Organizing and Embedding a Library Hackfest Into a 1st Year Course

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Introduction

What do libraries represent and do hackers belong in libraries? The Steacie Science and Engineering Library, York University hosted its second annual *Steacie Library Dungeon Hackfest*, February 19-20, 2014 (http://www.library.yorku.ca/steaciehackfest) to continue to discover the role that libraries have in hosting hackfests. Hackfests are marathon events that bring computer programmers together with other researchers to build apps, widgets, websites, or other software projects. Also known as hackathons, codefests, or codeathons, hackfests are increasing in popularity across major computer science and engineering schools in which the departments hosts the event. Recently, the trend of hackers *in* the library is becoming more prevalent, as observed at *Computers in Libraries* annual conference (http://www.infotoday.com/cil2014/). This year, the Steacie Library with the Computer Science department decided to embed the Steacie Hackfest into a first year computer science course in which students received a grade for participating.

Can embedding a library hackfest into a first year computer science course be an effective method to provide information literacy instruction and advocate open access? The paper believes that a library hosted hackfest can encourage critical information literacy through: narrative learning using library collections (Bruner 2002), creating a hackfest agenda that fosters critical making, supporting open source platforms for posting achievements and code (Muir 2005), and providing "break-out" critical learning sessions. The *Steacie Library Dungeon Hackfest* provided the science librarian the opportunity for information literacy by assisting students with coding tools, forming a research idea, developing a business pitch, and publishing source code in an open access platform.

First, the paper will discuss "why host hackfests in libraries?" Second, it will describe the outcome of embedding the Hackfest into a first year computer science course. Last are the steps necessary to organize a hackfest in an academic library, along with tips on hosting a hackfest that embodies critical making. Library hackfests, as a type of makerspace, are stimulating, interactive, and a space for building lifelong skills. The paper hopes to inspire other librarians to organize similar events that support student research and collaboration.

Why Hackfests in Library?

The Hackfest helps to maintain the library as a place of learning. Furthermore, a library hackfest becomes a part of the research landscape. The library provides a constructive space for innovation. It establishes the library as a collaborative environment as people work in groups alongside students, faculty, and librarians from various disciplines to conquer problems whether as small as day to day functioning or major problems facing humanity. It is common for universities with computer programming departments to host hackfests (Yerion and Rinehart 1995; Giannikas 2011; Goldberg 2013), such as MHacks (www.mhacks.org) at the University of Michigan that attracts participants from across the United States. Hackfests are ordinary activities in Silicon Valley where innovation and entrepreneurship is significant (Leckart 2012). Both Google and Facebook host internal hackathons to help spur new ideas and solve malfunctions. Furthermore, we have seen the rise of Start-up Weekends and recently, Toronto, Ontario hosted a successful Start-up Weekend Library edition in the Mozilla offices. If hackfests are already occurring at these various locations, why should library host hackfests?

It is less important for libraries to be part of the trend, and instead to seek to understand how library hackfests can be different and should be. When we examine the history of libraries, libraries were built on the foundation of democratizing knowledge, giving everyday people, regardless of race and social class, the ability to expand and build on their personal experience through knowledge. Libraries allow people to learn about the issues that are important to them, make informed decisions about politicians, the environment, technology, and any issue that impacts society. Benjamin Franklin (1995) summarizes that "libraries have improved the general conversation of the Americans, made the common tradesmen and farmers as intelligent as most gentlemen from other countries, and perhaps have contributed in some degree to the stand so generally made throughout the colonies on defense of their privileges" (Franklin 1995, 70). It is important to maintain the foundational principles of libraries as the driving force to building hackathons in libraries that consider critical thinking, critical making, and critical information literacy.

Critical Making and Critical Information Literacy

The paper believes that hosting hackathons in libraries is not just about digital literacies but critical making and critical information literacy. The essence of a library hackfest should foster critical thinking through critical making. Critical thinking evokes the library paradigm. Interesting enough, critical making brings together the theoretical aspects of critical thinking and the practical skills of physically "making things" (Ratto 2011). Moreover, critical making is similar to critical design, critical technical practice and reflective practice (Agre 1997; Dunne 2005). At the same time, it is different, in the sense that it focuses on the shared process of making. Finishing a final prototype is not important. Instead what is imperative is the exercise of participatory collaboration, critically analyzing materials, designs, constraints, and outcomes and relating it back to theoretical issues.

