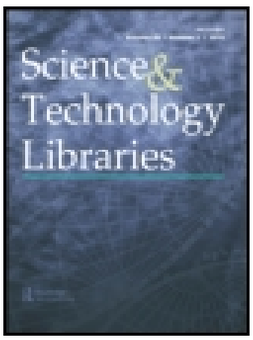

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Fostering a Tech Culture through Campus Collaborations: A Case Study of a Hackathon and Library Partnership

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ABSTRACT

Hackathons are time-bound, competitive coding contests that are often judged for prizes. Their name originates from joining hacking, playful exploration of hardware and software issues, with marathons, endurance competitions. The intent is to challenge participants to build working prototypes of hardware or software in a short time period, anywhere from one day to several weeks, though typically between 24–28 hours. While they are a mainstay in computer science fields, they are becoming increasingly popular in other domains, including libraries. Libraries have long championed life-long learning, a democratization of data, and access to information. These are similar mentalities of the maker movement, echoed in hackathons. Rapid iteration, problem solving, and cooperative learning are regularly present at events and within library systems. This paper details a case study of one institution's growth from a hackathon event host to deeper library engagement and partnership with an informal learning program. The authors will highlight benefits that both partners observed and will end with a pitch for why other libraries should consider hosting similar events. Finally, several recommended resources for libraries who are contemplating hosting hackathon events will be presented.

KEYWORDS

Hackathons; campus partnerships; informal learning; innovative practices

Introduction

Hackathons and other timed coding events typically emerge from Computer Science departments. They reinforce concepts covered in classes, provide practical applications of course topics for students to tackle, and are a fun way to engage with both the material and other students. Hackathons and make-athons embody the "maker" culture and require participants to think creatively about solutions to real-world problems. Often this same mentality of flexibility, the importance of an interdisciplinary approach to an issue, and creativity lives in the library. In addition to philosophical alignment, libraries have many appealing physical amenities for hosting events. On many college and university campuses libraries also serve as a main gathering spot, have

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flexible furnishing, provide ample wifi, allow food and drink, and typically have 24-hour spaces, all key components to a successful event.

In 2013, Ohio State University held its first hackathon in a library basement. The next year, the hackathon more than doubled in participants and took up two floors in that library. It then grew beyond the space the library could provide. But why host a hackathon in a library in the first place? Could not some other space on campus work? In this article, we will describe the evolution of the partnership between the OHI/O informal learning program and the libraries. We will cover how the growth of the program and popularity of events leveraged experts from the libraries. We will then discuss how it has led to additional referrals for other services provided by the libraries and deepened engagement between several academic units and the libraries. We will share lessons learned for building similar partnerships if other schools wish to host events at their own institutions.

Beyond having a 24-hour location and established liaison librarian connections to the computer science department, there are many other reasons why librarians and libraries make good partners for hackathon initiatives. Libraries are in the business of information and data sharing and fluency. While some people still think of libraries synonymously with books and journals, libraries and librarians have evolved to be purveyors of knowledge. They house experts in data use and reuse who are able to contextualize information resources, and often provide services around data cleaning and data visualization. Librarians regularly collaborate with departments and units across campus. In addition to the expertise available, libraries host a multitude of outreach events, often having spaces that accommodate presentations as well as a generous food policy. In short, the ethos in libraries aligns with hackathons and the spaces easily accommodate these tech-focused events. Figure 1 provides additional reasons why librarians and a library location are good considerations for involvement in hackathons.

Literature review

Hackathons are far from a uniform concept. Their length, theme, purpose, and many other characteristics vary widely. The names for these events can even vary, with terms like hackfest, code sprint, and other terms. When examining the literature for information about hackathons, five major themes emerged: hackathon logistics, topical hackathons with a specific theme, industry involvement and corporate engagement, participants in events, and connections to the curriculum. Each of these areas will be covered in additional detail.

Logistics

Many hackathon articles focus on the logistics of planning and hosting a hackathon or of how a hackathon is experienced by its teams, mentors, or

