Running a Hackathon for Academic Staff: A case study from DCU

Fiona O'Riordan
Dublin City University, fiona.m.oriordan@dcu.ie

Clare Gormley
Dublin City University, clare.gormley@dcu.ie

Follow this and additional works at: https://arrow.tudublin.ie/ijap

---

Running a Hackathon for Academic Staff: A case study from DCU

Dr Fiona O'Riordan & Clare Gormley

DCU Teaching Enhancement Unit

Dublin City University

Fiona.M.ORiordan@dcu.ie

Introduction

Dublin City University (DCU) has embarked on an ambitious pilot project, called DCU Futures, to '*reimagine undergraduate education for an unscripted world*' (DCU OVPAA). Challenge-Based Learning (CBL) is a central pillar of educational innovation being promoted as part of this project. The authors, as academic developers in DCU, are tasked with supporting educators to implement this innovative pedagogy, which is new to many. As year two of the DCU Futures pilot was concluding it was considered timely to have a university-wide event to mark the CBL journey to date. A conference was initially discussed where the podium would be shared with invited external experts and internal DCU academics sharing their experience. However the conversation swiftly moved to replacing the conference with a hands-on CBL experience. As it was a one day fast-paced event, it was designed as a hackathon. The big idea guiding the challenge was 'How can we design an *authentic and sustainable* assessment experience for all?' as this is a topic that exercises the mind of most academics. From the DCU TEU standpoint, the objectives of the hackathon were to:

- Provide a first-hand experience of a hackathon for academic staff to support them in implementing a similar approach;
- Experience the potential value and application of hackathons as an innovative and engaging learning experience;
- Facilitate an opportunity to learn about designing authentic and sustainable assessments.

1

This case study begins by presenting literature in this space, in particular the literature that informed this hackathon. An analysis and discussion of feedback from participants follows, presented under three categories (i) CBL Framework; (ii) hackathon experience as professional development; and (iii) lessons learned.

Keywords: Assessment; Challenge-based Learning; Hackathon; Innovation; Pedagogy.

The Hackathon

A Snapshot of Hackathon Literature

The term *hackathon* has its roots in the word marathon where people participate in a long and challenging activity until they finish it (Covic & Manojlovic, 2019). A hackathon can be described as an intense, time-bound event where people collaborate in teams to solve challenges (Briscoe & Mulligan, 2014). It can also be described as a 'rapid, time-bound, pressurised problem-solving event', (Lake, 2022). A hackathon involves exploring a significant 'real world' social or technical problem and developing a solution to address it with a group of other people. Often used as a platform to facilitate fast-paced innovation (Page *et al.*, 2016), they sometimes involve competitive coding events where participants go from idea to working software/hardware over a day or weekend (Nandi & Mandernach, 2016). However hackathons can also focus on solving social problems, policy making, or even crafting (Feder, 2021). They are increasingly being used as a basis for collaborative group projects in various educational domains (Lyons, Brown & Donlon, 2021; Kienzler & Fontanesi, 2017) with some higher education institutions (including DCU) using them to foster 21st century and transversal skills such as collaboration, critical thinking, problem-solving, and creativity (Lake, 2022).

While the duration can vary, hackathons tend to follow a broadly similar format. Most begin with participants pitching their ideas and possibly outlining their areas of expertise. Sometimes this happens as part of pre-event activities which might include reading of preparatory materials, initial idea generation, and team building (Lyons, Brown & Donlon, 2021). Once teams are formed, the

challenge is refined and the teams investigate the problem to find an appropriate solution. At the end of the event, teams present their solutions to peers and often a judging panel (Briscoe & Mulligan, 2014). Throughout all this hectic activity, participants are coached and guided by facilitators and mentors from industry or elsewhere who will help to tease out the solution, ask critical questions about audience and objectives, and direct teams to potential resources.