Critical making and 'making things' is an explicit practice of furthering critical knowledge through the practice of making things and material production. Why is critical

knowledge relevant? Critical knowledge helps people make informed decisions and tackle issues facing humanity through an analytical lens similar to the goals of libraries providing equal and free access to various sources of knowledge. Libraries are spaces available to patrons to help engage citizens with tackling problems and building knowledge on various social issues. Even more, critical knowledge is at the forefront of libraries, and is an important facet of research. It is here, in the library, that critical making and critical knowledge is significant to the social study of computing technologies. Producing a book display that utilizes the library collection helps to make the connection between the social study of computing technologies and making things. The process of making things in a library hackfest can engage participants with critical knowledge through books. Using a book display is part of narrative based learning (Bruner 2002) that can be used in the interaction of producing technologies.

Ratto (2011) argues that there are two ways of looking at technology: deterministic and material understanding of our relationship to technology. Often we interact with the Internet or technologies without thinking about discourse. However, by engaging with technology in these critical making spaces, such as hackathons and makerspaces, we can critically reflect on our lived experience in 'making things' to help us shape our understanding of technologies to one that is social and critical in our daily lives.

In addition, there are three aspects to the experience of 'making things' (Papert 1998). The first is the emotional aspect of learning, the personal feelings involved with the experience of understanding the problem or technology and its relation to everyday experiences. Second, is described as prototyping so that one can project an idea. The third is "messing about" with computers helps to illuminate the common rigid feeling we have with computers to one that is exploratory and develops a new connection with technology (Hawkins 1965). Messing around, and tinkering are sentiments seen in Steven Levy's (2010) history of hackers that evolved with his *Homebrew Computer Club.* The hackers were excited with the prospect of "messing around", "making things" and tinkering to discover new ways of building code and technology that were based on the Free and Open Source Software (FOSS) discourse (Levy 2010; Söderberg 2008). Overall, this is complimentary to the idea of lifelong learning, building knowledge, and critical reflection in libraries that is necessary to critically engage with technology.

Following, in a library, there are three stages to critical making (Ratto 2011): First, is the interaction with collection and relevant literature to gather theory and concepts useful to design; second, is with other participants, together design and build projects; and last, reflect through conversation, the process of collaborative design and critically engage with theory. Similarly, in the Steacie Library Hackfest, the three steps of critical making were included through: 1. Collection display (Figure 1), specifically of books on the topic of open access, handbooks, and leisure fiction on the surveillance culture; 2. In groups, participants formed concepts and worked on apps; and 3. In the final presentation component, students reflected on the process of 'making things', discussed app ideas, reflected on the societal impact, and last, mentors provided feedback and conversational points to help groups further reflect on projects and apps. Also, the Hackfest theme about living in a mobile world links to the experience of making things. Observations made during the Hackfest indicated that participants connected to the personal experiences and feelings expressed through their relation to technology, in particular mobile phones. Through 'messing around', participants built app ideas based on their experience. The breakout sessions,

peer to peer learning, and mentorship provided throughout the Hackfest helped to foster the aspect and stages of critical making and critical information literacy in the sciences. To summarize, there is a connection to critical thinking and innovation that is produced through critical making events.

The Hackfest and 1st Year Computer Science Course

After the first Hackfest, during reflection, it was realized that the hackfest provides a unique opportunity to embed open access and engaged learning services of academic libraries with course curriculum. An email was sent to the Lassonde School of Engineering in April 2013, inviting instructors to include the Hackfest in their upcoming course curriculum, as an experiential education potential for students. In particular, the emailed targeted instructors who would be teaching mobile application courses and first year computer science courses. A first year computer science course instructor responded and was interested in using the Hackfest as an engaged learning assignment for first year students.

The first year computer science course, *CSE1001 Research Directions in Computer Science*, is currently structured so that each week, students have a guest lecturer. Each lecture has an associated evaluation that may use a quiz or assignment, and is based on the material taught in the lecture. The class is graded as a Pass or Fail and no letter grade is provided. Students are to complete at least eight assignments and/or quizzes, along with a final paper, in order to receive a Pass grade. The library is already part of the lecture series. The library provides two lectures: the first is an information literacy instruction lecture; the second is an open access and scholarly communication in the sciences lecture. Now, the library Hackfest is included as an optional assignment for a mark that contributes to the final grade in the course.