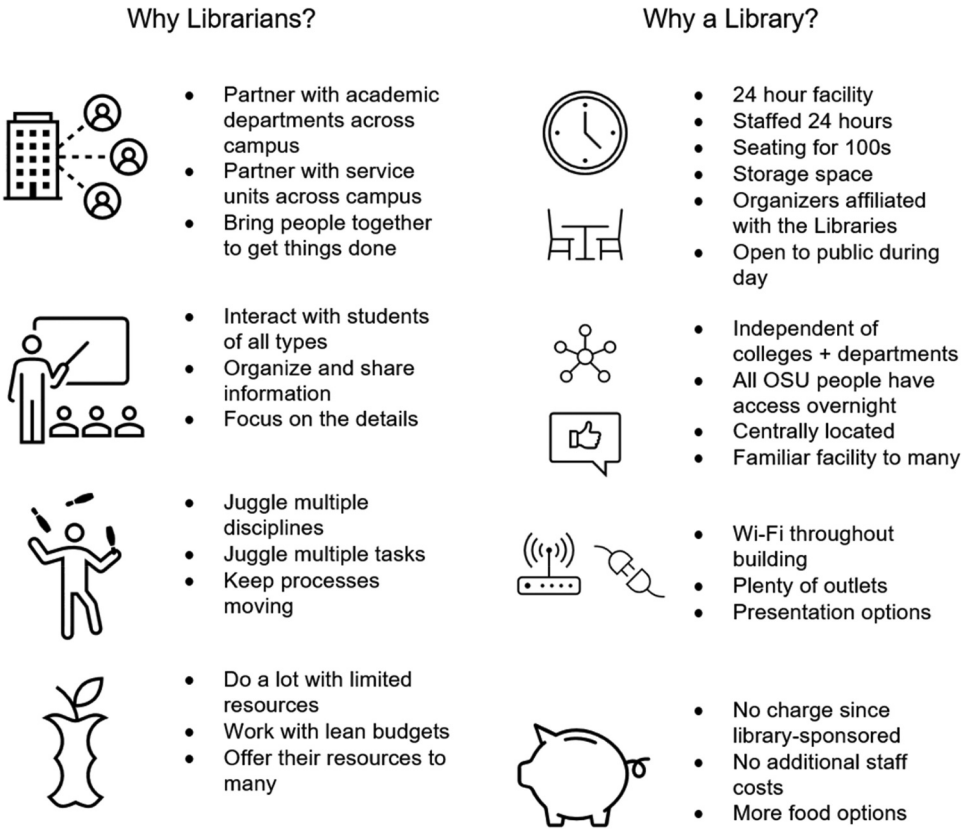

Figure 1. Reasons why both librarians and libraries are aligned with hackathons, datathons, or makeathons.

judges. While there are a number of commonalities to hackathons, the logistics of timing, location, number of participants, partners, and many other aspects can vary by event.

The topic of logistics is a major focus of multiple works. Table 1 indicates coverage of the major topics related to hackathon logistics addressed in these articles, but with some items from the authors' hackathon logistics added in.

This table gives an idea of the level of detail the articles cover on hackathon logistics topics. Time/Length factors were covered heavily in many cases. This points to the variety of lengths in hackathons and the schedule at hackathons. Team elements and dynamics were also discussed to some degree in each work. Perhaps the most interesting factor that was not widely covered were the essential elements of electricity and WiFi access. These are essential elements for such events, and only a few works mentioned them, and barely at that. The authors have noted that at events at their institution, many students bring their own computers, both laptops and desktops, and have requested extension cords, dedicated ethernet hookups, and even spread to other spots within the facilities to ensure faster upload speeds.

Table 1. Hackathon Logistics Covered. Items are scored by how in-depth the issue is covered. Blank is no mention, 1 is fleeting mention, 2 is some details, 3 is extensive details.

Work	Time/ Length	Location & Amenities	Power & WiFi	Food	Team Elements & Dynamics	Judging	Mentors	Total Score
Bogdanov and Isaac-Menard (2016)	2	2	1	2		2		9
Chandrasekaran et al. (2018)	3	1			3		3	10
De Götzen et al. (2020)	2	2	1	1	2	1	1	10
Kitsios and Kamariotou (2019)	2	1	1		3	2	3	12
Huppenkothen et al. (2018)	3	2			2		1	8
McGowan (2016)	1	1		2	2	1		7
Bonilla, Lozano, and Granda (2019)	3	2	1	1	2	2	3	14
McGowan (2019)	3		1		2	1		7
Demeter et al. (2018)	3	3		2	1	1	1	11
Decker, Eiselt, and Voll (2015)	3			3	3		1	10
Page et al. (2016)	3	3			3			9
Komssi et al. (2015)	3		1	1	3			8
Soltani et al. (2014)	3	3	1	1	2	2	3	15
Nandi and Mandernach (2016)	2	3	2	1	3	1	2	14

Topical hackathons

Many hackathons focus on building workable software or hardware, but there are growing examples of topical or domain-specific hackathons. Soltani et al. (2014) directly observed five different 24-hour topical hackathons in Sweden, with topics of eHealth, Open Data, eTourism, eHealth, and Space. Another observation was a three-month hackathon covering issues related to environment, education, culture, health. In examining these hackathons they noted trends related to defining the problem for the topical hackathon, what winners were offered, team members' skills, mentor expertise and communication, judges' expertise, and entry requirements. They noted that characteristics varied widely among the different events.

Hackathons can also be driven by company sponsors and their intended outcomes. Komssi et al. (2015) describes five different hackathons the company F-Secure was either involved in or organized itself. The hackathons each focused on different technology elements. One of the hackathons was actually more focused on software engineering and graphic designers working together, with an eye toward user studies.

Several articles highlighted events. Pyweekend was focused on non-computer science students specifically focused on both gender- and discipline-diversity and inclusion (Bonilla, Granda, and Lozano 2020). McGowan (2019) and Lyndon et al. (2018) described healthcare related hackathons, a growing trend in the field. Other topical hackathons focused on cycling, railway history (Taylor and Clarke 2018), astronomy, neuroscience (Huppenkothen et al. 2018), ecology, and the meat industry (Lodato and DiSalvo 2016).

Another common theme for hackathons is data. Carruthers (2014) described an open data hackathon at public library where the library partnered

with the city's IT department to highlight data from the city and encourage its use. Kitsios and Kamariotou (2019) described six different open data hackathons and examined similar factors used by Soltani et al. (2014) to analyze their quality. Some events have very heavy library connections, such as Smith and Lee (2017) who described how hackathons can help with the open educational resources (OERs) movement. Increasingly special collections materials have been used as themes for hackathons such as at the Coding Da Vinci hackathon (Theise 2017).

One final example of libraries seeking solutions for themselves in a topical hackathon comes from Bogdanov and Isaac-Menard (2016), who describe how Adelphi University Libraries ran a hackathon in order to get potential ideas and apps for library-related needs. The winning idea was a study group app.

