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Table 2. *Key metrics to track program outcomes*

Category	Metric	Measurement Method
Enrollment	Total project teams	Program enrollment form and conversation
	Participant unit/department	
	Participant job role	
Education	Advanced knowledge of key topics:	Pre- and post-course self-assessments
	Value proposition	
	Customer discovery	
	Identifying stakeholders	
	Assessing the market	
	Planning and development	
	Derisking innovation	
	Communicating innovation	
	Intellectual property	
	Regulatory topics	
	Investment for innovations	
Preparedness	Confidence identifying value proposition	Pre- and post-course self-assessments
	Confidence identifying stakeholders	
	Stakeholder and team support	
	Preparedness for execution of development plan	
	Preparedness to obtain funding	
Project Development	Downstream funding	Quarterly touchpoint for one year post-course
	Invention disclosures filed	
	Patents filed	Communication with downstream programs at U-M
	Startups formed	
	License agreements	
	Relevant publications	
Program Satisfaction	Instructor knowledge	Post-course survey
	Program met expectations	
	Convenient course format	
	Likelihood to recommend	

Project Funding

Projects with commercial potential were eligible to apply for early-stage milestone funding through the Innovation Academy; a total of $50,000 per year was available to allocate across projects. At the end of the course each year, a small committee of individuals from FFMI, the FCVC, and the OTT evaluated funding requests. These individuals included the Innovation Academy program manager, the FCVC faculty leads, the FFMI Director of Commercialization Education, the FCVC Quality Data Manager, and an FFMI staff member that manages an early-stage commercialization funding mechanism. The course instructor, with an appointment in OTT, contributed insights on the projects but did not vote on funding decisions. Funding decisions were based upon the communicated value of the project, the milestones the applicant proposed, and the potential impact of the funding on executing the milestones; evaluation criteria used are listed as Supplementary material.

Program Evaluation

The metrics in Table 2 were selected at the outset of the program to track its outcomes. Pre- and post-course self-assessments were administered to project team leads to measure competency in the in educational topics, preparedness to advance projects, and program satisfaction. Following course completion, the program manager reached out to each project team on a quarterly basis for one year to track project development metrics. The project development metrics applied to both new product and care improvement projects, though metrics related to intellectual property and startup formation were more applicable to new products. Expected outcomes for care improvement projects included publication, downstream funding, and implementation, depending on project complexity. After one year, the project manager tracked projects through communicating with OTT and with downstream funding mechanisms at FFMI.

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Table 3. *Innovation academy participant departments and job roles (years 1 and 2)*

Department/Unit of Project Team Lead	Number of Project Teams
Cardiac Procedures Unit	1
Cardiac Surgery	2
Cardiology	4
Cardiovascular Intensive Care Unit	1
Molecular & Integrative Physiology	1
Vascular Surgery	2
Roles of Participants	**Number of Participants**
Faculty	5
Nursing	2
Technician	1
Fellow	2
Resident	1
Medical Student	1
Patient	1

Table 4. *Funding distribution for projects enrolled in innovation academy course*

Project	Purpose	Funding Amount
Diagnostic/prognostic for treatment of heart disease	Commercialization milestone, match to Mi-Kickstart award	$21,250
App to increase participation in cardiac rehabilitation	Commercialization milestone	$16,700
Device to improve sternal closures	Commercialization milestone	$15,000
Artificial intelligence software to aid diagnosis for coronary artery disease	Customer discovery	$5000
Modified bite block	Customer discovery	$5000
Software to assess intraoperative clinical performance	Customer discovery, equipment	$5000
Software to reduce need for invasive diagnostic procedure	Customer discovery	$5000
Device to reduce blood loss in cardiac procedures	Customer discovery	$5000

Materials and Tools

Pre- and post-course surveys that included self-assessments were administered via Qualtrics XM (Provo, UT). Slides from each lecture, slide deck templates for stakeholder mapping, customer discovery reports, and pitches were shared via U-M Box, an implementation of Box.com (Redwood City, CA) cloud storage customized for U-M.

Budget

The total cost for one year of the Innovation Academy was approximately $167,500 consisting of five components: (i) program management ($57,000), (ii) administrative supplement for faculty ($11,500), (iii) course instruction ($45,000), (iv) project awards ($50,000), and (v) marketing and food ($4,000). Program management funds supported one program manager at 50% yearly effort and one supervisor at 15% yearly effort; these roles planned and executed the program and guided teams through innovation and commercialization resources available at U-M. Administrative supplement was provided to faculty leads for their time serving advocates and advisors for the program. At the time of publication project funding was not allocated in its entirety.