The requirements for *CSE1001* students along with other logistics had to be organized in collaboration with the faculty instructor. The course enrollment was 276 students however, the Hackfest planned to accommodate 25 students from the course, so to ensure space for a general call for participants. Registration occurred in December 2013; the registration form asked "Are you in CSE1001?" Following was the description, "Ensure you get your class participation credit by attending both days and being part of final presentations. Only the first 25 CSE1001 students registered will be eligible for class participation credit." Sixty students from the course registered for the Hackfest. It was necessary for students to participate in both Hackfest days and in the final presentations in order to receive a Pass grade. The Pass criteria were made clear in the registration form and in following emails that confirmed attendance to the Hackfest.

It is evident that students are interested in partaking in a hackfest. Students seek opportunities for engaged learning versus traditional lecture hall style teaching. Student interest in the Hackfest reiterates that engaged learners are better learners (McCormick, Kinzie, Gonyea, 2013). The model of the Hackfest is based in the education pedagogy of collaborative learning and engaged learners. Furthermore, the hackfest is an excellent first-year experience initiative to ground first year students in success and establishment within the institution (Johnston 2010).

When the hackfest idea was discussed with colleagues at the Critical Making Lab, iSchool, University of Toronto, it focused on building an entrepreneurial app. Originally, the break-out sessions planned were: 1. Does your app exist? 2. Business model generation. The first session was to include librarian mentors who would help groups' research if a similar app already existed. In this sense, the session was a skill-building session about search and retrieval versus a critical thinking session. How to build the Hackfest as a critical making event rather than a skill-building event was deliberated among these colleagues.

The decision was to change the first breakout session to: What impacts does your app have on society? Here, librarians would visit teams, talk about the ideas and concepts groups were developing, and help students to think about their app ideas critically. For example, a campus map group, *I'm @ York* (Table 1), wanted to utilize the Wi-Fi networks to help identify available study spaces. Student locations would be identified through a student's phone that would be connected to the Wi-Fi network. Similarly, another group that was working on a social media app, *My Ties* (Table 1), wanted users to provide their location information so that other friends could locate where they were and thus, join them in the activities they were engaged in such as playing hockey, headed to the movie, or in the library studying. Librarians asked these groups to think about issues of privacy and surveillance. Hacking is the catalyst to progressive thinking and reflection of issues of surveillance, intellectual property, and other technological impacts on society (Söderberg 2008).

We live in a society where the Internet has allowed us to be more social and open, but at the same time there are privacy concerns as a result. We observe the same issues with Facebook, in which we ponder, who owns an individual's information and how does that impacts a person's privacy and security? The first breakout session fostered participants to delve deeper into just building the app, but how they were building it, and to think about how society might be impacted or engaged with the app idea. The above app examples, started thinking about issues of privacy, and addressed them in the final presentations. The latter group created a solution to the privacy concerns by allowing people who would use the app to opt in to location information.

Also, the Steacie Hackfest is known as noncompetitive. Though sometimes having a competition can drive up numbers, having a noncompetitive hackfest fosters collaboration, establishes a safe, welcoming and comfortable environment for all participants without the pressure of having to finish a product or be compared to other groups. In this sense, groups are encouraged to discuss ideas with other groups with similar ideas. For example, at the Hackfest, there were three groups working on a campus map idea. In the beginning of the event, when people were pitching ideas, this was obvious that many people had similar ideas. As a result, one student encouraged the other campus map group to join ideas and/or to help each other. Though three campus map groups formed, throughout the event you saw a member of one group deliberating with the other campus map group when stuck on a problem. The campus map groups collaborated on solutions and helped to make each other's ideas successful. In a competitive environment, this would not have occurred.

Since the Hackfest's aim was to build upon the foundational ideologies of libraries of democracy, collaboration and critical thinking, the Hackfest became a 'hub' environment, a social learning space for participants to engage with each other and ask each other questions. The

noncompetitive environment fostered participants to be knowledge and technology producers, thus, democratizing technology. Producing democratic citizens is at the core of libraries but also, the hacker culture (Latour and Weibel 2005; Söderberg 2008). In this sense, library hackfests can be unique from other hackfests, by encouraging knowledge sharing and critical discussion within groups and among groups.

