Inclusivity in Hackathons: An Assessment of Mentorship Strategies

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I. Introduction

This research project focuses on increasing hackathon inclusivity, and increasing opportunity for novice computer science students at UBC. While hackathons provide an invaluable collaborative environment for students to learn technical skills and soft skills, novice participants face barriers to participating in them. One of the most significant barriers for novices is the lack of experience and confidence among participants, especially for those who are new to technology. Diversity can also act as a barrier, as hackathon organizers and mentors often reflect the demographic of computer science students. The mentorship that is currently provided at hackathons is very supportive, however it could benefit from increased personalization. This research aims to provide insights into the current practices and styles of prominent hackathons and identify ways to improve participation and engagement. If this research is applied to the creation of a UBC based hackathon students at all skill levels will benefit.

1. DEFINITION OF HACKATHONS

Hackathons are coding based competitions where teams or individuals with different levels of expertise work together to solve an issue in a set amount of time. They have grown in popularity among students studying computer science as a way to learn in-depth material and acquire new skills in a group setting. Through teamwork and interaction with other participants, hackathons give participants the chance to refine their technical skills, such as coding, problem-solving, and project management, as well as develop soft skills, such as communication, collaboration, and leadership.

2. BACKGROUND ON THE BENEFITS OF HACKATHONS

Hackathons have gained popularity as a way for professionals and students to practice software programming. Hackathons provide participants with a variety of advantages, including greater awareness of technological trends and job market requirements as well as the chance to develop crucial soft skills like teamwork, adaptability, task allocation, and critical thinking, as explained by Porras et al. (2018). In addition, the collaborative learning environment of hackathons has been found to promote accelerated learning and the cultivation of valuable soft skills, including communication, collaboration, and leadership. Beyond their individual benefits, hackathons can also offer value to stakeholders and contribute to societal progress. Porras et al. (2018) note that hackathons often lead to the creation of new innovations, increased visibility for emerging technologies, and opportunities for citizen participation. In this way, hackathons represent an effective and valuable tool for advancing software engineering education and innovation. The clear value of hackathons to learners emphasizes the need to ensure that hackathons are accessible and welcoming to all learners.

3. BARRIERS TO HACKATHON PARTICIPATION

Despite the numerous advantages of hackathons, there are still a number of obstacles to entry. Inexperience and lack of confidence in newer participants can deter them from participating and in doing so limit the learning opportunities accessible to all participants. In addition, gender diverse participants may experience discouragement from participating in hackathons at a higher rate due to lack of diversity in hackathon volunteers and organizers. The research that follows will emphasize and elucidate on these obstacles in order to further contextualize how hackathon planning can be improved.

4. RECOMMENDATIONS TO IMPROVE HACKATHON PARTICIPATION

To provide a stronger learning environment with more opportunities for novice students and students of all genders, I recommend that UBC organize and host a hackathon implement a new registration and team formation strategy. In the registration process pair inexperienced participants with experienced participants creating a supportive learning environment for all. Supportive advanced participants will be able to demonstrate industry standard coding, and provide support in understanding hackathon expectations.

5. RESEARCH AND SOURCES

The inquiry included an examination of the current practices and styles of six prominent hackathons for Canadian university students: nwHacks, hack the north, uoft hacks, cmd-f, western hacks, and mchacks. This involved analyzing their websites, FAQ pages, scheduling, workshops and other relevant sources. This analysis produced insights into how hackathons are currently organized, inclusivity strategies, and how they communicate with participants. Additionally, a literature review was conducted, which included several studies on hackathons. These studies covered various aspects of hackathons, such as best practices in running IT hackathons, gender differences in hackathons, knowledge transfer, and benefits of collaboration in hackathons. The review provided important context and insights into the existing research on hackathons. Finally, a survey was created and distributed to computer science students and alumni who have participated in hackathons. The survey aimed to identify the main reasons that

individuals do not participate in hackathons, particularly those who lack experience. It also explored the effectiveness of current strategies for collaboration and forming new connections in hackathons and investigated the potential benefits of implementing a mentorship program for hackathons, both for mentors and mentees. Together, these research methods provide a comprehensive understanding of the current state of hackathons, the existing research on hackathons, and the perspectives and experiences of participants. This inquiry aims to use this knowledge to identify ways to improve hackathons and increase participation.

6. SCOPE

The scope of the research project is to explore the current state of hackathons and identify ways to increase participation and engagement, particularly for novice participants. This goal is to increase learning opportunities and professional growth for UBC computer science students of all skill levels. In conducting this research thoughtful recommendations for creating a hackathon by UBC and for UBC with a high level of inclusivity will be provided.