Results

Enrollment

Over two years, 11 project teams (13 participants) completed the Innovation Academy. Participants represented diverse departments and job roles (Table 3). In the first year, six project teams enrolled and completed the program. These projects comprised four with commercial potential with early-stage translational data and two care improvement projects. In the second year, six project teams enrolled. One additional team requested participation after the course was full; they were invited to attend all sessions but could not present in workshops to ensure appropriate time for feedback and discussion for the first six teams. However, two project teams dropped the course due to unforeseen circumstances, and the seventh team was invited to participate in workshops, yielding five teams completing the course.

The design thinking workshop yielded one project participating in the Innovation Academy. This project was led by the Clinical Nursing Director and former patient. Their project is described in the patient-provider team case study. The other teams did not enroll in the Innovation Academy; however, their ideas were implementable without an intensive education program. Examples include an educational video and physical barriers for the six-minute walk test.

Education and Mentorship

Combining both years, 10 project team leads completed pre-course survey (83.3% response rate) and 10 project team leads completed the course completed the post-course survey (90.9% response rate). The discrepancy in response rates is due to six teams enrolling and five teams completing in the Innovation Academy in the second year. Pre-and post-course self-assessments demonstrated a measurable shift in self-reported knowledge (Fig. 2 A) in such major course topics as customer discovery, assessing the market, intellectual property, communicating innovation, and investment for innovations. As well, pre- and post-course self-assessments demonstrated an increase in self-reported preparedness to move these projects forward (Fig. 2B), particularly in the areas of stakeholder support, preparation of development plan, and readiness to apply for funding sources.

The post-course survey asked participants several questions about how the Innovation Academy influenced key steps in the translational process. Seven (70%) respondents indicated that they had met with a representative from U-M OTT, and four (40%) respondents indicated that they had filed an invention disclosure because of the Innovation Academy. Three (30%) respondents had found a new team member or collaborator. Importantly, all (100%) respondents indicated that the Innovation Academy helped them move their projects forward and connected them with resources to move their project forward. Of participants that indicated potential

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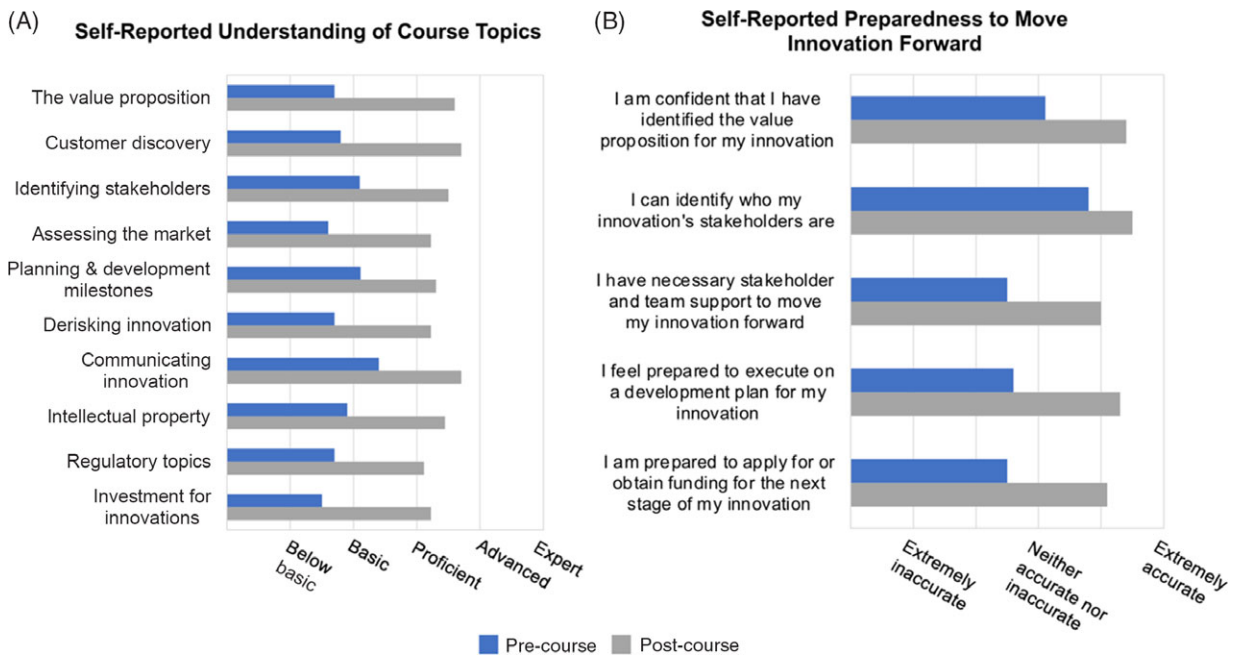

