Experiential learning in practice

Chapter 14

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Abstract

The Innovation and Creative Exchange (ICE) presents a blueprint for challenge-led learning within Higher Education (HE). It uses a combination of wicked and commercial challenges to develop knowledge exchanges and communities of practice for learning. ICE provides a dynamic and unique environment outside the traditional curriculum for undergraduate (UG) students from different disciplines to work together to build sustainable networks. It introduces disruptive parameters to impact on learning, placing students in a time controlled environment, challenging students both creatively and technically. It was found that students who engaged in interdisciplinary challenge-led learning scenarios developed core skills associated with commercial awareness.

Introduction

The Chinese proverb often credited to 18th century US philosopher, scientist and civic leader Benjamin Franklin underpins the fundamental principle of experiential learning and forms the underlining framework for this chapter.

"Tell me and I'll forget; show me and I may remember; involve me and I'll understand."

Benjamin Franklin

ICE uses the concept of challenge-led learning to enable UG students to: co-create knowledge and form knowledge communities/exchanges leading to the developments of skills and attributes associated with employability, enterprise and entrepreneurship. This chapter presents a blueprint for experiential learning in practice through employing interdisciplinary wicked challenge-led learning opportunities as part of the HE UG experience. A case study is presented which focuses on specific elements of the ICE

Project at the University of Huddersfield, UK. This project was funded through the Royal Academy of Engineering - Visiting Professors Scheme 2012-2016, with Professor Jonathan Sands (Vexillifer Elmwood) as the Visiting Professor of Innovation (VPI). Drawing on the work of Kolb (1984), ICE focuses on the elements of experiential learning concerned with concrete issues related to the learner and the learning context (learning-by-doing). The case study presents a synthesis of impact in relation to interdisciplinary wicked design-led challenges from the student's perspective.

It is widely recognised that in global society, environments are created characterised by 'wicked' problems, the solutions to which require transcendence of traditional discipline-based boundaries, new forms of knowledge-sharing and a tool belt of transferable skills. This 'wicked', messy context (Jordan et al. 2014), demands a shattering of traditional disciplinary boundaries and creates a strong rationale for embedding interdisciplinarity into the HE student learning experience. Furthermore, the call for HE to embed employability, enterprise and entrepreneurship opportunities into the student experience is compelling (DIUS 2008; QAA 2012; RAE 2012; McLeish and Strang 2014; DC 2015; BIS 2016;). Graduates as societies' leaders need to be highly skilled, commercially aware and able to apply creative ideas and innovations to practical real world scenarios. The ICE project provides a 'direct' experience in which the learner is actively involved in the 'real' situation through global wicked challenges or commercial challenge led activity. It brings together students from different disciplines and places VALUE on what each learner brings to the educational experience (a key aspect of experiential learning). The case study presented is a synthesis of the feedback from the student participants (2012-2017) and commercial partners involved in a series of 24-hour/7-hour design challenges. This data is complemented by a series of interviews with a team of students 12 months after their initial challenge-led learning experience. It is framed in the core principles of experiential learning, learning-by-doing and learning through reflection-on-doing. The example featured in this chapter as a case-study is from the 2016 24-hour design challenge, the theme of the challenge was 'internet of things'.

Context

Interdisciplinary working has been recognised as a key contributor in solving complex global social problems (DIUS, 2008; QAA 2012; BIS 2016). It therefore follows that graduates as societies leaders with a genuine interest in making the world a better place must have the ability and confidence to work across disciplines. In today's global economy and in society as a whole, we are faced with many wicked challenges which require new ways of working and graduates need to be prepared for this through the integration of interdisciplinary working within their UG experience. It has been recognised that the commercial sector are suffering skills shortages (BIS 2016). A recent report by The Association of Graduate Recruiters (AGR 2016) acknowledged that 71% of employers tailor their recruitment to find candidates with commercial awareness, but a mere 15% hire graduates with this skill. Further to this it was ascertained that problem solving, teamwork, self-awareness and interpersonal communication were skills that employees thought should be developed as part of a student's HE experience (AGR 2016). This is supported by a plethora of literature which advocates the value of providing collaborative experiences within HE which use, live briefs and problem solving as a mechanism for enhancing learning, employability, enterprise and entrepreneurial development (Stember 1991; Power 2010; Marcketti and Karpova 2014; De Hei et al. 2016).