By providing themes, hackathons focus users to grapple with a topic and provide creative solutions to specific issues. The advantage to this approach is that it can be easier to recruit participants based on the interest in the topic and create collaborations around those shared interests. They also help the hosting entity recruit judges and mentors, as well as promote specific data for analysis.

Industry involvement

While many hackathons have industry involvement either in the form of judges and mentors or as sponsors, some hackathons are hosted or initiated by companies in the tech industry or even held internally. Many companies in the tech industry use hackathons to recruit interns or employees. They are useful as a way to observe students working in teams and problem solving in real-time, skills that will likely translate into how they would work in a corporate environment.

Pe-Than et al. (2020) examined the corporate 2017 Microsoft OneWeek Hackathon. The researchers conducted pre-hackathon interviews, post-hackathon interviews, and four months later additional interviews of team leads and members. This work examined issues such as team formation, project management, project sustainability, corporate innovation, individual networks (the personal, not technical, kind), career paths, and skills. An interesting component of the observations were how different team types (preexisting versus newly-formed) performed.

Guerrero et al. (2016) described a hackathon for students, but hosted within a company offices. Similar to other industry-sponsored hackathons, teams included a mix of company employees and students. They recruited students based on their involvement in non-university projects. The hackathon focused on the needs of an application related to invasive species. The students and the company all found this hackathon to be a valuable experience.

Page et al. (2016) described a hackathon which involved a university hosting a hackathon sponsored by a single greeting card company, which hoped to

conceptualize new digital products. The authors examined, via student interviews and a graffiti wall feedback, aspects of the work of the teams over the course of the multi-day hackathon. The authors had multiple findings and recommendations related to team dynamics, logistics, facilities, and other issues – going so far as to outline a "curriculum" for holding a hackathon. As a final note, they found the company involved to be satisfied with the outcome of the event.

Finally, Frey and Luks (2016) offered what might be an advocacy paper for the value of company-internal hackathons. They proposed they can have value to non-tech areas of companies, like HR, sales and marketing, and finance. They also suggested that companies may want to invite key people from both inside and outside of the company to participate. They end their paper with examples of competitive corporate hackathons that illustrated such value.

The participants

A number of authors have examined the impact on or viewpoints of the participants in hackathons. Some articles focused on logistics of the spaces (Richard et al. 2015) or other event specific topics like food (Nandi and Mandernach 2016), while others examined feelings participants had about the events themselves (Maaravi 2020). By learning from previous studies of participant feedback, planners could replicate successes and avoid pitfalls when hosting their own events.

In terms of the progression of students as they move through the hackathon (in this case, five-day event), Chandrasekaran et al. (2018) used anecdotal evidence and surveys of participants to divide the progression of students through the stages of the event, going from Peak of Youthful ignorance, moving downward to the Pit of Despair, then slowly going to the Slope of Hope, finally ending with the Plateau of Enlightenment. They also referred to the likelihood of the final code being better than anticipated as the Residual of chance. This information has potential implications for keeping students motivated and working with struggling students through the middle portion of a hackathon (as they head down toward the Pit of Despair) in order to keep them working and addressing what is getting them to this stage.

Warner and Guo (2017) conducted an in-depth study of six hackathon attendees. They found hackathon attendance was driven by social components and peer-learning was key. Students thought the hackathon was closer to simulating a work environment rather than a classroom experience. They conducted a larger survey of those who have never attended a hackathon and respondents indicated major reasons included novice fears, lack of time, and lack of an idea or team. This study detailed additional feedback from attendees related to discomfort, food quality, sleep, and other considerations. The article provided many suggestions when planning a hackathon –

including pre-work that can address building teams, forming ideas, and addressing novice fears.

Sadovykh, Beketova, and Khazeev (2020) conducted a survey of hackathon participants and found some issues with team dynamics (some reported team members no contributing to the work) and mentor contributions (several disagreed or strongly disagreed that the mentor provided valuable contribution). Gama, Gonçalves, and Alessio (2018) similarly had participants reporting learning more from team members and peers than instructors and mentors. Nandi and Mandernach (2016) summarized post-event surveys from two events and highlighted student feedback about the value of peer-to-peer learning, direct application of skills from courses, and the benefits to having skilled mentors present. Lyndon et al. (2018) examined participant feedback and found major themes around collaboration, transferable knowledge and skills, and expectations about hackathons. In this case, students expected to do more coding and did not expect planning and design to be major components of a hackathon. Creating shared expectations of the participants, mentors and judges are a key component that can be addressed with specialized events leading up to the hackathon.

Kos (2019) focused on female participation in hackathons and provided recommendations for inclusion of different collaborative styles and goals that included no team size restrictions (including allowing for no team), noncompetitive goals, fun events not related to hackathon goals/content, allowing for easy goal or group switching, and holding workshops throughout the hackathon. These recommendations pointed to the typical hackathon design, as being heavily focused on competition instead of learning, and requirements around team formation as part of the registration process, all of which may lead to a decrease in female participation.

Curriculum

One final theme present in the literature was the connection of hackathons to the curriculum. Many colleges or universities hold hackathons as a co-curricular endeavor to augment topics covered in coursework. The events also exposed students from a variety of majors to elements and skills related to technology.

Gama, Gonçalves, and Alessio (2018) detailed a hackathon that was the final project for an undergraduate Internet of Things course, with students aware of this component prior to joining the course. After the 24-hour hackathon, six random students were interviewed from different groups. Some notable findings from the interviews included that some participants had previous experience with hackathons; students found that classes with practical application were fundamental to their success with the hackathon; most students learned something either alone or from group members during the hackathon.