How the literature informed the approach

A hackathon is a form of Challenge-Based Learning (CBL). According to the working definition of CBL at DCU, Challenge-Based Learning (CBL) is a 'process of collaborative engagement with peers, academics, and stakeholders to develop solutions to real-world social, technological, environmental and economic challenges of urgency and significance. CBL is a distinctively learner-driven pedagogy where learners, with the support of academics, define the dimensions of the challenge to be worked on. Throughout the process learners are given opportunities to acquire the necessary knowledge and skills to propose solutions for the challenge in question' (CBL Working Group, 2022).

The DCU hackathon was organised in accordance with the CBL framework of *Engage - Investigate – Act* (Figure 1). This framework is drawn from Apple's original definition of CBL (Nichols & Cator, 2008) and is the same overarching framework as that used by the European Consortium of Innovative Universities (ECIU). DCU is one of the 13 members of this consortium who have a particular remit to promote, develop and support the use of Challenge-Based Learning across Europe (About ECIU, n.d.).

3

Figure 1: CBL Framework Overview. Source: ECIU

The CBL Framework involves a three-phased approach aimed at supporting all stakeholders through the process. The three phases are (i) Engage; (ii) Investigate; and (iii) Act. Early on the hackathon organisers decided to allocate a master of ceremonies to help steer participants through the process. As a result the various stages of the process were introduced and kept on course by Frank van den Berg, our invited 'CBL Ninja', from the University of Twente. What follows is a brief overview of what occurred:

1. The **Engage** phase is where teams explore the 'Big Idea' and develop Essential Questions - open-ended, thought-provoking questions to raise further possible lines of inquiry - that are used to define the actionable challenge. By the end of this phase the team should have agreed the specific challenge they are going to focus on.

In our case, the 'Big Idea' or theme at the heart of the hackathon was 'How can we design an *authentic and sustainable* assessment experience for all?'. In line with advice from Lyons, Brown & Donlon (2021) we decided against presenting such an open concept on the day due to the strict

4

limitations on time and instead invited those who had registered to pitch specific ideas for specific challenges on this theme beforehand. These were refined into a series of Challenge Statements which were then presented as options for participants to work on on the day. As Briscoe & Mulligan (2014, p.4) state, 'Aims or challenges can be gathered beforehand, and they can be shared or kept secret depending on the format of the event.'

2. The **Investigate** phase is where the team explore as many resources and sources of information as possible to research and address this challenge. They need to identify what information they need and develop their knowledge and skills throughout this phase. Once they have the required information, they need to synthesise and analyse it in relation to the actionable challenge.

In our case, to support the Investigate phase, we needed to ensure that expert mentors would be in attendance to work with our participating academics (approx 50). A team of mentors were asked to work in groups of 4-5 to guide the 'hackers' in co-creating potential solutions to their chosen challenge. The 11 mentors came from across academia in Ireland and the UK and were invited for their expertise in assessment and curriculum design. Crucially, in line with Briscoe & Mulligan (2014), they were required to be personalities comfortable with working informally with new people in small teams intensively under pressure of time. Actively working alongside the team, their role was that of an expert critical friend, someone with a deep knowledge of the topic who is capable of asking probing questions and providing effective feedback.

Another vital resource on the day of the DCU Assessment Hackathon was the presence of the student ambassadors who also acted as critical friends but added an additional powerful stakeholder dimension in terms of student voice (Hassan *et al.*, 2022). The student ambassadors were on call throughout the day and provided an immediate 'reality check' and immediate feedback on the questions and ideas being posed. Other generous colleagues were available as further resources and sources of expertise on a range of topics - e.g. transversal skills, eportfolios, and strategic learning innovation - should advice on those aspects be requested.

5

Furthermore, a TEU colleague with particularly strong social media/Twitter expertise developed a social media campaign in the run up to the day and ensured that updates were circulated online as the day unfolded. This was important as hackathons can potentially suffer from a lack of institutional memory, which is the collective set of facts, concepts, experiences and know-how held by a group of people (Briscoe & Mulligan, 2014, p.11). This paper confirmed the importance of preserving documentary evidence about discussions, ideas, and the overall learning process in digital form, as much as possible.

3. The **Act** phase is where the proposed solution(s), recommendations or prototype are developed and shared. During the Act phase, teams design a working solution/prototype or a set of recommendations for a solution.