II. Data Section

1. Current Hackathon Structures:

Through investigating nwHacks, hack the north, uoft hacks, cmd-f, western hacks, and mchacks it is evident that most hackathons contain event schedules which involve industry workshops, keynote speakers from professionals in tech, and mentorship upon request by students.. These events cover a range of topics such as programming tools, APIs, databases, and platforms. In addition to hacking, there are also activities for relaxation or health, novelty or competition.

Individuals are expected to form their own teams. Team sizes can vary from one to five people. For participants who know others in the event team typically happens before the event. If participants are entering the hackathon by themselves, there is a Discord channel through which participants can seek out other team members. Some hackathons, such as NWhacks, provided an event during the hackathon where solo participants can talk to others with the goal of forming a team. However, none of the hackathons researched provided team matching based on skill set, or any formal team matching. Mentorship takes place externally to the team, and mentors will help students if the students request help. Workshops are provided to help hackers learn new skills and explore new technologies. Overall, hackathons welcome students of all skill levels. The workshops and mentorship available is valuable in supporting hackathon participants, however research hows this support can be further improved to support more students.

2. Barriers to Participation and Learning in Hackathons

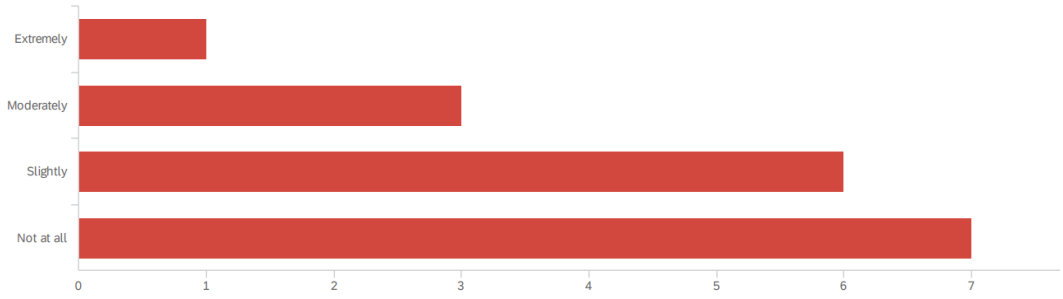
For those looking to advance their abilities and expertise in the technology sector, taking part in hackathons can be a rewarding experience. However, a number of obstacles may make it difficult for some to take part in and benefit from these events. In particular novice participants, or gender diverse participants. In the following section common obstacles that participants face with be discussed.

A. Lack of Experience and Confidence

One of the most significant barriers to participation and learning in hackathons is the lack of experience and confidence among participants. Many individuals who are interested in technology may feel intimidated by the level of knowledge and expertise demonstrated by other participants and lack confidence in their own ability. Research into gender differences in

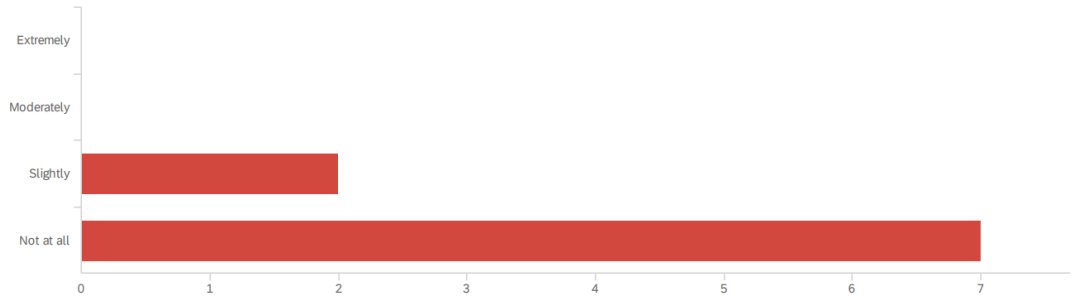
hackathon experiences shows that as a competitive environment hackathons are “particularly sensitive to phenomenon such as stereotype threat, imposter syndrome, and social identity threat” for participants of all genders (Hardin, 2021). Through my primary research, a survey distributed to computer science students and alumni, data shows seven out of seventeen participants were “not at all” confident in their skill level prior to their first hackathon, with only one respondent stating they were “extremely” confident and three “moderately” confident:

Q7 - Before participating in your first hackathon how confident were you in your skill level coding:



When filtered by gender of survey respondent, the reported confidence level is further reduced:

Q7 - Before participating in your first hackathon how confident were you in your skill level coding:



Supporting research on this barrier to participation, Serek's research on university hackathon participation showed that new participants "did not know exactly what to do and what the hackathon expects from them" creating a barrier to starting work (Serek et al., 2020). Individuals who lack experience in technology may feel unsure of how to approach a hackathon project or may struggle to understand event expectations. Another contributor is stress induced by time constraints. The pressure to deliver a successful project within a limited time frame can be overwhelming for those who are not used to working in such an environment.