Background to ICE

ICE provides a dynamic and unique environment outside the traditional curriculum for UG students from different disciplines to work on wicked global challenges and commercial challenges. It introduces disruptive parameters to impact on learning, placing students in a time controlled environment (either 24-hours or 7-hours), challenging students both creatively and technically in a competitive interdisciplinary environment, thus developing essential employability skills such as problem solving, resilience, communication, team working, and project management.

UG students from across the university (primarily second year degree students) are offered the opportunity to register for an extra-curricular 24-hour/7-hour design challenge (either wicked or commercial), this is open to all disciplines across the university (30-40 places are available per challenge). There are prizes for the winning teams which vary depending on funds and commercial sponsorship - short internship for the winning team (1 day – 5 days) are the favoured award. Initially students are invited to register for a challenge, upon registration the discipline and specific UG programme for each individual is noted, this is to maximise opportunities for interdisciplinary teams to be created. The event is advertised and marketed as an opportunity for participants to: network beyond their core discipline, co-create knowledge, and enhance employability, enterprise and entrepreneurial skills and attributes through problem solving activities (learning-by-doing). There is the requirement within every challenge to present ideas concepts and solutions to a panel of internal and external judges (from the commercial sector). The framework for the two types of challenge-led learning (wicked or commercial) are illustrated in Figure 14:1.

<FIGURE 14:1 ABOUT HERE>

Methodology

The themes for the design challenges are revealed on the first morning of the event, by the organiser (Figure 14:1 for framework). Students are introduced to the 'challenge theme' in the form of a simple statement and provided with a set of ground rules including guidance on intellectual property. The 'challenge theme' is deliberately set as a wicked global challenge which is open and complex (it is initially presented as a single statement). Recent challenge themes have included: "safety in extremes", "sustainable solutions for global challenges", "the ageing population", "internet of things", and "sustainable recycling in the 21st century". An expert/commercial speaker presents a 40-60 minute overview, exploring different discipline angles and perspectives, opening discussion and interaction with the student participants, and providing provocation around the theme. All students are encouraged to take notes and interact with the guest speaker, a full copy of the slides is available once the 'challenge theme' has been released. There is an opportunity for questions at the end of the guest speaker's presentation to clarify any uncertainty. Following the formalities, the student participants are equally

split into teams of 3-5 members 'Interdisciplinary team forming', the sampling for this is based entirely on the disciplines in attendance on the day (this is arranged after registration, whilst the students are engaged with the guest presentation), to ensure cross-discipline collaboration occurs. Where possible all teams include one member from the design discipline, this is to ensure students have a connection with the technical support for the 'design challenge board' and printing which is offered through the School of Art and Design. Each team is issued with a 'challenge pack' which contains a printed copy of the schedule for the 24-hour challenge, copies of the guest speaker's presentation, notebooks, pencils and a USB memory stick containing a proforma for a poster style 'design challenge board' (which is to be used to present to solution to the challenge to the judges, a printing slot is also issued with technical support for day 2 of the challenge). The teams are then encouraged to spend the remainder of the morning 'brainstorming' the wicked challenge and getting to know their team members skills and background. The room is set up so that each team has a workable space (large table), teams are free and encouraged to use the resources and facilities they have in their respective schools and the wider university facilities (internet and library). This is to encourage cross-fertilisation between disciplines across the university. The guest speaker, facilitators (academics from different schools within the university) and a Professor of Innovation circulate around the groups to enable further questions and dialogues to occur. A working buffet lunch is provided for all teams and then the students are left to pursue the challenge in whichever way they choose, the base room remains available for those wishing to use the space. Various approaches are used by the teams to approach the challenge, many teams segregate tasks and separate individually or in pairs in pursuit of their goals, forming later as a team to share findings. Mid-afternoon on the day of the challenge, a 'mentoring drop-in' is scheduled with academic staff from different disciplines. Not all teams choose to attend, some teams engage with the task independent, emailing academic mentors if they have any queries. This is a voluntary facilitated session, to give the teams the opportunity to discuss the practicality of their ideas – quite often the students talk through a range of ideas and solutions to the challenge to identify the most feasible idea/solution to develop further and present to the judges on day two. The remainder of the day is spent preparing the 'design challenge board' for the presentation on day two. Students are not expected to work beyond 5pm, however if they choose to do so that is acceptable.

