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Student Reflections on the Hackathon Experience

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Abstract

Experiential group-based workshops can be complex when they are run to scale. Though educators may ask students for feedback, this information can often be problematic to interpret from a large group. In this paper, we discuss the delivery of a University innovation hackathon, and the resulting student feedback. Hackathons are intended to be engaging, filled with expert and peer interaction, and geared to challenge student assumptions about innovation. As such, it is important to get a broad sense of student thoughts and feelings about the experience, to guide future iterations. We consider the simple ways that educators can interpret meaning from qualitative feedback in a large class context. This will be meaningful for those interested in hackathon development, and also those interested in large class pedagogies.

Keywords: *Hackathon, experiential learning, challenge based learning, group work, student feedback, large classes*

1. Introduction

Currently, there is limited empirical evidence about the efficacy of hackathons on university students or on many important concepts relating to competency development or learning (Angarita and Nolte, 2020). As such, more scholars and educators are interested in conducting exploratory research to understand and evaluate them (Heller et al., 2023). Oftentimes, it can be challenging to glean a full understanding of the effectiveness of an educational activity, due to small class sizes (Piercy et al., 2012). When student numbers are limited, researchers often opt for qualitative methodologies such as focus groups and interviews. In large class contexts, surveys are the most common method of analysis, however admittedly some of the nuance of the research may be lost in this format, and organic student ideas or novel opinions have limited voice. Even when students are asked open-ended or opinion questions within survey feedback rounds, it can be a challenge to comb through these. When an educator is interested in the student feedback in a more holistic manner but does not have the capacity for a full data screening and interpretative process, there are few options. In this practical paper, we provide an overview of a scaled hackathon and the simple methods used to attain some initial meaning from our many student opinions collected.

2. Teaching and Learning Context

The DCU Hack4Change Social Innovation Series has run since 2019 for over 600 first year Business students in Dublin City University, Ireland. The hackathon was developed as part of the social innovation/enterprise portion of a yearlong Learning Innovation for Enterprise (LIFE) module, and is an annual timetabled event. The purpose of the series was to allow students to learn more about key social issues, develop empathy for those who experience them, and to apply innovative thinking skills in devising solutions. Student engagement during the event and their post-event reflective essay forms the grading component for the hackathon.

For the purposes of this paper, we focus on the 2022 hackathon where = Sustainable Development was the overarching theme. Based on their chosen topic, students developed Problem Definition Statements before their hackathon session, focusing on what the outcomes and impacts of their chosen problem are, and what their point of innovation might be, given existing solutions.

Academic and practicing specialists provided expert insight into the theme and the wider topic of social innovation, delivering keynote and ‘lightning’ talks, providing mentoring to student teams, and offering feedback at visual pitch development sessions. Between each round of engagement with the academic and industry specialists, teams worked on research and ideation, assisted by a set of informative prompts and a specially created ‘HackImpact’

canvas, which divided their concept journey into three main sections: Problem, Solution and Validation, to facilitate team decision making. For the final activity, students were asked to post their problems and solutions in visually compelling Instagram posts to receive some further feedback from peers, and were awarded prizes according to their fulfilment of the brief.

More than 650 students took part in the Hack4Change series. Each day, the event welcomed over 200 student participants, who were supported throughout the day by 20-25 subject specialists from across DCU and industry. In addition, 15 postgraduate business students assisted with the logistics and execution of the event, for which they also received academic credits in a respective event management module. Students devised innovative concept ideas such as football jersey upcycling, an appliance repair education service to reduce overconsumption caused by designing for obsolescence, and much more. While a considerable undertaking for the teaching staff, all agreed that witnessing the student reactions and engagement made it wholly worthwhile.

Coinciding with the annual hackathon series, a research panel involved in the delivery of the module and related subjects are involved in data collection pertaining to the efficacy of hackathons. The research is intended to extend our knowledge about the efficacy of hackathons as a pedagogical tool and provide robust feedback to develop these further from multiple stakeholders (students, staff, industry). Each year, attending students are asked to undertake a post-event survey which includes questions pertaining to the event itself, personal self-efficacy and career intentionality items, and a number of other scale measures (perceived creativity, climate change anxiety etc.). The dataset (which has an approximate 1500 responses to date) forms part of an extensive educational research study on the effectiveness of hackathons on student perceptions. In addition to the numerous quantitative items in the survey, there are a limited number of open-ended questions about the specific event attended, namely: 1: “Please suggest ways that we can improve a Hackathon like this in future”, and 2: “Any final comments? Anything else you wish to share about your hackathon experience?”. While it would be beneficial to include more robust qualitative prompts, it is understood that students tend to disengage easily when filling cumbersome surveys. In addition, the capacity to engage in rigorous qualitative or thematic analyses (using Nvivo or similar) is limited within the research team.