Fig. 2. Influence of Innovation Academy on Preparing Innovators and Projects for Future Milestones. (A) Self-assessed understanding of innovation topics before and after the Innovation Academy course. Data from two years of program participation. Participants reported an increase in their understanding of all topics surveyed. (B) Self-assessed preparedness to move projects forward when before and after the Innovation Academy course. Data from two years of program participation. Participants reported increased preparation in all topics surveyed.

to commercialize their project, eight (100%) indicated that they had knowledge of commercialization resources available at U-M.

The outcome metrics related to educational objectives listed in Table 2 rely on self-assessment. As a professional development program, appropriate competencies were demonstrated through developing a pitch; the pitch template required participants to apply key educational concepts to their projects.

Project Development and Funding

Project funding was allocated across projects with commercial potential for project development milestones (Table 4), including customer discovery, protoyping, animal testing, equipment for a clinical trial, and a match to larger grant of early-stage commercialization funding (Mi-Kickstart; Michigan Translational Research and Commercialization for Life Sciences) for proof-of-concept testing. Funding for customer discovery, for example, was used to attend a relevant conference to allow the innovator to speak with stakeholders about the innovation's value proposition. Projects funded for customer discovery were also referred to a course provided by FFMI to facilitate stakeholder interviews and refine the business case [7]. In both years, a portion of the budgeted project award funding was not distributed; teams could request additional funding after the funded milestones were completed.

Care improvement projects were not eligible for funding from the Innovation Academy per the program funding agreement. One project furthered its development through U-M resources, as described in the patient-provider team case study. The second care improvement project aimed to revise workflow in the electronic health record for collecting patients' nursing admission paperwork and medical history. At the time of publication this project had not moved forward due to competing priorities, but the participant intended to continue the project in the future.

Case Study: Preclinical Diagnostic Development

A physician-scientist cardiologist was referred to the Innovation Academy by FFMI staff. After a conversation with the program manager and course instructor, he enrolled in the Innovation Academy and was connected to a licensing specialist at OTT. The participant's lab had identified a biomarker that could serve as a diagnostic for cardiovascular disease. During the Innovation Academy, the participant honed the value proposition and market for the innovation and developed a concise pitch for the project. Directly following the course, the participant applied for early-stage commercialization funding (Mi-Kickstart), which requires matching funds, for proof-of-concept studies. The Innovation Academy awarded matching funds contingent on the participant receiving a Mi-Kickstart award. This funding was awarded, and the project is in progress.

Case Study: Patient-Provider Team

The Clinical Nursing Director for the cardiovascular ICU participated in the design thinking workshop with several nurses and a former patient. During the workshop, the team ideated an app for helping patients communicate their needs when they had limited ability to communicate verbally or through writing. At the end of the two-hour workshop, the team had not yet defined to whom or what information the app would communicate. Potential ideas included communicating with the care team or family at home, and potential information to communicate included media of the family, patient health data, and patient comfort needs.

To explore this further, the Clinical Nursing Director and patient enrolled in the Innovation Academy in its first year. The team received mentorship in the course on how to determine a first use case of the app by interviewing stakeholders and determining the unmet need. The team decided to focus on helping patients communicate about their comfort and needs. They furthered the

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idea through a service available at OTT where they developed patient and provider use cases and schematics of how the app would look and function.

After completing the Innovation Academy course, the team won first prize in the FCVC Innovation Challenge, an annual pitch competition [17,18], to fund the development a prototype of their app. They continue to receive support from the FCVC, FFMI, and the OTT in the form of helping the team craft their milestones and providing relevant connections; for example, guidance through the procurement process and the names of experienced app developers.

Discussion

The Innovation Academy was created to enhance a culture of innovation at the FCVC by providing innovation and entrepreneurship education, mentorship, and funding. Self-assessment and survey responses indicate that the program has been successful in teaching key innovation and entrepreneurship concepts and preparing participants to move projects forward. The Innovation Academy facilitated key translational steps and introduced participants to education, mentorship, and funding resources available to early- to late-stage projects at U-M through the FFMI, OTT, MICHR, and other relevant units. Funding through the Innovation Academy provided an opportunity to seek funding for translational projects that may not be funded through traditional academic granting mechanisms. The case studies presented exemplify how competencies through pitch development, combined with mentorship and connection to resources, can help secure funding and complete project milestones.