Day two begins with the student challenge teams using their allocated time slot for printing with the technical support team, resulting in a high quality design challenge board to present to the judges later in the day. The student teams are each given 5 minutes to 'pitch' their solution to the wicked challenge in a 'dragons den' format to a panel of four judges, with opportunity for questions from the panel. The teams spend the reminder of the morning practicing their 'pitch', all team members are encouraged to participate in this activity. This is to ensure learning opportunities are maximised and all students develop presentation skills. Each team is allowed one printed 'design challenge board', the use of PowerPoint is strongly discouraged primarily due to the limited timeframe. However, some teams bring in lap-tops with short videos to demonstrate the design concept (this is particularly evident with the teams with product development students since they already have this skill set). The pitches begin after lunch, the judging panel consists of members from different disciplines: two from the commercial sector and two academics, from enterprise and from a discipline to complement the challenge (in a commercial challenge the company advises on the judging panel). The presentations are dynamic and fast moving, students need to work as a team, managing their time and thinking on their feet to answer the judging panels' questions. The judging criteria is focused around six areas (see bullet points below). The panel judge all pitches separately and at the close of judging they assemble all the 'design challenge boards' to cross reference notes to determine the prize winners. Feedback is collated independently for each team.

- Presentation skills
- Concept/idea/design
- Approach to research
- Team skills / group working (reflections)
- Commercialisation and use of data/benchmarking
- Timing (5 mins)

All student teams are invited back into the room and the judges share their general thoughts in relation to areas for success and for improvements, each presentation board is available for all teams to see and the positives/development areas of each concept/idea prior to the awards (prize giving). Thus, ensuring there is transparency and each team receives positive and developmental feedback direct from the judging panel. The prizes are then presented in reverse order by a representative of the judging panel, it is made explicit why the idea/concept was a prize winner, so that all students can benefit from the feedback and reflect on their own experience. At the end of the event all teams are encouraged to reflect and discuss with the judging panel and their peers their ideas and approaches to learning – all the 'design challenge boards' are available and on display so the students can learn from each other. During the event notices are displayed regarding image capture to ensure any student can request their image not to be captured and shared, students are notified at the start of the challenge that their boards may be made available for academic purposes or for marketing.

Analysis

The participant feedback from the design challenges during the period 2013-2017 have been analysed in context of the learner and the learning context as described under the concrete issues by Breunig (2009). The participant feedback was collected prior to the awards (prize giving) for each challenge using a combination of open and closed comments (see Figure 14.1). For the purpose of impact, it is the open text comments (impact on personal experience and general comments) that are analysed and discussed.

In relation to the participant reflection, many contributors acknowledged a positive learning experience in relation to their emotions and feelings. Many comments used the term "love" to denote a pleasurable experience "I love working with all of my team who were from different specialisms", "I would definitely love to give this a go again", others described the event as "fun, exciting, enjoyable, creative, great idea and experience, refreshing, awesome and of personal benefit". Stating that they would

participate again in this style of learning and would happily recommend the design challenges to others. There were numerous comments relating to the excellent organisation, which suggests that this is something that is important to the learner and a high value is placed on this and it is perceived as impacting on their learning experience. One notable extract "Overall I cannot fault the opportunity of taking part and enjoyed every stress inducing minute of it. I would definitely do something similar again", demonstrates that participants appeared to appreciate the disruptive learning techniques and values the benefits of dealing with unfamiliar circumstances (building up resilience). A second student commented "Good experience … [it] put me under pressure…again not a bad thing." Other learners reflected on a deeper level in relation to the impact on their learning experience, valuing new techniques for learning and had plans to implement them to benefit their studies (demonstrating transferable skills, problem solving and resilience) for example: "… I always struggle coming up with initial ideas so I will be using these techniques in my degree", "I believe I learned a lot from peers in my team and this experience will benefit me in future group projects" and "I have taken this exercise seriously and it will definitely benefit me in the future."

In terms of the learning process (Table 14:1), there is evidence to support confidence building, development of interpersonal skills and communication, improved time management and team working. Unsurprisingly there were many comments relating to the value of developing commercial awareness, many of these were relating to speed to market and appreciation of the commercial pace. It was interesting that one participant reflected on finding the multi-disciplinary aspect quite difficult, another furthered this by stating: "I need to do it again, it is not a matter of if I want to, I need to if I was to improve" again denoting a perceived value of challenge-led interdisciplinary learning in relation to their personal development.