3. Literature Review

Social innovation refers to the creation of new ideas displaying a positive impact on the quality and/or quantity of life (Pol and Ville, 2009, p.884). It considers the development of novel products, services or processes which are driven by the social needs of its intended audience rather than profit-seeking. Increasingly, socially motivated business practices are

being integrated into the fabric of many business courses and schools (Kanashiro, Rands, and Starik, 2020), as universities recognise their role in developing socially aware graduates who are informed about the consequences of climate change. Social innovation education brings together aspects pertaining to system thinking, co-creation, and sustainability (Wang et al., 2022). Its pedagogy necessitates the development of critical and systems thinking skills, empathy, and problem-solving abilities (Lyons and Bender, forthcoming).

We consider that a hackathon is an excellent vehicle for challenge-based learning in an innovation (or social innovation) module or course, particularly in large class settings where effective experiential learning is more complex to orchestrate (Hilliard, 2021). Derived from the words 'hack' and 'marathon', a hackathon is a time-bound, collaborative event which leverages design methodologies to enhance the innovative output of participating teams. It is a live event where participants commit to a problem or project in a short-form intensive working group (Čović & Manojlović, 2019). These experiential events are conceived to engage students, employees, or citizens in collaborative acts of ideation and are intended to be experiential, active, and filled with expert and peer interaction. In an educational context, they can provide the opportunity to connect with industry mentors, providing authentic learning opportunities for students using real-world challenges (Gentelli, 2015). Hackathons allow students from various disciplines the chance to work together on corporate challenges or social problems, developing their collaborative and teamworking skills. The duration of these hackathons also varies from one day, a weekend, 48-hours spread over 3 days, or for prolonged periods such as a semester (Cobham et al., 2017; Kienzler and Fontanesi, 2016). There are multiple types of hackathon, depending on the intended audience and purpose.

We consider that challenge-based learning (CBL) aligns well with the goals of social innovation education, and furthermore the format of a hackathon. CBL occurs in students via the identification, analysis, and design of a solution to a sociotechnical problem. The learning experience is typically multidisciplinary, takes place in an international context and aims to find a collaboratively developed solution, which is environmentally, socially, and economically sustainable (Malmqvist, Rådberg, and Lundqvist 2015, p.87). A number of key elements pertaining to CBL are notable for this study. Firstly, pedagogies which aim to develop CBL usually involve stakeholders from discrete domains, who work a collaborative capacity towards the co-creation of solutions (Garay-Rondero et al., 2019; Membrillo-Hernández et al., 2018). Direct industry engagement between stakeholders and students not only facilitates authentic learning but can be a conduit of engagement and assessment in large-class settings when experts from industry mentor, judge and assess student outcomes (Lyons and Buckley, 2021). Second, CBL methodologies commonly focus on urgent sustainability and social issues (Garay-Rondero et al., 2019), where the

challenge being presented to the participants (students) is an authentic real-world issue. In large class settings, the participation of industry and educational experts from social enterprise and innovation during a hackathon can facilitate a more networked, distributed approach to this learning, helping students to connect with authentic stories from experts (Mantai and Huber, 2021). Thirdly, educators are primarily interested in the process of the learning experience more than output (Gallagher and Savage, 2020). The encouraging, creative, and collaborative nature of hackathons is a unique learning experience which helps to build a sense of community among students; something which can be regarded as difficult in large classes (Farrell, 2021). Lastly, there is often a technological aspect to CBL methodologies, where classroom or learning experiences are technology supported or enabled in some manner (Gallagher and Savage, 2020). Colombelli et al. (2022) found a positive and significant effect of CBL programs on the student entrepreneurial mindset and skills of financial literacy, creativity, and planning.

How to interpret the feedback comments

Following the 2022 event, LIFE educators were interested in attaining a general sense of the student's reaction to the event. In the quantitative survey items pertaining to feedback, it is noted that students had a mean positive significant change in their perceptions of: social issues, understanding of innovation, pitching skills etc. These will be further expanded upon in the upcoming quantitative study as previously mentioned.