The Hackfest had 11 mentors through the 2-day event. They consisted of librarians, faculty, entrepreneurs, *UIT* or university Computing Services, *Innovation York* (http://www.innovationyork.ca), and *MaRS Innovation* (http://marsinnovation.com). Faculty mentors comprised of the Engineering faculty and one from the Digital Media department. Unfortunately, the Hackfest was not successful in reserving a Business faculty member. At the same time, the Hackfest had couple of entrepreneur mentors, an alumni York University student who is a founder of *Phashtag* (phashtag.com), and a venture capitalist from *VentureLab* (http://venturelab.ca/). Students received both technical skills and critical skills from librarians. Several mentors continue to help groups to finish projects after the Hackfest. These mentors include the Steacie library, *Innovation York*, and *UIT*. To reiterate, the focus of the event was not necessarily to finish a project and instead about the process of 'making things'.

Last, the Hackfest utilized the Steacie Library collection. A book display (Figure 1) was created before and during the event. It contained books about the open access movement, technical handbooks, and leisure reading books. Titles included *Decoding Liberation* (Chopra and Dexter 2008), *Android Application Development* (Rogers 2009), and *Little Brother* by Cory Doctorow (2008). Something as simplistic as a book display can assist with narrative based learning (Bruner 2002) and it encouraged the students participating in the Hackfest to tap into the knowledge available through library. To summarize, the Hackfest project is relevant to embedded information services, as the Hackfest embedded open access, collaborative and engaged learning, and critical thinking pedagogy within a course curriculum through the facilitation of the academic library.

Figure 1: Steacie Library Hackfest book display 2014.

Student Survey

Registration for the Hackfest opened in December 2013 to *CSE1001* students. Overall, 100 people registered for the Hackfest, of these, 60 were in *CSE1001*. Of the 60, 29 students were accepted into the Hackfest and 17 actually showed up. Only 1 female student from *CSE1001* attended however, she did not appear the second day. Of the 17 students, 12 students received a Pass grade, while 5 students received a Fail. Also, 12 students from the class responded to the feedback survey. Eight groups formed, and six included *CSE1001* students (Table 1).

Table 1: List of Hackfest groups that included *CSE1001* students

Group	Description
York Push	A notification app for when your professor updates the course website.
My Ties	A social media app that allows you to find friends and make memories by locating where and what your friends are up to. Source Code: https://github.com/stevemccann/YorkHackfest
YU GPS	A campus navigator that uses GPS and maps the inside buildings and the outside areas of the York University Keele campus.
Leaving York	Bus schedules and GPS for various public transportation systems leaving York University.
Timeify	"This is My Time" meme app. Makes York University's "This is My Time" advertisement inclusive to any student. Source code: https://github.com/ulesta/timeify
I'm@York	Campus map that includes available study spaces and parking.

The feedback received from the students was generally positive, helpful, and informative. Below are the highlights of *CSE1001* student's comments (Table 2-4; Figure 2). It is evident from comments and observations made during the Hackfest that engaged learning is important to students, as it provides networking and collaboration opportunities, the ability to apply skills learned in class outside the classroom, and the challenge to build a project in a limited time frame while receiving mentorship from faculty. Students suggested that the Hackfest be an overnight and competitive environment in the future. Also, they suggested that more participants should be allowed to attend the Hackfest. In terms of critical thinking, students were asked "what type of critical thinking did you consider in regards to your app or project?" Here students mostly described building the app, developing code, and coding in a limited time frame as critical thinking.

Table 2: Additional comments and feedback provided by *CSE1001* students.

Q3: If you are a CSE1001 student, do you have any other comments?
Great event to let first years gain development experience!
Try and group lower year students with upper students so they can maybe learn something from the upper year students
Hackfest needs to be a competition
One thing that could make it better is to have someone at least teach the basics of mobile programming, at least to bridge the gap between what a CSE 1001 student would know to that point and how it would apply to android programming, for example, since it is based on java.
It is a good motivation to encourage programming students to join a hackathon, since most don't even know what one is; I certainly didn't.
The opportunity should have been open to a higher percentage of the class.

Table 3: Table 3 describes what *CSE1001* students liked about the Hackfest. Orange comments represent students who liked the idea of collaborating with others on a project. Green comments are those that liked the Food. Blue comments are students who liked the opportunity to apply code outside of class work. Purple comments represent those that mentioned they liked having mentors available to assist with project development.