<TABLE 14:1 ABOUT HERE>

The learning context formed two category codes in the analysis. Firstly the recognition of "value" of what each learner brings to the experience and secondly a reflection on the "holistic" process of

learning, through experience. There were a number of extracts relating to the perceived value of team working. These where categories under 3 open codes; friendship/networking, impact of collaboration, and skills (Table 14:2). In terms of the learning context the friendship/networking open code was the most significant, both in terms of a) value of discipline epistemologies "I also find it incredible that after only a day, I came away with a team that I had formed a friendship with and now have an insight into demonstrating an idea to someone who has the means to make it a reality" and "It was really interesting to work with other students from different subject areas". And b) value of sustained networking for learning "I have contacts / friends on completely different courses to me who I will no doubt be calling on for help on future projects as well as the one we started". Further to this the open code, 'skills' demonstrated appreciation of discipline differences "...really great getting to know people from other courses and seeing how they work and learning what skills they have that are different from your own" and "it was a new experience to work with students from other departments and try and utilise everybody's skills to work together to produce something". There was also some acknowledgement of missing skills which was interesting and illustrated the value the participants placed on presentation and communication during challenge based learning, "the lack of other design based members left no-one with the skills to develop or present ideas on a visual level".

<TABLE 14:2 ABOUT HERE>

There were a number of extracts relating to the holistic learning experience. These where categorised under 4 open codes; general comment, value of collaboration, further prospects and learning value (Table 14:3). In terms of the learning context the perceived learning value, was the most significant open code. Participants commented how challenge-led learning had made them "… more passionate about [their] subject and [felt] that this would be a good idea to implement within … modules", others focused on how it had synthesized learning "…bringing in different skills we have learnt throughout our time here so far". Participant again commented that the networking had been beneficial both in terms of connecting with peers from other disciplines "As an engineer, it is important that I develop the ability to work with multiple disciplines and in the 24-hours we were given I have been given a massive insight into how completely separate skill sets can come together to generate an idea" and making

connection with academic staff from around the university. "It was really helpful to speak to the different tutors … and pick their brains about our ideas, as I would never normally come into contact with these courses usually". Other comments in the learning value open code relate to motivation, stimulation, creativity and the value of learning new things (Table 14.3). The general comments, were interesting from the critique perspective and will be used to inform new challenges and improve the experience. It was interesting at a basic level that participants felt that the facilitator should "at the beginning [remind them] that swapping contact details of some form is really useful". Whilst this may be perceived to be an obvious process in team working, it clearly was not conducted by all groups and upon reflection these students had learned an important process step for future collaborative working/learning. The remaining open categories denoted the value of collaboration "do it as it fosters collaboration in between different schools which otherwise wouldn't communicate with each other" and in the 'further prospects' open code it is clearly evident the contribution and value perceived from different disciplines including, applied science, business and design (Table 14.3). Further to the comments from the participants the judges and Visiting Professor's comments demonstrate the value to the commercial sector (Table 14.4). Professor Jonathon Sand's (Elmwood) commented "Real energy and passion is created when teams of students from the different disciplines come together" (2017).

<TABLE 14:3 ABOUT HERE>

<TABLE 14.4 ABOUT HERE>

What Next?

Following the 24-hour wicked design challenge all teams were offered the opportunity to attend a proof of concept development day. This involved active participation in design thinking, the business canvas model, IP/patenting, and a technical specifications seminars. The students had the opportunity to apply for a £1000 grant to prove a concept. Academic staff were available throughout the day to assist student teams in developing their ideas into a proposal. Further to this all teams who were interested in applying for the funds were allocated two mentors (academic or commercial) to assist them in managing the project. Below is a mini-case study from the winning team of the 2016 24-hour design challenge