To decipher the multiple opinion statements, the file was downloaded to Excel and screened for missing variables using Pivot tables (to remove any students who did not respond to the Q, or responded N, N/A or similar). Of the 468 students who responded to the 2022 survey, there were 272 responses of this nature (out of a possible 936) which accounts for 30% of the feedback comments. After a quick initial scan, it was noted that "more guest speakers" was a popular phrase – thus this term was recorded as MGS using the 'Find and Replace' function. We performed some basic COUNTIF searches for popular terms to get a sense of the quantity of responses of this nature (See Table 1). The formula used for discrete codes, and for specific terms within sentences are listed below, respectively.

=COUNTIF(CQ2:CR469, "N")

OR

=COUNTIF(the range of all your feedback data, "The code")

=SUM(LEN(CQ2:CR469)-
LEN(SUBSTITUTE(CQ2:CR469,"enjoyable","")))/LEN("enjoyable")

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OR

=SUM(LEN(your range)-LEN(SUBSTITUTE(your range,"term searched","")))/LEN("term searched")

Table 1. Excel Searches

Label or Phrase searched for	**Times (or rows) noted**
Count "enjoyable" positive comments:	62
Count "enjoyed" time length comments:	67
Count "shorter" time length comments:	26
Countif N	272
Countif MGS	46

Next, in Excel, we decided to use conditional formatting to get an initial visualisation of the feedback statements (See Figure 1). Several terms common to useful feedback statements were formatted in the excel sheet to appear in a different colour, including the terms "less", "more", and "too". Once these were loaded, the spreadsheet was very easy to scan for suggestions, revealing key statements such as "ensure it is not one person doing the work, make more people accountable for slacking" and "have it in a bigger venue or with less students in each group".

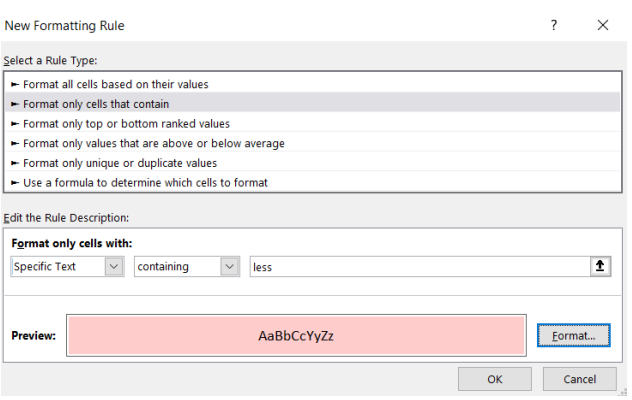


Figure 1: Conditional Formatting in Excel

By scanning in this manner, a number of practical and useful recommendations for future events were sourced.

Next, the Excel sheet with just the feedback comments was saved as a .csv file and uploaded to a free wordcloud generator (in our case monkeylearn.com, See Figure 2). This provided a visual representation of the most common sentiment or terms used by the students, and some basic analysis. Again, while there were many facets to the hackathon

experience, it was noted that the guest speakers were the most significant in terms of feedback comments, with both positive and negative recommendations.