B. Limited Diversity in the Field of Technology

Another barrier to participation and learning in hackathons is the limited diversity in the field of technology. Hackathons are often reflective of the demographic of computer science students, at UBC in 2017 the percentage of female computer science and computer engineering students was 32.4% (University of British Columbia, 2017). This can make it difficult for individuals from diverse backgrounds to feel welcome or represented. The lack of diversity in the field of technology can also limit the range of perspectives and ideas that are shared during the event,

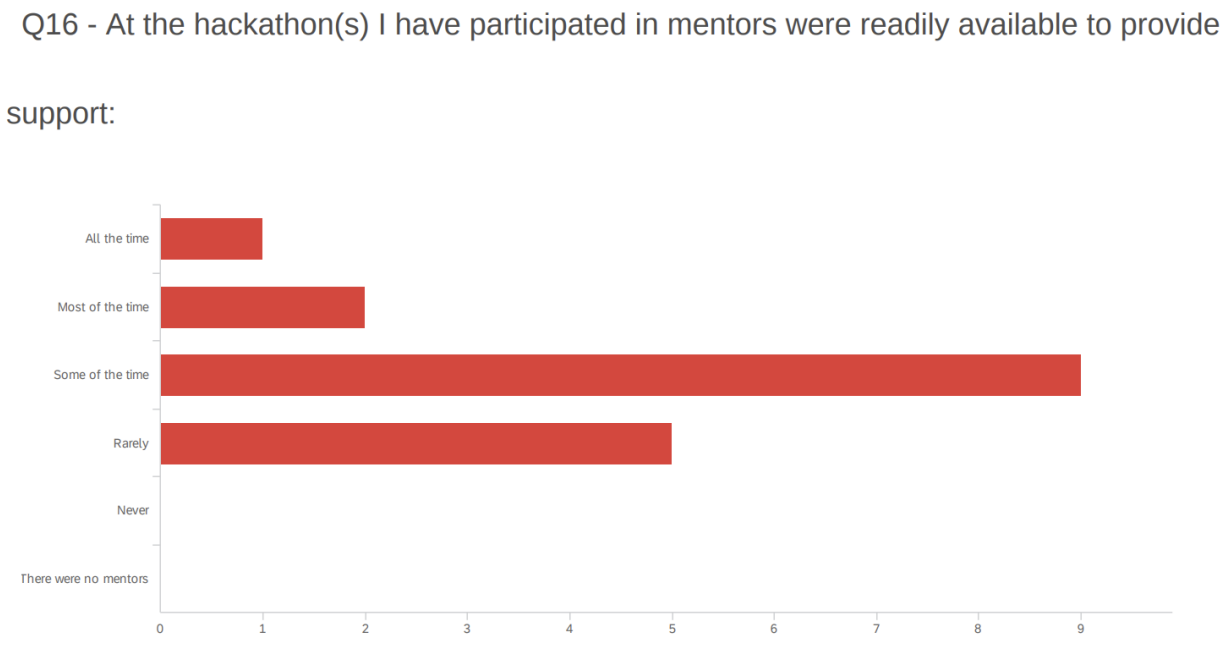
which can stifle creativity and innovation. In relation to mentorship opportunities research shows lack of diversity in mentors can limit “how much members of underrepresented genders feel comfortable asking questions of industry mentors” (Hardin, 2020). Hardin’s research also demonstrated that female participants submit projects at a lower rate than male participants especially when event organizers are not diverse. The most commonly stated reason for not submitting work being “not done yet” (Hardin, 2020).

Qualitative interviews procured personal stories including the recounting of “a girl who is new to computer science and she was definitely intimidated by a lot of what other people seemed to know that she did not. And she did not even know where to start for a project, did not find a team, and had other stuff to do the weekend. So she just did not end up coming back” (Female HeartyHack). Team matchmaking is often an ad hoc or under-organized aspect of hackathons, and yet it is central to many attendees’ experience.” (Hardin, 2020).