Strikingly, most students did not report that they learned from other groups, the teacher, or a mentor. Overall, all students reported liking the hackathon as a learning instrument within a course and felt it should be replicated in other courses.

In Sadovykh, Beketova, and Khazeev (2020) report of a Management of Software Development course, the hackathon focused on building soft skills such as customer communications, customer benefits, and faculty-industry communications. As part of the study, they interviewed participants (students, customers, and mentors/faculty) following the hackathon and four aspects were reported by more than half of the surveyed: new knowledge (96.4%), practical experience (89.3%), new industry contacts (57.1%), and business insight into domains insight (57.1%). This shows that the experience for many was not all focused on the tech skills.

Finally, Bonilla, Granda, and Lozano (2020) examined how hackathon affected student motivation and grades in their CS1 course. Examining both participating and nonparticipating students, the authors found that participants showed higher levels of motivation. However, their grades were not statistically different after the hackathon. The authors suggested it is possible that the students selected were already getting good grades, so grades did not have much room to change.

In this way, hackathons as part of a curricular approach enhanced the learning experience through improvement to both tech and non-tech knowledge and skills. Students benefited from working with industry partners. While it is unclear whether student performance as measured by grades increased as a result of participation, motivation to engage with the material did. It would be interesting to see a longitudinal study on the impact of grade performance on hackathon participants.

Case study

Given that the literature presents a wide variety of approaches to hackathon events, we will cover how a library started supporting student learning through a hackathon and how that has led to other points of engagement for the libraries. Ohio State is a large research university in the urban setting of Columbus, OH. The institution has many libraries across campus and uses a liaison approach for teaching and research support related to library engagement. One librarian is the liaison to the Computer Science Department. Another met a computer science faculty member at a new faculty orientation and stayed in touch through the STEAM Factory, an interdisciplinary group of faculty and post-doctoral students (https://steamfactory.osu.edu). When the computer science faculty member mentioned a student was interested in throwing a hackathon, the librarian said, why not have it at the libraries?

One major reason for the appeal of the central campus location was to recruit hackathon participants from across the university, not just the computer science department or the College of Engineering. The libraries are a central resource for all students. They serve as physical and communication hubs for campus. As students from all disciplines and colleges already use the library spaces, they are an ideal location for fostering collaborations from different majors, a good prospect for a tech event.

To consider why a library would host a hackathon, one must first consider the spaces available on a large campus. Despite its many facilities, most campus buildings are closed overnight, with exceptions for those with special access to that facility. Other than the hospital, the big exception to this was the 18th Avenue Library. This facility is a 24-hour library, with overnight access limited to students and employees, with five floors, ample seating, and an abundance of wifi spots and electrical outlets, this seemed like an ideal location for a technology-focused, overnight event.

In 2013, the first hackathon (a 25-hour event, complete with a power hour due to daylight savings time) had 85 participants and easily fit in the basement of the library in three separate rooms and an open space. This year, there were two library faculty and a handful of staff members involved in planning meetings for the months leading up to the event. Library staff members recruited judges, staffed the registration desk, answered questions leading up to the event, dealt with storage and space logistics, created print and digital advertisements to recruit participants, coordinated food deliveries, supplied snacks and supplies, facilitated the pitch presentation technology and wrote up an after-event summary (Nandi and Mandernach, 2013). The libraries highlighted the winning team projects through the digital flat-panels throughout several library locations.

This first year required a lot of logistical support as everyone was learning about hosting an event. Most facilities staff, library administration, library staff as well as participants had never experienced this type of event. Historically, companies would host small hackathon events to work on their technology, either on campus or at their own businesses and bring students in, but there was not a campus-wide hackathon with an open theme. Care was taken by the planners to encourage creativity and a theme was not provided, but an idea booklet was available if teams were stuck. They only other rule was on team size, 2–4 participants, to ensure there were no lone wolves and no mega-teams. Students made a wide variety of outputs. Library IT and computer science faculty served as judges. Judges scored projects based on creativity, technical depth, challenge of the work, and usefulness in the real world. Additionally, they chose two projects for the best demonstration. The winners, who received prizes from the sponsors, included a music app that could borrow music from multiple phones, and emergency app that used small robots to demark the area, and a transportation map with geolocations. All present for judging could vote for the crowd favorite as well.

Event planners surveyed participants after the hackathon to learn what went well and what improvements could be made in the future. While overwhelmingly positive, students had suggestions for a wider variety of food options (since the first year was mostly donuts, candy, pizza, coffee, and soda), clarity around the judging process, and more time to code.

The second year (a 36-hour hackathon) saw growth to 203 participants, with two floors- the basement and the third floor were reserved for the event. Due to the event's growth, judging was conducted through small pitches to two judges instead of in a single room. The top ten teams then demonstrated their products through a showcase event later in the afternoon held across campus in the student union. Hackathon planners wanted to ensure the event was still free for participants, so the faculty directors recruited additional sponsors to help defray food costs and purchase prizes.

In this year, the library staff members coordinated the weekly planning meetings that were held in the library for the months leading up to the event, stored prizes and items for the giveaway swag bags prior to the event, coordinated logistics, recruited judges, and streamlined processes from the previous year. The staff worked closely with the newly formed student logistics team to plan for the space needs and connectivity of technology so that the participants on the various floors would be alerted to food deliveries and other event related activities. The library hosted the SWAG bag packing parting the day before the event and stored the bags until they were distributed to attendees. Planners learned from the previous year that participants brought a lot of components (monitors, iPads, keyboards, etc.) to use during the event and therefore more space was allocated to each team.