Q7: What did you like about the Hackfest?
Meet with other York students and try to build something
Opportunity to meet other people to work on new projects.
The food! The experience! The networking opportunities!
Opportunity to try something new and code outside of class
I like the idea of working as a group to create app by ourselves.
Food, people's ideas
Interaction with others who know more about programming, which made it a very good environment to learn from.
Meeting some people & making connections. Learning about UIT & robotics society hackathons. Exploring the tunnels under the Petrie building.
Great communication and study chance, nice food and drink, presentations full of passion and hope.
How people got together and the collaborative feeling. I also liked the opportunity provided to meet more experienced people such as the mentors.
Food
I liked the amount of resources available to us and the faculty that were willing to help us. It's always a good feeling to know that you can try something you have never done before and apply it within two days. Overall a very great experience

Table 4: Description of how the Hackfest has contributed to students in *CSE1001* skills for school and/or work

Q9: Name one way in which the Hackfest has contributed to your skills for school/work?
Multidisciplinary team trying to build a mobile app - it was a good learning experience.
Helped to gain insight on app development.
I feel that the Hackfest definitely improved my leadership skills.
My team has decided to continue our idea into an app that we plan to release to York in the future.
It teaches me that we can do anything if we work as a group. It also let me to explore the creative ideas.
Programing, group work and presentation, which made me confident about presenting my ideas to group of people.
I learned about the Model View Controller design pattern, which is primarily used in web based applications. This topic was presented in class two weeks later, which made it easier to grasp.
I leaned about proof of concept, pseudo code, & all of the open data at York. Also, some the knowledge taught to us in CSE1020 by Prof. Jenkin's, that was not a part of the course, I was actually able to utilize during this hackfest, and that something I never would have applied on my own.
Team
Not much because it was just two days but I learned a lot.
Made new connections.
Helped me learn more about android development on eclipse and XML.

Q23 Overall, how would you rate the Hackfest?

Answered: 20   Skipped: 0

Answer Choices	Responses	
Excellent	35.00%	7
Very good	60.00%	12
Fairly good	5.00%	1
Mildly good	0.00%	0
Not good at all	0.00%	0
Total		20

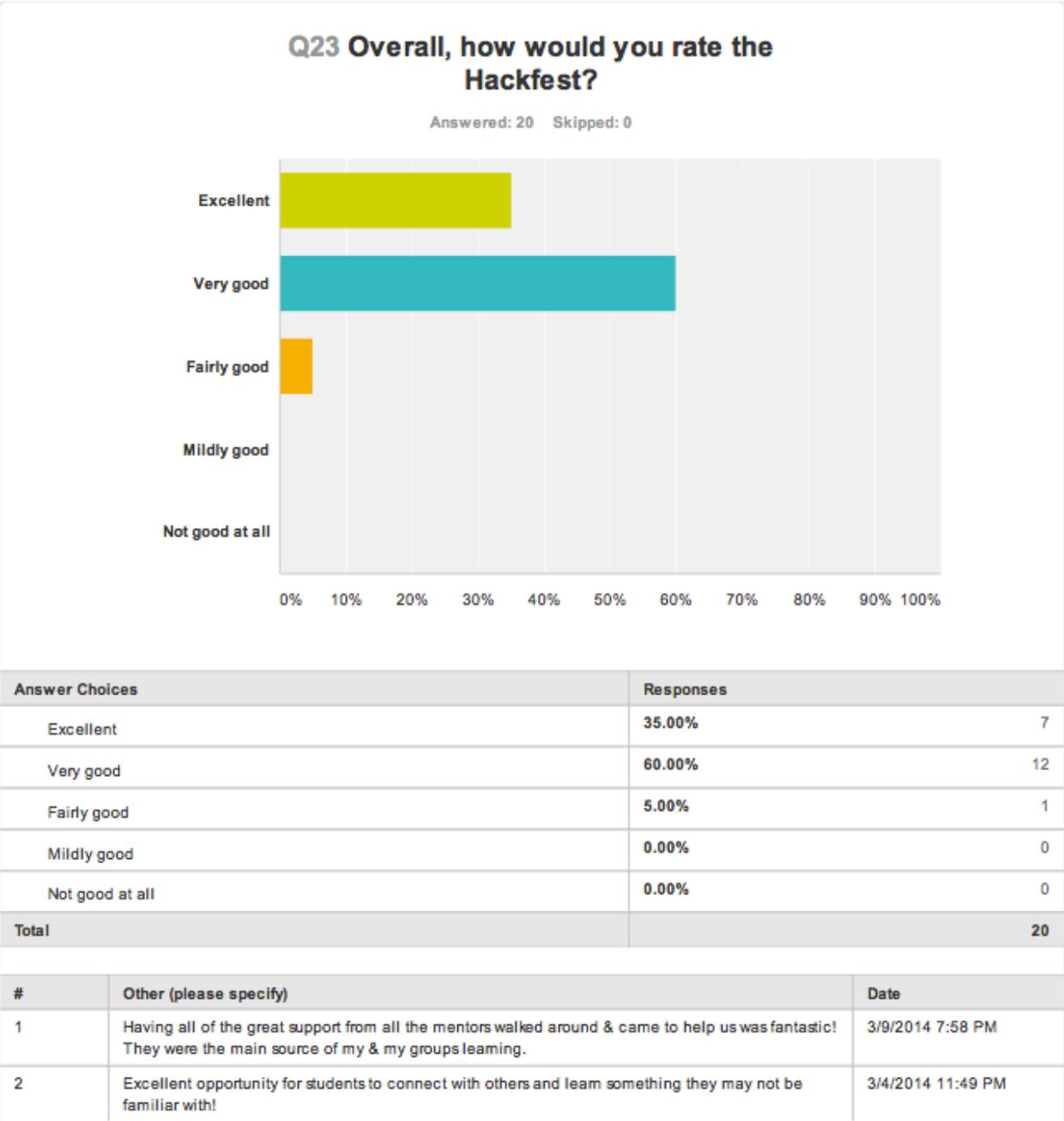| #	Other (please specify)	Date
1	Having all of the great support from all the mentors walked around & came to help us was fantastic! They were the main source of my & my groups learning.	3/9/2014 7:58 PM
2	Excellent opportunity for students to connect with others and learn something they may not be familiar with!	3/4/2014 11:49 PM