In our case, the day culminated in a series of short (10 min) presentations where ultimately 9 teams presented their proposed solutions to an assembled audience. A lively series of presentations ensued, with prizes being offered for those deemed to have met the criteria particularly well. Seven judges were invited to view the presentations and evaluate who should win. The day wrapped up at approx 5 pm. Attendees were kept busy and provided with plenty of food and beverages throughout an intense day of discussion, negotiation, and activity. The schedule for the Hackathon is shown in Figure 2.
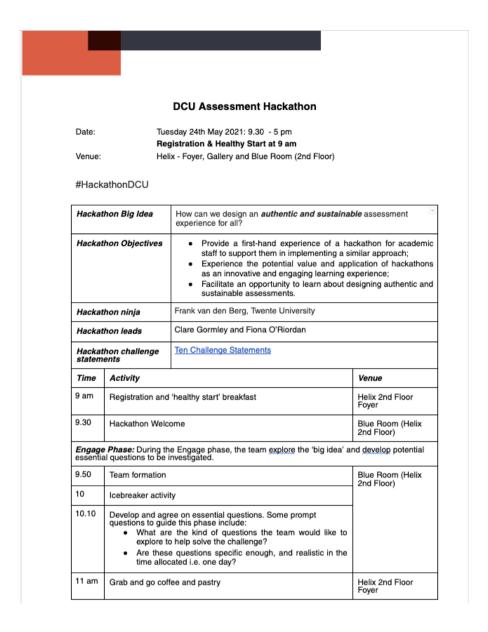
Figure 2: Extract from Hackathon Schedule. See full schedule of DCU Assessment Hackathon.

Analysis

Ethical clearance for this research was secured through Dublin City University Research Ethics Committee. Content analysis was carried out, per Holsti (1969) being any technique for making inferences by objectively and systematically identifying specified characteristics of messages. In addition to the consent questions, participants were asked a total of nine open ended questions. Analysis of the data identified three main categories: (i) CBL framework; (ii) hackathon experience as

7

professional development; and (iii) lessons learned. Analysis and discussion within each of these categories are presented below.

Challenge-Based Learning (CBL) Framework

The organisers were keen that the hackathon experience be grounded within an evidence based CBL framework. Findings show use of the framework had a positive impact *'[T]he explanation and experience of the process of CBL';* and knowing how '*CBL works as a process as opposed to an output*' were valuable learnings. Hackathon discussions throughout the day helped enhance understanding of CBL and hackathon vocabulary e.g. '*the opportunity to discuss the complexities of CBL was very welcome*'. Participants welcomed the structure of the day - *'I think the way the day was set out in addition to the mentors' help and the feedback from the students were key factors to the success of the day'*. Although one participant did say '*[T]he key stages were not as clear as could be useful (or maybe our group just didn't listen!)*'. The importance of the challenge was also acknowledged as key to the success of the hackathon or CBL experience - '*The challenge was really a wicked challenge. The diversity of the team added to this challenge*'; and '*[C]hoice of challenge on the day was great'!* Overall participants felt there was much potential impact for this approach, especially if rolled out across the university - '*I think it will have a high impact especially if it is institutionalised*'. The role of the hackathon facilitator (ninja), external assessment experts (mentors), and student ambassadors were called out frequently as key success factors of the day, exemplified in the following selected responses as to what worked well on the day - *'The feedback and discussion with students'; 'the mentors' guidance and students feedback'; '[T]utors [mentors] assigned to each group were the key success factors'; 'the final remarks from the expert [facilitator]', the keynote speaker [facilitator/ninja].*

Despite participants seeing the value of CBL within a framework and structured environment, some shared concerns about aspects of the approach. Although they appreciate the approach, some will not use it because '*I did not enjoy the experience and can see that it may not suit a lot of students*'. This

8

contributor was keen to say their feedback is not '*a reflection in any way on the organisation or running of the event, but the nature of hackathons*'. Others were concerned about the time constraints, and cited a negative on the day was '*... lack of quiet time to concentrate and think things through…the lack of time to carry out meaningful research*', and '*I think that given the importance of reflection of learning in the process that there could be more time given to this element*'. A considerable number had a view on how use of a one-day hackathon, in their context, could be problematic '*...short version of CBL (one day or one week) would definitely not work*'; and another '*I don't think a one day/one week approach is that useful. I will be more inclined to half a semester or a complete semester approach*'.