Library staff volunteered for shifts to make sure that a core planning team member was present throughout the event. Food storage became a major component, with bottomless coffee and snacks provided throughout the event. Following the event students were surveyed about the event and recommended improvements (Nandi and Mandernach, 2016).

There were many lessons learned through this year as well. Student planners were very intentional at planning how participants would want to engage, how to make the judging a fairer process, and had strong opinions about food choices. Participant post-survey results indicated that there was a disconnect between the two floors, timing for food was not clearly communicated, and many were frustrated to have to move to the showcase venue. The switch to a 36-hour event did not enhance products, it exhausted both the participants and the planners, and the switch of locations added to the complexity of the event. In future years, the event switched back to 24 hours of coding and several hours for judging and presentations. The logistics were managed from a Google Sheets with a list of to-do's leading up to the event. With additional people involved in planning, having a shared resource was essential to keep the group on track.

While the first two events were manageable, trying to grow the size of events meant taking over more and more of the facility, which was not sustainable for the libraries. By outgrowing the space in the libraries, another campus locale was needed. Going to another library would not work as there was only one other library location that could accommodate more people in a single location. To provide security and staffing for times the library was not typically open would have been cost prohibitive in other library locations. After considering multiple spaces for potential hackathon space, the student union was recognized as a potential venue. It specializes in hosting events and its ballroom could seat hundreds of people, with other spaces able to hold overflow. The biggest change for them would be to adapt to a 24-hour event. See Figure 2 for a visual comparison of the two spaces.

Though the libraries no longer served as host for the hackathon after 2014, several library faculty and staff remained involved in a variety of capacities. By 2015, the success of the fall hackathons was evident and hardware aficionados wanted an event focused on their area, thus the first MakeOHI/O, a makeathon, with nearly 100 attendees was held in the spring. With two strong events, the program of OHI/O (https://hack.osu.edu/about.html) was born.

The mission of the OHI/O (a play on input/output, as well as a local chant of "O-H!", "I-O!" for the university and in particular its sports teams) program for informal learning focuses on fostering a tech culture at Ohio State University and its surrounding communities, ultimately providing students the opportunity to learn and build with real technologies outside of the classroom. Through the platform, OHI/O better connects students to real world problems and opportunities by engaging with the community and industry partners. The OHI/O program has grown from the single event to a robust

Figure 2. Space comparisons of the library basement and the student union (Pictures taken by authors).

program supporting informal learning as seen in Figure 3. The hackathon continued to grow after it left the libraries space as seen in Figure 4.

The libraries continues to be an important partner to the entire OHI/O program with both spaces and people. The libraries reserves spaces and hosts select lower-volume events in library spaces as well as several hype events leading up to the larger events. For the first couple of years after the hackathon moved out of the libraries, there was not a designated space for the planners and the libraries volunteered to serve as a holding space for swag bags and vendor giveaways for the weeks leading up to the hackathon. There were even a couple of swag bag stuffing parties in the basement of the library before those moved over to the student union as well. The libraries, both through subject librarians and other library communication channels, promotes events and highlights winners.

Logo	Event	Topic	Audience
Regular Events			
HACK OHI/O	HackOHI/O 2013	Code	College/University students
MAKE OHI/O	MakeOHI/O 2015	Electro-mechanical Objects	College/University students
	ShowOHI/O 2017	Celebrating Success	Winners from the academic year's events.
HIGH SCHOOL I/O	High School I/O 2017	Code	High school students
DATA I/O	Data I/O 2018	Data use/analysis	College/University students
code i/o	Code I/O 2019	Code	Students 10-15 years old
HACK AI	Hack AI 2019	Artificial Intelligence	College/University students
CAPTURE THE FLAG	Capture the Flag 2019	Cybersecurity	College/University students
BIO HACK	BioHack 2019	Biomedical projects	College/University students

Logo	Event	Topic	Audience
Irregular / One-Off Events			
	RoboI/O 2019	Robotics	Middle/Junior High School Students
Hack the Hack	Hack the Hack 2018	OHI/O program logistics	OHI/O Student Organizers
LOGI OHI/O	LOGI OHI/O 2018	Finance and logistics	College/University students
HOUR OF CODE	Hour of Code 2018	STEM Principles	Families

OHI/O
OHIO STATE'S HACKATHON PROGRAM

Figure 3. OHI/O program list of events, the year of their inception, subject area of focus, and intended participants.