The patient-provider team serves as a key illustration of the unique assets of the Innovation Academy: (i) the pairing of patients and their providers to innovate and improve care based on patient experience, (ii) the importance of ideation and education to bring forth and iterate on ideas, and (iii) the introduction into the innovation and entrepreneurship ecosystem. In both examples, the innovations were further developed and funded through other components of the innovation ecosystem at U-M.

The Innovation Academy is a relatively new program, and in its current form has several limitations:

- *Scalability:* In its current state, one two-hour workshop can accommodate three projects to allow time for instructor mentorship. Of note, FFMI administers a program that accommodates additional teams but provides less in-depth mentorship [7]. In formation of the Innovation Academy, FFMI and the FCVC chose to provide a course with intensive mentorship and project development to impact the FCVC's innovative culture and provide a successful platform for project success. To accommodate more than six project teams while retaining the in-depth mentorship, additional time would need to be allocated via longer sessions or additional workshop sessions.
- *Budget:* As a new program, the Innovation Academy budget intentionally invested heavily in program management, faculty stipends, and high-quality instruction and mentorship to ensure its success. Still, the budget described here may inhibit the program's replication at other institutions. The Innovation Academy benefitted from the instructor's extensive experience and the time they dedicated to mentoring teams, though this is one budget item that may be adjusted. As well, efficiencies may be gained, particularly in recruitment, as the program's reputation is established.
- *Return on Investment (ROI):* It is difficult to quantify an ROI on an educational program focused on early-stage projects. Projects are likely to evolve and many benefits, such as knowledge gained and a more innovative culture, are difficult to measure. Institutions investing in such a program should understand that impact should be measured through such milestones as downstream funding, patent applications, and publications rather than ROI.
- *Design Thinking Workshop:* The design thinking workshop yielded one team participating in the Innovation Academy. The time to recruit teams, patients, and families was significant and must be considered. The majority of the innovations proposed in the workshop were easily implementable without participating in the Innovation Academy; it is possible that a different topic may have yielded projects that better bridge to the Innovation Academy. As well, the workshop described here recruited roles that are less likely to be able to set aside work time for the Innovation Academy. As such, one must consider program and institution priorities when deciding to invest in such a workshop, choosing the topic, and recruiting participants.

Virtual Implementation of Innovation Academy

Due to the coronavirus pandemic, the second year of the Innovation Academy converted to a virtual format prior to Session 13. For the last three sessions, draft presentations and discussion were held via the BlueJeans© video conferencing platform (San Jose, CA). The pitch showcase was postponed for three months to accommodate shifts in schedules of participants with clinical duties due to the pandemic. The pitch showcase was held utilizing the Zoom© video conferencing platform (San Jose, CA), and the funding distribution team also met by Zoom.

The third year of the Innovation Academy will be held in 2021 in an entirely virtual format. Course lectures and group discussion will be held on Zoom. All sessions will be recorded and shared with participants. Course materials, such as lecture slides, recordings, and workshop assignments, will be shared through the Canvas© virtual learning management system (Salt Lake City, UT). The brief experience holding pitch practice sessions virtually in its second year did not cause concern for the ability to convey materials or facilitate discussion; however, it is anticipated that there may be some change in information conveyed or quality of discussion. Questions will be delivered in the post-course survey to measure participant experience specifically targeting the virtual experience. Furthermore, as the main deliverable for the course is the participant pitch, those that have attended past pitch showcases and the upcoming virtual pitch showcase will be surveyed for impressions of change in pitch quality.

Upon recruiting for the course (seven projects anticipated), the virtual format appeared to be an advantage in that participants did not have to travel to the classroom and missed sessions could be viewed at a later time. Data will be collected via attendance and a post-course survey on whether participation (synchronously or asynchronously) is comparable to past cohorts.

Conclusion

The Innovation Academy provided early-stage innovation and entrepreneurship education, mentorship, and funding that helped validate projects and move them along the translational pathway. The program was accessible to all that contribute to the FCVC, including faculty, trainees, and staff, with codesign and

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participation opportunities for patients and family members. By providing such training and resources, participants not only advanced specific projects but also gained skills and knowledge in key areas necessary to deliver innovations to patients.

The program serves as a model that can be replicated by other CTSA institutions for successful commercialization of research and implementation of care improvement processes. Institutions within the CTSA network that seek to enhance innovation and entrepreneurship programs have the advantage of relevant programmatic support, such as that provided by groups like MICHR and MIAP, at their institutions or available through network partnerships.

Supplementary material. To view supplementary material for this article, please visit https://doi.org/10.1017/cts.2021.9.

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