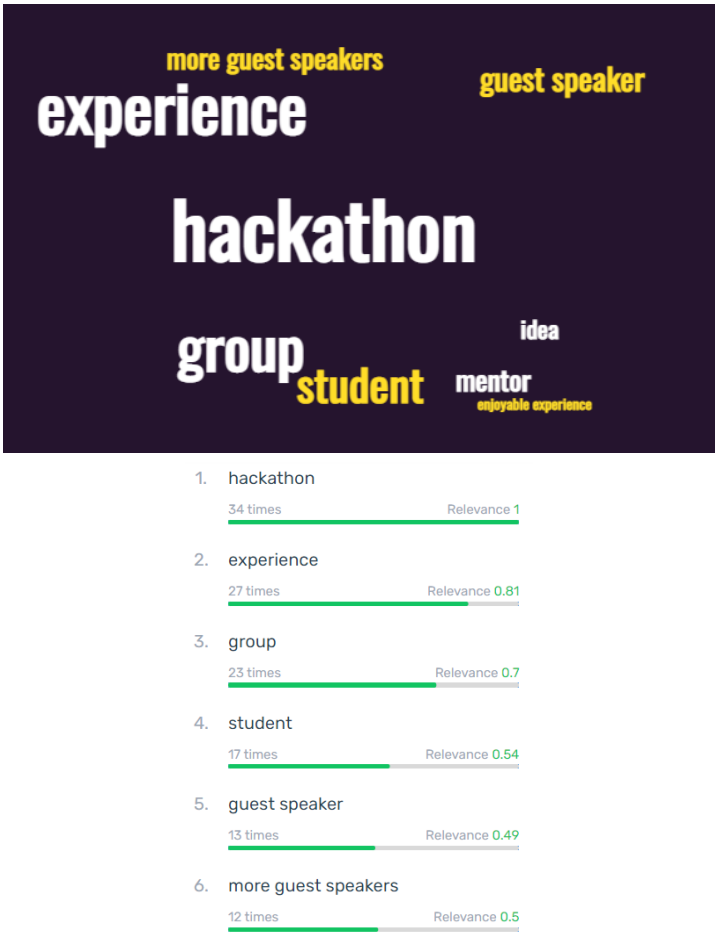


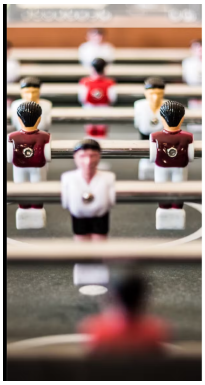
Figure 2. WordCloud results

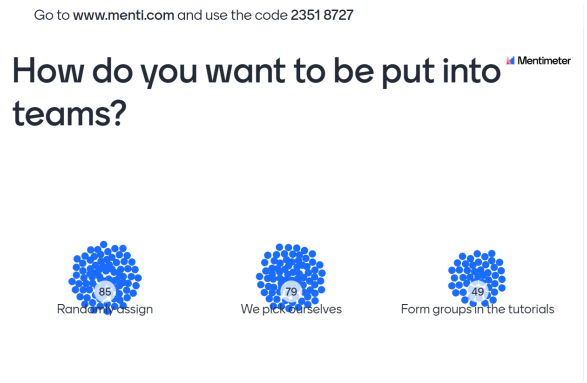
5. Reflection on Implications for Practice

While the steps above provided a very simplistic overview of the data, it was useful. We acknowledge that there are many other (more robust) tools and methods which could be used to effectively collect and interpret student feedback. However, we believe this was a

quick and useful series of steps which may be of relevance to educators in similar, large-class contexts.

For those who aim to use student feedback in a live setting, i.e., during the event or hackathon, we recommend menti.com as a fast and engaging method. This has been used within the same event and module as a prompt and voting mechanism (See Figure 3) and was found very stimulating for the group. In addition, it can be used in a large class setting to provide thanks and final questions when there is a guest speaker in attendance (See Figure 3).





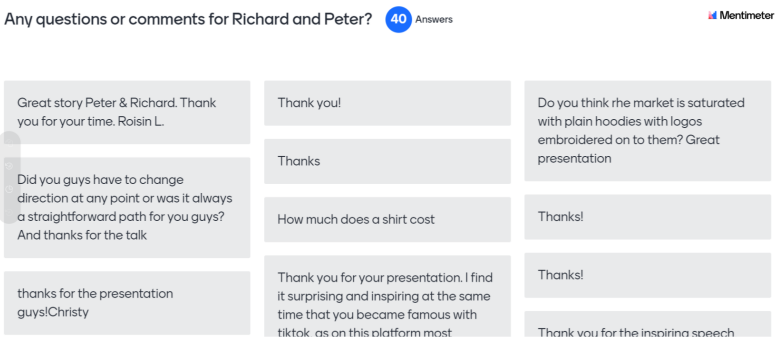


Figure 3. Examples of student engagements with Menti tool

6. Conclusion

Admittedly, hackathons and large group experiential activities can be a challenge to fully embed in the curriculum, yet it is highly desirable they become part of the "next normal" university experience, particularly as we look to exploit the potential of new digital technologies. In the best traditions of the hackathon concept, there is an opportunity to hack the traditional higher education model to help develop more creative students, enterprising mind-sets, and future work-ready graduates for tomorrow's world, today. Large classes provide a high diversity of student ideas during hackathons and therefore vast potential for novel learning experiences and innovative outcomes (Garcia, 2023). However, it is imperative that hackathons and other novel learning methodologies be studied in many ways for their effects on students in small and large class settings, and to iterate the curricular offerings. This paper presents an ad hoc method of scanning large amounts of qualitative survey feedback in a simple, but practical manner, helping to navigate some typical constraints of large-class teaching and assessment. It is hoped that methods like these will provide quick, initial recommendations to educators of large classes, to precede larger, more comprehensive evaluations.

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