Hackathon Experience as Professional Development

Many participants were keen to see how hackathons work in practice so they could use it with their students and '*...enable me to do better hackathons*'; and to enjoy an '*[I]ntroduction to a new way of thinking about teaching*'; '*Curiosity and the desire to be in my students' shoes for once*' and to see how they might incorporate such an approach into future modules - '*I am thinking about using this approach in my teaching*'. For many, this was their first experience of hackathons so they enjoyed the opportunity to learn in a hands-on manner '*I enjoyed the opportunity to…..take on the role of the learner, the ability to ask the experts questions without judgement*'. Engaging in the hackathon in a collegial manner with colleagues was valued - '*Understanding the workload from the lecturers perspective [and] liaising with colleagues*'; '*...share ideas, learn, interact, socialise and communicate with peers*'; and '*I've learned from my table peers: the wonderful things they do, the ways they manage different groups sizes*'.

Participants appreciated the hackathon as an occasion to expand their understanding and experience of assessment - '*To improve and broaden my understanding of assessment*'. Specifically, academics cited a host of different assessment aspects that they learned about, for example, ePortfolio, assessment structure and scaffolding, authentic assessment, the assessment process and end product,

9

importance of feedback to assist student progress, assessment design to involve students, joint assessment.

Lessons Learned

Many observed the level of planning and preparation that goes into this type of teaching and learning experience - '*Long term planning and adequate resourcing is required',* and *'...it requires a LOT of preparatory work*'. Other concerns regarding planning were around the choice of space e.g. ensuring the space, acoustics and food were adequately attended to and deserve attention.

Notwithstanding the effort required to plan such an event, some participants remarked on the need for students to have some experience or underlying knowledge before engaging in CBL '*students need a foundation of domain knowledge and skills to make the most of the experience*'; and '*a certain level of existing experience and expertise is assumed of the students*'. Preparing the hackathon and scaffolding the students was considered by one participant as making CBL '*...difficult to implement'.*

Relevance of all resources used on the day was also called out. For example some felt the prizes for winning teams were unnecessary and distracting, although one participant enjoyed the prize aspect. Others commented on the jamboard tool for reflection, and challenge criteria for guidance, not being adequately used - '*Reflection and feedback through the jamboards felt shallow without true benefit*' and '*... the challenge criteria were not referenced enough on the da*y'.

In considering the analysis it is important to acknowledge the small sample size (n.7, 29% response rate) as a limitation.

Discussion

CBL appears to have great potential when grounded in an evidence-based framework, and combined with a well-planned structure and appropriate challenges. CBL is collaborative, and most rewarding

10

when used in a multi disciplinary way that enables the seeing of 'connections across disciplines' (Shakila *et al*, 2021, p.1497). Feedback from participants demonstrates clearly the value of learning from colleagues, including facilitators and mentors.The length of a potential CBL experience exercises many, with the tension between intensity of time pressure vs opportunities to deeply engage and reflect. The literature tells us that the time constraint can galvanise and focus attention, leading to a range of contributions being created in a relatively short period of time (Briscoe & Mulligan, 2014). However for some, the time is simply too short.

The opportunity to engage in a hackathon offers a valuable professional development experience, particularly when the challenge is one that is relevant and of interest to the participants. Briscoe & Mulligan (2014) advise that 'organisers must try to align the way the event is held with their motivational values' (p.11). Assessment speaks to all academics in one way or another, so a challenge in this space engages them. Being able to walk in the shoes of their students was greatly valued, and provides confidence and an appetite for using such an approach with their students. Similarly, being able to discuss their teaching with colleagues within a supportive learning community, was seen as a major benefit, where participants enjoyed exploring many assessment ideas.