Figure 2: The overall rating of the Hackfest of all participants.

Lessons Learned

One lesson learned is that not to restrict attendance numbers. As mentioned above 60 students from *CSE1001* registered and only 17 actually attended, partially since only 29 were approved to attend. This number needs to be higher as others were interested. Additionally, it is necessary to be clear about instructions and criteria of a Pass grade. Throughout the Hackfest this was made clear during the call out for participants and in email. However, further clarity

may be needed thus, it is suggested to visit the class beforehand to announce the Hackfest and to answer questions of grading criteria.

Another factor that continues to be an issue is the lack of female presence. Increasing female attendance is a priority for planning next year's Hackfest. For example, ensuring female mentorship is available and possibly featuring a breakout session specifically for female participants are potential ideas. Last, asking for feedback from female participants will be significant to what worked and what did not.

It is clear from observation and the survey that mentorship, space, and good food are highly valued. Having a variety of mentors available, including faculty and industry members will continue to be an asset in future Hackfests. Mentorship from UIT, also known as Computing Services, like the first annual Hackfest, was significant. UIT provided incentive for student to build university specific applications and provides continued mentorship still... Also, they assisted larger groups to divide up work. At the same time, some students comments suggested that they did not know what to do at times as not all had programming abilities. Thus, a team building exercise or task delegating exercise is an idea for a potential breakout session for the future Hackfest.

Last, the question on critical thinking did not provide insight in some of the comments that were observed during the Hackfest. During the Hackfest, critical issues of privacy and surveillance were discussed. Yet, this was not mentioned in the survey answers. It seems that what researchers understand as critical thinking and critical making is not necessarily the same as student's perception of critical thinking. Therefore, the survey question on critical thinking needs to include keywords to prompt student reflection. Also, the answers suggest that breakout sessions require reconstructing, and summarizing discussions may be needed. Note, for next year, it will be important to ask if students utilized library collections during the Hackfest.

Organize Your Own Hackfest

The next section provides ten steps to hosting a hackfest and suggestions for establishing a critical making hackfest, to inspire other academic libraries. The first set of steps is granular and includes logistical elements. The second portion provides constructive methods to help a library, or any makerspace, to actively engage participants with the discourse of science, technology and society.

STEPS

Step 1: What is the theme of the Hackfest?
Last year, at the Steacie Library, the theme was *Open York Data*. Open York data incorporates York University records that are freely accessible, such as course codes, lab stats of computers available in various libraries, subject headings, and research interests of faculty. This year's theme was *Culture and Technology in a Mobile World*. The theme was about creating an app that can be about anything, health, accessibility, gaming, organizing, chatting or creating an

app for York. A theme can be as broad as Toronto where the Hackfest would use Toronto open data. Or as narrow as: water monitor, refining water use to improve the quality of aquatic ecosystems. The previous theme can be found at Random Hacks of Kindness (www.rhok.org), a global organization that hopes to make the world better by developing practical open source technology solutions. The water monitoring case examines the environmental impacts of people's water use. Note, that a narrow theme may mean attracting less hackfest participants.