'internet of things'. The case study presents the team's journey after 12 months. A team of 4 second year students from different disciplines (see Table 14:5) was formed. The team worked together on the challenge theme the 'internet of things' and came up with a concept of the Blue Bin. The concept was to design a bin that could be used in the university to recycle paper giving print credit to individual users. Students (identified by their University ID card) would enter their waste paper into a smart bin which weighs the paper deposited, each student is then rewarded with print credits. There would also be a smart app to accompany the physical bin which has a gaming element enabling data to be compiled showing which of the University's academic schools is most diligent in recycling. The four students developed the concept and explored potential mechanisms theoretically during the 24-hour design challenge. The judges awarded them first prize for the concept, development and presentation of the idea. The team then attended a proof of concept event to develop their ideas further, this was half-a-day and was closely followed by an Innovation Funding Day Event where the team worked together with academic and industry mentors from across different disciplines to develop their idea for a funding grant of £1000. Professor Stefan Gabriel (Visiting Professor of Innovation) was at this event to advice on developing concepts into business plans/incubations. The 'Blue Bin' team decided to prove concept by developing a working prototype. During the next 3 months (July-Oct) the team worked closely together to build a prototype using the funds to purchase mechanical and electronical components to enable the concept to be turned into reality. Figure 14:2 illustrates the initial design board, the concept and the actual working prototype developed (courtesy of 'Project Blue'). This was presented in a competitive process (Dragon's Den-type of event) and the team won the prize for the most innovative proof of concept.

<TABLE 14:5 ABOUT HERE>

<FIGURE 14:2 ABOUT HERE>

In terms of experiential learning the members of the team provided a 50 word reflection on their individual experience after the event (Table 14:6). There are some similarities in terms of emotions/ feelings, the values to learning and the holistic process reported generally by the participants of the 24-hour challenges offering evidence of a concrete learning experience, reflection, conceptualisation and

active experimentation (Kolb, 1984). The students related emotions and feeling with both the process and directly with the learning experience. Friendship and networking appeared to be a priority "It has been an unbelievable experience that has offered me the chance to not only meet new people and make forever friends…" and "The ICE project for me has been such a beneficial experience. I've learnt skills which I would never have gained through my degree and I'm still being offered brilliant opportunities and meeting new people due to taking part in this project". The value of cross-discipline collaboration and its impact on learning was recognised "The ICE 24-hour challenge in tandem with the inception of Project Blue [brand name] has been an amazing experience collaborating with a team of incredibly talented students in the development of a simple idea into a flourishing project" and "to my surprise the value of the ICE challenge has been not only been in the high pressure work itself, but in the experience and highlighted importance of cross discipline student collaboration" and "I look forward to seeing where Project Blue takes us next, and the opportunities for collaboration with other students and industry partners". The value to skill development for commercial awareness is also evident: "personally as a designer, Project Blue has demonstrated an ability to not only craft and develop an idea into strong brand identity but then weave that brand into a styled companion digital role out & animation, all of which have become highly transferable skills when working in industry", "offered me the chance… [to] learn things in industries that I have no knowledge of at all. I would recommend it to anyone not only as a confidence building experience but also the chance to pursue an idea or concept that you wouldn't otherwise get the opportunity to even look at."

<TABLE 14:6 ABOUT HERE>

Experiential Learning in Context

Three of the participants from the 'Blue Bin' Team continued with the project for 6 months after the proof of concept and submitted "Project Blue" (as it became known) for the Morphous Prize (European Universities and Graduate School Championship). This involved creating a business plan, branding campaign and further market research to support the proof of concept. Since not all the team was able to participate in this event, the team had to negotiate an 'Intellectual Property Agreement' between the members to enable the project to progress. Thus, demonstrating key skills required within the

entrepreneurial context as all the team demonstrated maturity in the business negotiations. The three team members who continued with the project were interviewed 12-months after the initial 24-hour design challenge to determine the value and impact of interdisciplinary challenge-led learning in the context of experiential learning. A snapshot of their collective experiences was captured and contextualised with the four stages of Kolb's experiential learning cycle (Table 14:7).

<TABLE 14:7 ABOUT HERE>

Concrete Experience - All three students reported learning value however, the drivers for getting involved initially were different. One participant commented "It is a good chance to get to know people…you could meet someone you have nothing in common with at all, but you get on with them really well". Another stated "The 24-hour challenge provides a real world working environment on campus. Working with a team of like-minded students on an industry brief under tight time constraints was something in the run up to placement I was eager to be involved in". There were some similarities in relation to feelings of apprehension and the recognition of a safe environment for risk-taking combined with the delight of discovery - "I thought if I do mess up and I am out of my depth, well I can do it and I will come back and just carry on studying" and "this is something that I had no idea what I was doing". The participants related different strategies for approaching the task: "You had to figure out who was best at what? We had a structured team [different disciplines]", "the only challenge was when we came to the next stage after the challenge, we had a lot of skills in one area". Yet they demonstrated extreme resourcefulness in their approach - "I never knew about half of the facilities we had [at university], and I learned that through the people I met. … so many different things and so many opportunities and I had no idea."