The extensive planning and preparation required for an effective hackathon or CBL experience was acknowledged as essential by the majority of the participants. However, this is a double-edged sword, because it can act as a potential barrier to those with limited resources in implementing this approach. A key concern, which is also related to time and resources, is the scaffolding required for students to effectively engage in CBL and this is a potential line of enquiry for future research.

Conclusion

Overall the hackathon was received well. As organisers, we believe that the data supports the view that the first two objectives were realised on the day. Staff did receive a first hand experience of a hackathon and as a result, they were able to see if such an approach might have potential value within

11

their own contexts. Through their conversations and the requirement to create and share a tangible output - in this case recommendations for practice - they engaged in valuable conversations with colleagues about assessment. However, we are not convinced that the third objective was fully reached i.e. an opportunity to learn about designing authentic and sustainable assessments. Analysis of the data, and challenge solutions presented at the hackathon, did not necessarily add to the broader conversation about sustainable and authentic assessment approaches in general. However, for many groups, the solutions proposed were innovative to them, and were influenced by either the need for authentic or sustainable assessment in their context.

References

About ECIU. (n.d.). Retrieved 2 March 2023, from https://www.eciu.eu/about-eciu#about-eciu-university

Briscoe, G., & Mulligan, C. (2014). Digital Innovation: The Hackathon Phenomenon. *Creativeworks London*. https://qmro.qmul.ac.uk/xmlui/handle/123456789/11418

Covic, Z., & Manojlovic, H. (2019). Developing Key Competencies through Hackathon Based Learning. *2019 IEEE 17th International Symposium on Intelligent Systems and Informatics (SISY)*, 167-172. https://doi.org/10.1109/SISY47553.2019.9111513

DCU Office of the Vice-President Academic Affairs (DCU OVPAA). DCU Futures: Reimagining Undergraduate Education for an Unscripted World. Available online: https://www.dcu.ie/ovpaa/dcu-futures (accessed on 28 February 2023).

DCU Teaching Enhancement Unit (DCU TEU). DCU Assessment Hackathon, 2022. Available online: https://www.dcu.ie/teu/hackathon/schedule (accessed 1 March 2023).

Feder, T. (2021). Hackathons catch on for creativity, education, and networking. *Physics Today*, *74*(5), 23-25. https://doi.org/10.1063/PT.3.4746

Hassan, O., Foley, S., Cox, J., Young, D., McGrattan, C., & Bheoláin, R. N. (2022). Steps to Partnership: Developing, supporting, and embedding a new understanding for student engagement in Irish higher education. *All Ireland Journal of Higher Education*, *14*(1), Article 1. https://ojs.aishe.org/index.php/aishe-j/article/view/681

Holsti, O.R. (1969). *Content analysis for the social sciences and humanities*. Reading. MA: Addison-Wesley.

Kienzler, H., & Fontanesi, C. (2017). Learning through inquiry: A Global Health Hackathon. *Teaching in Higher Education*, *22*(2), 129-142.

12

https://doi.org/10.1080/13562517.2016.1221805

Lake, G. (2022, March 30). Hackathons in Education: A Creative Approach to Developing Researchers and Solving Educational Challenges. *EERA Blog*. https://blog.eera-ecer.de/hackathons-in-educational/

Lyons, R., Brown, M., & Donlon, E. (2021). Moving the hackathon online: Reimagining pedagogy for the digital age. *Distance Education in China, 7, [English Version]*.

Nandi, A., & Mandernach, M. (2016). Hackathons as an Informal Learning Platform. *Proceedings of the 47th ACM Technical Symposium on Computing Science Education*, 346-351. https://doi.org/10.1145/2839509.2844590

Nichols, M.H., & Cator, K. (2008). *Challenge Based Learning White Paper*. Cupertino, California: Apple, Inc.

Page, F., Sweeney, S., Bruce, F., & Baxter, S. (2016). The use of the "Hackathon" in design education: An opportunistic exploration. *International Conference on Engineering and Product Design Education*, Aalborg University, Denmark.

Shakila, N.U., Nizamis, K., Poortman, C., & van der Veen, J. (2021, December). Interdisciplinary Challenge-Based Learning: Science to Society. In *SEFI2021 49th Annual Conference Proceedings* (p.1491).

13