Step 2: Decide whether the hackfest will be a competition.
If a competitive hackfest is organized, logistics to consider include prizes, possibly of monetary value, judges, and criteria for judging and evaluating. A competition is seen as an incentive for students to participate, drives them to finish and create a useful product or tool. By not having a competitive hackfest, as the Steacie Hackfest, thinking of other incentives to increase participant interest is important to consider. Incentives include hackfest swag, continued mentorship, food and beverages, and exposure to community innovation and entrepreneurial organizations. Recall, libraries at the core are spaces of collaboration, engaged learning, and critical thinking, so a noncompetitive hackfest helps to foster these ideologies. The Steacie Hackfest wanted to provide a safe, welcoming, inclusive, and comfortable environment for participants to express needs, questions, and share ideas.

Step 3: Consider logistics such as where, when, number of days, lead-up or follow-up events.
The 'where' aspect asks, where in the library will you host the hackfest? Is a private enclosed space available such as, a reading room, a computer lab, a floor level, and/or study rooms? 'When' considers the time of year and coordination with other library events. Consider the hackfest as an *Open Access Week* (www.openaccessweek.org) event (Higginbotham 2013; SPARC 2013), or plan it around the holidays, or beginning of the year. Also, decide on the number of days the hackfest requires. Will the hackfest be a 1 day or 2 day event? Or, do you have the space and logistical abilities to do a 24-hour marathon, or 9:00 am – 5:00 pm? Last deliberate if a lead-up event or follow-up event will be organized. Here, partnering with a student association will be an asset.

Step 4: Examine the budget.
For the budget consider costs of posters, food including breakfast and lunch, caffeine, swag/prizes, mentor or judges thank you gifts, and lead up event needs. Ensure the university libraries office approves the budget a few months prior to the event, at minimum.

Step 5: Establish sponsors or partnerships to help with funding and supporting the event.
There are different types of sponsors each with their own pros and cons:
a) Corporate sponsors such as, Google or Microsoft are big companies that can really help with publicity and funding of the event. However, be conscious of the event becoming a hackfest for the company and overshadowing the event as a library hackfest.
b) Local organizations such as, *MaRS Innovation* or *Hacker You* (hackeryou.com). Find organizations that support innovation, makerspaces and open source software development.

c) University sponsors such as, the Libraries and appropriate university research institutions. With the Steacie Hackfest, sponsorship was obtained from *Innovation York* that supports services for industry and academic partners.

Step 6: Produce a hackfest website.

Important aspects to include on the website are: description, theme, and agenda. Also, the website should contain a registration form. The Steacie Hackfest used Google Forms to create a registration form. Other hackfests use Eventbrite (University of Toronto 2013), have a twitter account, and list their sponsors (University of Michigan 2014)

Step 7: Publicity and communications.

Here, speak to the libraries communication officer and major sponsors communication officers. Think about messaging and promotion. Also, consider avenues of communication on-campus, and off-campus. For example, campus newspaper, campus radio, university's e-newsletter, LCD screens that are on campus, library website, email listservs, department or faculty meetings, posters, flyers, and word of mouth are ways to build the event attendance.

Step 8: Develop an agenda for the day(s) of the event.

The agenda outlines the hackfest proceedings and should be available on the website prior to the day of the event. Also, think about the location for breakfast and lunch, final presentations, and when and where groups will be formed. Consider hosting workshops or breakout sessions that are to be included in the agenda.

Step 9: Create a feedback form.

This is to evaluate the hackfest, reflect on possible improvements, and spark new ideas.

Step 10: Reflect.

During and after the hackfest, organizers should reflect and take notes of significant moments. View feedback, consider comments and observational notes from the day of, and note any new ideas for next year's theme and logistical improvements.

With these ten steps, also ensure that there is a hackfest organizing team to assist with website development, communications, design/logo, organizing mentors and volunteers, among other logistical tasks mentioned above.

CRITICAL MAKING SUGGESTIONS

This section provides four tips (Ratto 2013; Resch and Shujah 2014) to help a library build a critical making hackathon.