Upon reflection "Reflective Observation" all the participants commented on the value of networking and learning from others: "Even … he had been down the hall from me for the last two years and I never met him", "I experienced fast paced working environment with potential to deliver a project that's not limited by your own particular skill set. Giving you the opportunity to learn and develop from other

people's experience". One participant commented that "one of the key things I learned was that it was alright not to know it/things." "I actually learned a lot about not just working with people who don't know what engineering is and how it works. But also how engineering works myself learning-by-doing, and that it is alright not to know". There was a support element and empathy to assist others - "one thing I learnt in particular was to understand people's weaknesses and to let them try and overcome them." There was a strong acknowledgement that challenge-based learning underpinned the real world environment - "I've found that when talking to employers outside of university they're much more interested in the value of challenges like this, rather than seeing a normal academic project". "So among many employable skills learnt on the challenges, team work to me was the most important." "Learning how to work with people better, because everyone says - I find groupwork frustrating and try not to do groupwork. Yes, group work is frustrating sometimes and I wouldn't want to do this as part of my degree but I feel that doing this as an extra curricula activity, it does have its benefits because you learn how to work with people before you go into employment and you learn a lot from your mistakes with working with people".

When evaluating the experience (Abstract Conceptualisation) the participants commented on the learning environment and its impact. "I grew as a person. It is a different learning experience than we experience on our course, you are completely outside you comfort zone", and "The challenges however light the fire beneath you and really force you to make critical decisions on the fly to create the very best work in such a small amount of time". "I ...[now] consider everything, the way I dress and the way I speak to people and it might be you only meet someone once, but in five years' time they might be really important to your future. I defiantly see more opportunities". "You learn a lot of how to deal with people and being to be able to work with people from very different disciplines than what you are working in, is a very employable skill as well, it is so useful. You are learning how to do this before you go into employment".

The biggest impact for learning from the 24-hour interdisciplinary challenge was within the "Active Experimentation" stage and how students saw this experience enhance future learning. "I will take a lot of confidence and patience [away with me], if you don't know something it doesn't mean you're never

going to know it, you just need time to understand it". "I have defiantly committed a lot more of my time to do things I always wanted to do, but never done before. The experience of the challenge and after have given me the confidence to do this". "Whether that's interacting with my team, presenting to an audience, or simply putting my head down and getting the job done. The 24hr challenges manage to wrap all three of these elements up into just one day of work which is in a nutshell what makes them massively valuable to the students" and "I feel I could do something more complicated [in my final year] after doing this than I would have been able to do before the project…". Skills of lifelong learning were demonstrated - "I learnt a lot of lessons… [such as] not to let things get to me too much, I am a person that wants to do my best, some of the things I do like: work late into the evenings, I feel like I have learnt to let go a bit, it is alright to have down time. I have learnt to trust other people".

Conclusion

The ICE project is presented as a blueprint for innovation in experiential learning and demonstrates the value of learning by doing through interdisciplinary wicked design-led challenges. It was found that by placing students in interdisciplinary challenge-led learning scenarios, skills associated with commercial awareness were developed such as problem solving, teamwork, self-awareness and interpersonal communication (resilience and confidence to work in unfamiliar environments). These skills were not only developed, there was an acknowledgement of their development by the students involved. Thus, demonstrating the value and impact of learning-by-doing and learning through reflection-on-doing (experiential learning) in practice. There is much literature supporting the value of providing experiences within HE which use collaboration, live briefs and problem solving as a mechanism for enhancing learning, employability, enterprise and entrepreneurial development. However, this project brings together opportunities to co-create knowledge through forming interdisciplinary learning communities and knowledge exchanges and captures the students perspective in terms of the perceived value and impact of this experience. Student who participated in the challenge denoted a pleasurable experience and comments can be assimilated to show appreciation of working outside their comfort zone, both initially after the event and upon reflection many months after the initial experience.

Throughout the feedback, student comment - resilience and confidence building is demonstrated. Stress and pressure are linked to positive learning values and there is a realisation that this style of learning (challenge-led learning) will benefit them in their careers, both in terms of skills but also in terms of their extended professional networks. Students who undertook the challenge reported engaging with more opportunities for learning then they potentially would have done.

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