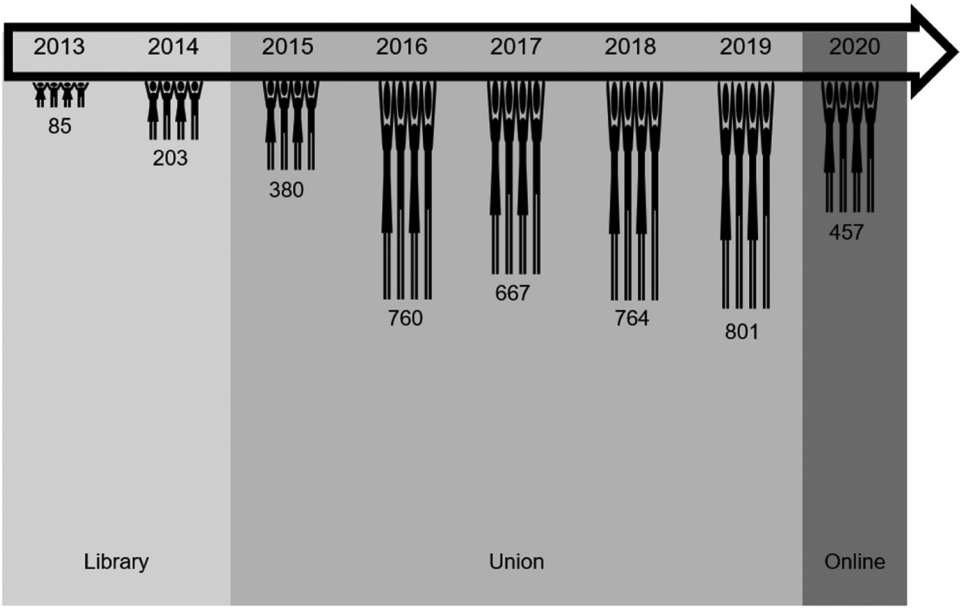

Figure 4. Participation numbers for the OHI/O hackathon (HackOHI/O) and locations where the event was held from 2013–2020.

Several library staff have remained involved as judges for the annual hackathon event and the Dean of Libraries is a distinguished VIP who delivers one of the prizes to a top finishing team. In other cases, library staff are technical experts for specific events such as the DataI/O, which started in 2018, a data visualization challenge that happens annually in the fall. For this event, the data visualization specialist teaches several educational workshops during the event and is available as a mentor to teams. The libraries also provides historical knowledge related to logistical support for planning events both big and small and aids in mentoring student organizers and leaders. Finally, the libraries has two spots on the faculty and staff advisory group of the OHI/O program. In these ways, the library can support the growth of the program with very little effort.

Additionally, connections made through the hackathon program have led to several referrals for library support. One of the authors of this article serves as a subject librarian liaison to the Department of Computer Science and has been involved in the OHI/O program since its first hackathon. This program enabled the librarian to work more closely with faculty in this department, meet student participants, but perhaps most fulfilling was close work with multiple student organizers. Working with, advising, and assisting student organizers in the work needed to put on such a large event has allowed him to interact with students performing work and showcasing skills that are not typically seen in a class setting.

This librarian compiled a list of books as part of the Cybersecurity Canon to support the newly created Institute for Cybersecurity & Digital Trust. He

leveraged his expertise with LibGuides to create resources for a career guide as well. He joined the OHI/O faculty advisory committee in 2019 and served on the hiring committee for the program coordinator in 2020. During those interactions there was discussion about plans for a makerspace on campus and he was able to connect both a faculty member from the department of Electrical and Computer Engineering and OHI/O's program director to library contacts he had at other schools who provided similar services. They were able to share details related to planning the space and standing up services. In this way, the relationship that started during the hackathon continues to grow and evolve to deeper engagement with both the computer science and the electrical and computer engineering departments.

Another librarian serves as the co-faculty director for the OHI/O program which involves bi-weekly meetings with the OHI/O staff and the other faculty director to develop strategic directions for the program. She often shares insights from a different departmental perspective, leverages connections across the libraries and campus partners, and highlights potential resources-space, people or campus networks. One example that grew out of the hackathon related to the College of Nursing's pop-up maker space, the Innovation Studio, that travels to various buildings around campus. After initially finding out about the service at a hackathon event, the librarian proposed to library administrators that the maker space have a residency in both of the main libraries for seven weeks each. The maker space reported that these were the two busiest residencies the space had observed and deemed the collaboration so successful that they requested a repeat of the residency the following year. Several of the ideas developed during the residency led to future makeathon projects. This partnership would not have developed as quickly if not for the OHI/O program. In this way by pairing librarian's natural affinity for connection-building with campus-wide programs, both the OHI/O program and the libraries reap rewards.

For the libraries, the continued involvement in the OHI/O program provides benefits of awareness of events elsewhere on campus, new areas of innovation support that are developing on campus, and finding ways to bring other technology-focused areas in partnership with the libraries. This has allowed the libraries to join conversations earlier in their development and collaborate on projects that support innovation and creativity for both research and teaching.

A particular strength of libraries and librarians is their experience with working with departments and units across campus. This experience provided the OHI/O program with ideas for campus partnerships, advertising venues that increased visibility of events, sources for judges and mentors, and most importantly options for growth in the types of students who participate. The goal of trying to get non-engineering student involvement meant reaching out to units that engineering disciplines were not used to working with – but

libraries and librarians can help make such connections. Involvement of more non-engineering students and employees in the planning process increased as the OHI/O program grew. Participants outside computer-related programs has increased (Figure 5.) Non-STEM disciplines (social sciences, humanities, and arts) remain low participants, but participation grew from earlier events (Appendix A).

Overall, the authors recognize that this level of involvement in a similar program on other college campuses may be more than most libraries may want. However, at Ohio State, the librarians are tenure-track faculty members and therefore need both service and scholarship as part of the promotion process. The work involved with the OHI/O program is counted as campus-level service and both librarians have leveraged the work with the program into portions of their research agendas (Nandi & Mandernach, 2016, Dotson, 2019, Armstrong & Longmeier, 2020) with presentations at ACM Conference on Computer-Supported Cooperative Work and Social Computing, ACM Technical Symposium on Computing Science Education, Earth Educators' Rendezvous, and the Special Libraries Association Annual Conference.