Tip 1 is to establish a dedicated space for the event or workshop. It does not necessarily have to be a makerspace. It can be low budget, such as a reading room, a floor of a library, or a computer lab. For example, the *Critical Making Lab* (criticalmaking.com), iSchool, University of Toronto has a dedicated space for "making things", and a dedicated floor for critical thinking research, the *Sephamore* (semaphore.utoronto.ca), on the 5th floor of the main library, Robarts

Library, University of Toronto. There is a "makerspace", but also collaborative furniture. Instructors and researchers have offices located here that encourage the library community to visit and ask questions. In the Steacie Library, we do not have a dedicated space for making things, but our offices are embedded within the libraries, so there is an unspoken open door policy that really facilitates conversations with students and researchers. After the Hackfest, students often visit the Steacie Hackfest main organizer to discuss ongoing projects.

The second suggestion is that the critical hackathon build relationships between participants and faculty/staff. Thus, inviting course instructors and researchers from different faculties to be present as mentors either during the hackfest and/or at the final presentations is essential. Commonly, the Steacie Hackfest invites Engineering and Computer Science, Science, and Digital Media faculty. However, the goal is to involve other disciplines depending on the theme of the hackathon. Furthermore, mentors are available during the event, but it is suggested to have ongoing mentorship available, if possible. What has been observed in the two Steacie Hackfests is that some groups seek to continue with their projects and ask for further assistance following the event.

Third, build a hackathon that uses the history of libraries and the library's connection to broad social and cultural issues or needs. As mentioned earlier, Benjamin Franklin's (1995) quote supports that libraries improve society by fostering engaged citizens and knowledge sharing. In this sense, the theme plays a significant part to fostering critical thinking. Moreover, host the hackfest as an open source event, ask participants to post on GitHub (github.com), or use open source technology, such as Arduino. Even more, encourage participants to work together to solve problems and analyze ideas critically by connecting them to a greater social and cultural context. Thus, encourage collaboration between groups, and a sense of social learning.

Last, create an agenda and theme that fosters critical literacies and not just digital literacies. Therefore, encourage participants to engage with the library collection and resources, and have a book display that inspires participants. Also, consider a theme that will foster critical thinking. For example, the theme may address disability and accessibility, and consider the connection of equitable access to a broader social context. As mentioned earlier, the website, Random Hacks of Kindness, is a great resource to find themes that develop practical, open source technology solutions, and respond to some of the most complex challenges facing humanity such as water pollution and poverty. The organization examines how technology can be used socially to improve conditions for everyone so that we can all exercise our rights as democratic citizens.

Conclusion

The paper concludes that embedding a library hackfest into curriculum is effective and goes beyond traditional methods of teaching and learning of information literacy, and open access to students and faculty. Libraries are built on the idea that citizens regardless of background have equal opportunity to learn so to have the ability to make informed decisions whether it is about government, electing officials and other changes, such as technological, that impacts society. Recall Franklin's (1995) ideological perception of libraries, as it facilitates the

choices we make in libraries, and has influenced the choice to host hackathons in libraries, at least in the case of the Steacie Hackfest.

Moving forward, critical information literacy and critical making is the lens in which the Hackfest was organized. Furthermore, through the case study of embedding the Hackfest into a first year computer science course, it is discovered that first year experience and retention (Johnston 2010), and engaged and experiential education are also important facets for libraries hosting hackathons (McCormick, Kinzie, and Gonyea 2013). More research into engaged learning and first year experience pedagogy in higher education will be an asset to future planning of hackfests.

In the same way that the Linux model (Raymond 2000) allows anyone with the Internet and programming knowledge to participate in the development process, the Hackfest democratizes software and technology resources (Latour and Weibel 2005) that is essential to the collaborative noncompetitive spirit of the *Steacie Library Dungeon Hackfest*. The Hackfest builds upon the foundational bearings of libraries in general, democracy of knowledge, and technology. Furthermore, "free access to software tools is a prerequisite for the existence of a hacker community" (Söderberg 2008, 18). Thus, groups were encouraged to post and share code to GitHub (Table 1). However, understanding the value of open source as a discourse and strategy to knowledge learning is something that continually needs discussion with students and in future hackfests. To conclude, embedding a library hackfest in a first year computer science course is a productive way to establish critical thinking on issues of open access. Lastly, the learning process of a library hackfest is not necessarily about the end product as "the process of making is as important as the results" (Ratto 2011, 254).

Endnotes

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