C. Limited Personalized Mentorship

Hackathons can be fast-paced and intense events, making it challenging for participants to receive personalized mentorship. While some events may provide mentors or coaches to assist participants, the mentorship is upon request which can be intimidating for novice or diverse participants. One hackathon participant described their fear of asking for help saying “the risk of not being able to [do it], and like just having to go to them and be like, I have no idea what I’m doing, I do not know what’s happening here. It’s, like, scary” (Hardin, 2020). Of the seventeen

survey responses I received in my primary research, five reported that mentors were “rarely” available, and nine reported that they were available “some of the time”:



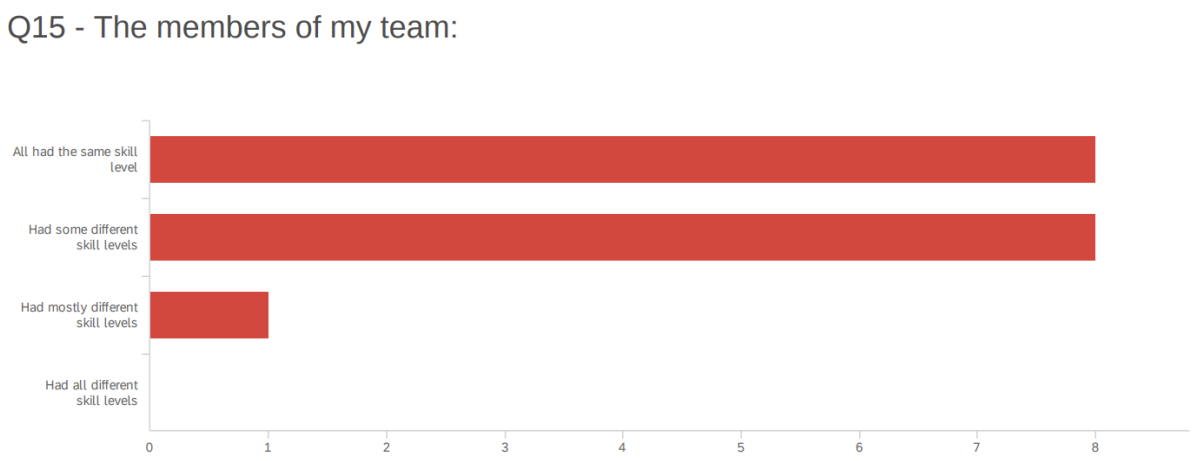
D. Misunderstanding of Participant Expectations

Finally, a significant barrier to participation and learning in hackathons is the misunderstanding of participant expectations. New participants have less of an understanding of what is expected of them. This is shown in Serek’s research on hackathons which demonstrated how newcomers “set high or unrealistic expectations on hackathon outcomes” resulting in discomfort and at times conflict (Serek et al., 2020). Without a clear understanding of these expectations, participants may feel further reduced confidence in their skill set and their ability to fulfill expectations.

3. Considerations for Implementation of Mentorship Programs in Hackathons

To address these barriers, a UBC hackathon could be created in which teams are assigned based on participant skill level. Research supports this strategy as being viable for reducing barriers to participation in novice and gender diverse participants. For example in a study done on corporate hackathons with multidisciplinary teams, the final recommendations suggested hosts "provide two slots for an Azure developer, one for "expert" and one for "apprentice" with the understanding that if both slots are filled, a mentorship relationship will be established. This could be valuable for both parties (Trainer et al., Citation2017) and could support both the learning objectives of the apprentice and also avoid frustrating team members" (Pe-Than et al., 2022). Another study on corporate hackathons found that "Watching others code allowed participants to gauge each other's expertise and understand the programming conventions and practices of experienced programmers" (

Despite the presented advantages of having a wider range of skill levels, of the seventeen respondents to my survey, all seventeen participated in hackathons in teams, however only two reported not knowing other team members prior to the hackathon. Eight respondents stated that of their team members "all had the same skill level", and another eight stated that their team had "some different skill levels".



This emphasizes the need to support student hackathon participants by facilitating team formation taking skill level into consideration.

A. Operations and Logistics

To implement a strong learning environment for participants the number of mentors needed to support the number of participants should be considered. The standard team size for a hackathon is three to five members, at least one member per team should have a more advanced skill level and be identified as a mentor.

To encourage mentor participation, hackathons should continue to offer incentives to mentors such as professional networking opportunities and official designation as mentors to generate valuable resume content for mentors.