Benefits to libraries and librarians

In addition to the reasons mentioned above, some of the drivers for library involvement in the OHI/O program at Ohio State included allowing students and judges to think of the libraries as more than books. While libraries support many areas of a student's educational experience, reframing how individuals perceive the library and its services is important. Additionally, we were able to leverage connections that were already in place through the subject librarians and other library teams, such as the libraries' communications department. In the libraries, we had a greater understanding of how large organizations function and how to identify the people needed to move a process forward. Being able to conduct an environmental scan and understand components of a multi-faceted network are tasks liaison librarians frequently perform when

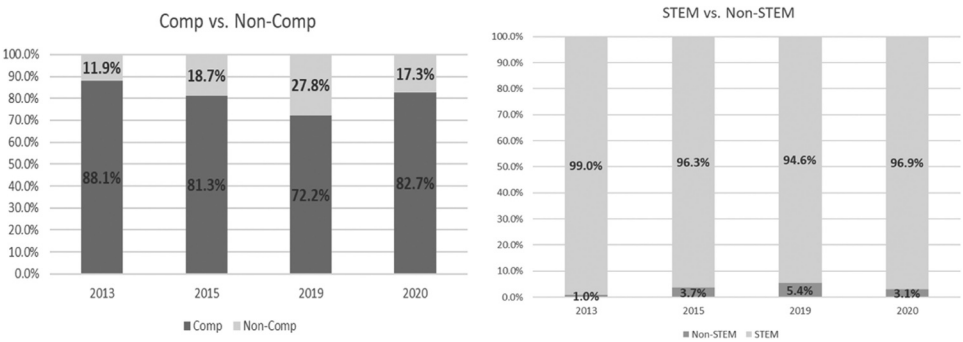

Figure 5. Participation by academic major and year of event.

developing new services or providing support to their constituents. Thinking of these skill sets as marketable tools that librarians can bring to a partnership added value to the conversations, even if the librarians initially did not recognize they possessed these traits. As it turned out, the librarians involved were experts at logistics and could anticipate common issues that might arise with the spaces, food deliveries, and student experiences. All of these skills were incredibly useful contributions for the overall success of the early events.

Libraries provide an ideal location, but more importantly they have a wealth of expertise that can be leveraged. Library staff have served as judges, mentors, and connectors to the wider campus community. Libraries already serve as a cross-disciplinary event space, host many other outreach events, and are often connected to other campus communication outlets. Libraries have varied spaces for presentations, workshops, and other smaller events that build excitement for a main event. Libraries have generous food policies, often provide 24-hour access to spaces, and both wifi and hardwired connections for events. Libraries often employ developers, have more control over their vendor systems, and house collections that can be viewed as data. Therefore, library staff could propose potential projects students could work on during a hackathon using spaces, services, or collections. Events can be an excellent recruiting tool for student developers interested in library work.

For others considering hosting similar events, check out these guides for planning a hackathon, coding contest or other events leading up to a hackathon especially related to the various details (Bogdanov and Isaac-Menard 2016; Nelson and Kashyap 2014; Nolte et al. 2020) Even if your library does not have capacity to host a full event, you can use libraries to highlight winners, advertise the importance of data literacy or information fluency at a pre-event workshop, or try a smaller event such as a Wikipedia edit-a-thon.

Benefits to hackathon partners (students or organizations like OHI/O)

Organizations or groups of student leaders interested in planning and facilitating these hackathon events will benefit from a relationship with their library. In addition to facilities and physical space, and broad reach for advertising to a diverse audience of participants, libraries also have a network of faculty and staff who are prime recruits for the hackathon judges, organizers and mentors.

Libraries are well networked in the university, offering better access to funding possibilities (whether internal or external) and playing matchmaker for mutually beneficial partnerships across campus. These relationships may be for the purposes of research, fundraising, course development, student engagement or meeting other goals. Similarly, by bringing different disciplines

together, various perspectives are shared aiding growth and development of the hackathon program and its participants.

For OHI/O in particular, because the libraries had such a long history of engagement with the program, employees of the libraries helped to lead the way in formalizing a staff position for the program as it grew, including writing the job description, interviewing candidates and onboarding the new hire. In addition to supporting the Program Director, the library employees also mentor teams of student organizers. Student organizers develop and experience real-life higher-level organization, marketing, communication and fundraising skills from their mentors.

Our hackathon in the news

Given the growth in the OHI/O in terms of both the number of participants, but also the number of programs, the program has been discussed in multiple venues. Local news sources such as the local NBC station, the Columbus Dispatch and the Columbus Underground, national outlets like Digital Engineering 247 (https://www.digitalengineering247.com/article/next-gen-student-competition-profile-hackohi-o), as well as campus news outlets such as The Lantern and the College of Engineering. Adequate and ongoing media coverage are important factors in getting a quality hackathon program to grow. With news sources, mentors, judges, and potentially sponsors will get exposed to the event.

Future research and conclusion

The hackathon movement has great benefits to universities. Libraries hold a key position on campus that can enable such programs begin, grow, and flourish on campus. The expertise and spaces are great starting points and can allow for the growth of programs through expertise and the spaces available. Ohio State's program grew from a single event with about a hundred people involved in library basement to hundreds of participants, organizers, judges, industry partners, and mentors across several programs. The experience of the OHI/O program may seem daunting, but it grew due to the hard work and enthusiasm of these groups and individuals.

Harkening back to some of the literature review findings and local desires, some areas we wish to consider for future grown and research could include topics of efforts to increase non-computer and non-STEM participants; investigating the role of these events on student success in future courses or careers; examination of COVID-19 implications on the program and evolution of events. We also note that future research by other schools could involve comparisons of events, the potential to specialize events by topics or programs, and share best practices for running events.

There is little doubt that the OHI/O program will continue to be strong due to its success with leveraging partnerships on and off campus and its popularity with tech-interested students across campus. We look forward to seeing how it will grow and develop over the next several years.

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Appendix A: Majors and Comp/STEM Status

Table A1: Major and Comp/STEM Designation.

Major	Comp?	STEM?
Accounting	Non-Comp	Non-STEM
Art	Non-Comp	Non-STEM
Arts and Sciences, Undecided	Non-Comp	Non-STEM
Associate of Arts	Non-Comp	Non-STEM
Business Administration	Non-Comp	Non-STEM
Communication	Non-Comp	Non-STEM
Comparative Studies	Non-Comp	Non-STEM
Criminology	Non-Comp	Non-STEM
Criminology and Criminal Justice Studies	Non-Comp	Non-STEM
Dance	Non-Comp	Non-STEM
Economics	Non-Comp	Non-STEM
Education – Middle Childhood Education	Non-Comp	Non-STEM
Exploration	Non-Comp	Non-STEM
Exploration, Undecided	Non-Comp	Non-STEM
Fashion and Retail Studies	Non-Comp	Non-STEM
Finance	Non-Comp	Non-STEM
History and Political Science	Non-Comp	Non-STEM
Law	Non-Comp	Non-STEM
Linguistics	Non-Comp	Non-STEM
Logistics Management	Non-Comp	Non-STEM
Marketing	Non-Comp	Non-STEM
New Media and Communication Technology	Non-Comp	Non-STEM
Operations Management	Non-Comp	Non-STEM
Philosophy, Political Science, and Economics	Non-Comp	Non-STEM
Political Science	Non-Comp	Non-STEM
Psychology	Non-Comp	Non-STEM
Public Policy Analysis	Non-Comp	Non-STEM
Sociology	Non-Comp	Non-STEM
Visual Communication Design	Non-Comp	Non-STEM
CIS and Linguistics	Comp	STEM
Computer & Information Science	Comp	STEM
Computer and Information Science & Linguistics	Comp	STEM
Computer Engineering	Comp	STEM
Computer Science	Comp	STEM
Computer Science & Engineering	Comp	STEM
Computer Science and Engineering & Physics	Comp	STEM
Computer Science and Engineering + Mathematics	Comp	STEM
Computer Science and Engineering and Data Analytics	Comp	STEM
Data Analytics	Comp	STEM
Digital Sciences	Comp	STEM
Electrical and Computer Engineering	Comp	STEM
Electrical Engineering Technology	Comp	STEM
Finance and Data Analytics	Comp	STEM
Finance and Management Information Systems	Comp	STEM
Information Systems	Comp	STEM
Linguistics + Computer Science	Comp	STEM
Management Information Systems	Comp	STEM
Web Development	Comp	STEM
Wide Area Networking	Comp	STEM
Actuarial Science	Non-Comp	STEM
Aero and Astronautical Eng	Non-Comp	STEM
Agribusiness	Non-Comp	STEM
Astronomy and Astrophysics	Non-Comp	STEM
Biochemistry	Non-Comp	STEM
Biology	Non-Comp	STEM
Biomedical Engineering	Non-Comp	STEM
Biomedical Science	Non-Comp	STEM
Chemical Engineering	Non-Comp	STEM

(*Continued*)

Table A1: (Continued).

Major	Comp?	STEM?
Chemistry	Non-Comp	STEM
City and Regional Planning	Non-Comp	STEM
Civil Engineering	Non-Comp	STEM
Earth Sciences	Non-Comp	STEM
Engineering	Non-Comp	STEM
Engineering Education	Non-Comp	STEM
Engineering Physics	Non-Comp	STEM
Engineering Technology	Non-Comp	STEM
Engineering, Undeclared	Non-Comp	STEM
Environmental Engineering	Non-Comp	STEM
Food, Agricultural and Biological Engineering	Non-Comp	STEM
Forestry, Fisheries and Wildlife	Non-Comp	STEM
Geographic Information Science	Non-Comp	STEM
Geography	Non-Comp	STEM
Horticulture and Crop Science	Non-Comp	STEM
Industrial and Systems Engineering	Non-Comp	STEM
Industrial Design	Non-Comp	STEM
Materials Science and Engineering	Non-Comp	STEM
Mathematics	Non-Comp	STEM
Mechanical Engineering	Non-Comp	STEM
Microbiology	Non-Comp	STEM
Molecular Genetics	Non-Comp	STEM
Neuroscience	Non-Comp	STEM
Nuclear Engineering	Non-Comp	STEM
Nursing	Non-Comp	STEM
Pharmaceutical Sciences	Non-Comp	STEM
Physics	Non-Comp	STEM
Science & Technology Exploration	Non-Comp	STEM
Science, Technology and Environment Exploration	Non-Comp	STEM
Social Sciences Air Transportation	Non-Comp	STEM
Spatial Analysis	Non-Comp	STEM
Statistics	Non-Comp	STEM
Stone Lab program	Non-Comp	STEM
Veterinary Medicine	Non-Comp	STEM
Welding Engineering	Non-Comp	STEM