B. Strategies for Identifying and Matching Mentors and Mentees

Another important consideration for implementing mentorship programs in hackathons is the process for identifying and matching mentors and mentees. One approach is to have participants fill out a survey during registration to gauge their level of experience and areas of interest. This information can be used to match mentees with mentors who have relevant expertise. It is also

important to consider the diversity of mentors and mentees. Diversity in mentors should be prioritized where possible.

III. Conclusion

1. Summary and Overall Interpretation of Findings

The findings of this study highlight several key factors that can hinder inclusivity and participation in hackathons. These include the lack of experience and confidence among participants, limited diversity in the field of technology, limited personalized mentorship, and the misunderstanding of participant expectations. Addressing these barriers is crucial to create a more inclusive and supportive environment for all participants. In conclusion, improving inclusivity at hackathons is essential to ensure that all individuals interested in technology can participate and learn in a supportive and inclusive environment.

2. Recommendations for Improving Inclusivity at Hackathons

To address these barriers and improve inclusivity at hackathons, the following recommendations are suggested:

1. Implement a hackathon hosted by UBC with the specific goal of including novice participants.
2. Create a mentorship program that matches mentors and mentees based on shared interests and experiences.
3. Ensure that mentors can communicate hackathon expectations to participants.

By implementing these recommendations, hackathon organizers can create a more inclusive and supportive environment for all participants, regardless of their background or level of experience. Doing so will not only help to broaden the range of ideas and perspectives shared at these events but also help to promote greater diversity and innovation in the field of technology.

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IV. Appendices

Appendix A. Survey Questionnaire

Hackathon Participation and Learning

Intro Hackathon Participation and Learning Survey

I am an undergraduate computer science student at UBC completing a technical writing project. The purpose of this survey is to gather primary data on the experiences of computer science students and alumni who have participated in one or more hackathons. The survey seeks to investigate hackathon learning and participation to gather feedback that could inform improvements in future hackathons. The survey contains 19 multiple-choice and short answer

questions. It should take approximately 10 minutes to complete. Your responses are voluntary and anonymous. Thank you for your participation.

Q1 What is your gender?

Male (1)

Female (2)

Non-binary / third gender (3)

Prefer not to say (4)

Other (5) _____

Q2 What is your education status?

Undergraduate student (1)

Graduate student (2)

Alumni (3)

Other (4) _____

Q3 What is your major?

Q4 Have you participated in a hackathon before?

yes (1)

no (2)

Q5 If you answered yes, how many?

Q6 What were your main reasons for wanting to participate in a hackathon?

To learn new skills (1)

To meet new people and network (2)

To build my resume (3)

Other (please specify): (4) _____

Q7 Before participating in your first hackathon how confident were you in your skill level coding:

Extremely (1)

Moderately (2)

Slightly (3)

Not at all (4)

Q8 Coding in my first hackathon was:

Very easy (1)

Moderately easy (2)

Challenging (3)

Extremely challenging (4)

Impossibly challenging (5)

Q9 Before participating in your first hackathon, hackathons appeared:

Extremely accessible to all skill levels (1)

Moderately accessible to all skill levels (2)

Mainly accessible to experienced students (3)

Only accessible to experienced students (4)

Q10 After participating in your first hackathon, hackathons appeared:

Extremely accessible to all skill levels (1)

Moderately accessible to all skill levels (2)

Mainly accessible to experienced students (3)

Only accessible to experienced students (4)

Q11 Did you form a team or work alone?

Team (2)

Alone (4)

Q12 If you worked on a team how many members were on your team?

Q13 How many members did you know prior to the hackathon?

Q14 If you knew your team members how did you meet?

Class (1)

Friends (2)

Other (3) _____

I worked alone (4)

Q15 The members of my team:

All had the same skill level (1)

Had some different skill levels (2)

Had mostly different skill levels (3)

Had all different skill levels (4)

Q16 At the hackathon(s) I have participated in mentors were readily available to provide support:

All the time (1)

Most of the time (2)

Some of the time (3)

Rarely (4)

Never (5)

There were no mentors (6)

Q17 Did you feel like you learned new skills or improved existing skills during the hackathon?

Yes, significantly (1)

Yes, moderately (2)

Yes, slightly (3)

No, I did not learn anything new or improve any skills (4)

Q18 How would you rate the quality of mentorship and resources provided at the hackathon?

Excellent (1)

Good (2)

Average (3)

Poor (4)

Terrible (5)

Q19 How much of a role did peer learning and collaboration play in your experience at the hackathon?

None at all (1)

A little (2)

A moderate amount (3)

A lot (4)

A great deal (5)