

Abstract

The sudden shift from traditional education to online education created many challenges and difficulties for universities, faculty members, and students. Through the COVID period, students' enthusiasm dropped heavily and many lost motivation due to the different learning environments and conditions besides reduction in the graduate job opportunities. Hence, in the 2021/22 academic year, during the coronavirus outbreak, a series of virtual and on-site extra-curricular activities were offered to Electrical and Electronic Engineering (EEE) BEng students at the University of West London as a complement to their degrees. The activities were well-planned to address students' anxiety over employment prospects in a post-COVID world. The study's findings were promising as students reflected positively on their experience and how it could influence them in the future. The students who participated in these activities have found each of them enlightening in that it exposed them to many different areas of engineering and its diverse applications. Whilst they appreciated all of the five activities, most of the students found the professional lectures to be the most interesting activity in terms of the topics covered and the wide influence of subjects discussed on all aspects of students' daily lives. In addition, the information provided by the speakers complemented the students' studies. In conclusion, this case study should be considered as a reference to select the right activities that meets Engineering students' needs.

Introduction

In the 2021/22 academic year, students of Electrical and Electronic Engineering (EEE) BEng at UWL have been provided with several extra-curricular events as a complement to their degrees (Buckley and Lee, 2018). This consisted of talks with external speakers and opportunities to network with professionals (Walsh and Powell, 2018). There have been mainly five such events in this academic year. In chronological order, Table 1 classifies the events based on their type and provides the events venues and dates:

Table 1. The Extra-curricular Activities AY 2021/2022 for EEE course students.

Activity/Event Number	Event Title	Venue	Event Type	Event Date
1	IEEE Empowering Women in the Triple Helix Model	Online	Webinar	Tuesday 26 th October 2021
2	IEEE Xmas Lecture	Regent Street Cinema	Off Campus	Thursday 9 th December 2021
3	Ofcom Presentation	UWL St Mary's Road, Ealing	In Campus	Tuesday 14 th December 2021
4	Power Systems presentation	UWL St Mary's Road, Ealing	Hybrid	Thursday 16 th December 2021
5	Sky Legal Insight Day	Sky Campus, Isleworth	Off Campus Workplace	Tuesday 5 th April 2022

This case study presents five different extra-curricular activities consisting of career talks by external speakers (Sky), professional lectures (IEEE Xmas lecture), international conference (IEEE webinar), related technical talks (Ofcom and Power System), and networking opportunities (Sky). The activities were evaluated based on students' feedback to measure the impact of improving students' extrinsic motivation, boosting students' learning experience, strengthening students' professional links, growing students' networking skills and engaging students with the employability world.

Event Descriptions

1. IEEE Empowering Women in the Triple Helix Model Webinar

The first extra-curricular/employability event took place virtually, with a focus on female engineers/academics from universities and research institutes in Ireland and the UK. The main body of the event was composed of a range of technical talks given by several women in engineering who gave their presentations in fields such as Artificial Intelligence, Wireless Sensors, Optical electronics and Cybersecurity. Each speaker had a maximum of five minutes to present their topic due to the considerable number that were scheduled to speak in this event. Many of these presentations were based on innovative projects that these women were currently undertaking. A small window of time was allocated for questions and answers relating to any of the technical talks. The speakers and the virtual audience were then split into virtual rooms known as breakout sessions which were composed of three technical topics that were covered in the talks. This virtual event lasted from 11am to 1:30pm on the same day. This event was organised by the IEEE Women in Engineering UK & Ireland and Confirm Centre.

2. IEEE Xmas Lecture

The IEEE Christmas lecture took place on-site at the Regent Street Cinema in Central London. The showpiece topic for this event was the History of Computing from its inception in the 19th Century up to today. The speech/lecture paid particular attention to dispelling popularly held myths about the history of computing and the etymology behind certain computing terms. This event was operated in a hybrid manner, with a physical lecture at the cinema and a virtual session for those who could not attend. After the end of the lecture, a mini awards ceremony took place for many of the IEEE members who attended. There were opportunities afterwards to ask questions to the lecturers and organisers as well as to network with professionals in the IEEE.

3. Ofcom Talk

The second of the on-site talks took place inside UWL's Ealing campus, and the main speaker for this event was from Ofcom. As the Director of Spectrum Engineering at Ofcom, the focus of her talk was on the methods of managing the electromagnetic (EM) spectrum and its uses in numerous technologies. Topics of her presentation included the regulation and licensing of radio frequencies and coverage in hard-to-reach locales of the UK in addition to other topics in telecommunications. The speaker of the presentation is responsible for allocating/selling licenses to companies for the use of a particular band of the EM spectrum. The event ended in a group photo with the speaker, lecturers and the attending EEE students.

4. Power Systems hybrid lecture

At the end of the first semester, a virtual presentation about Power Flow Control using an innovative technology from Smart Wires Inc was held by an external speaker. Using a system developed by Smart Wires Inc, this company aims to maximise power transmission and distribution by intelligently sending power back and forth using any spare transmission capacity. Explained were the clear benefits in terms of incorporating distribution-side power generation into the overall grid (e.g., Solar and wind power from commercial and residential areas) compared to traditional methods of power management. After the end of the talk, there was an opportunity for students and the lecturer to ask the speaker questions, with the event ending in a virtual photoshoot.

5. Sky Legal Insight Day This was a full day event. The objective of the event was to expose students to careers and professions. It focused especially on legal careers within Sky. Unlike the previous four events, this one did not only involve engineering students, but students pursuing law courses in UWL as well. Furthermore, this was the first event that was not about engineering. The event, which took place at Sky's headquarters in Isleworth, consisted of a legal case study, a workplace lunch with sandwiches, a demonstration of Sky's newest product, group photos, and various talks on employability, legal aspects and on law careers at Sky. The legal case study encouraged students to tackle a scenario that involves a legal dilemma in groups of three or four and present it in front of an audience. Students had to gain as much knowledge and understanding of the problem and viable solutions as possible in a limited time period. Each group was given help by a legal professional from Sky to prepare their speeches and to understand the important legal details. The rest of the day involved talks with law specialists from Sky, along with showcases and photo shoots. At multiple times of the day, there were opportunities to ask questions to these professionals about employability and on various legal aspects.

Students' Event Evaluation

The completed ratings for all of the extra-curricular activities for 2021/2022 academic year is shown in Table 2 based on students' evaluation. Each aspect given ratings out of 5, with 1 being the worst and 5 being the best.

Table 2. Extra-curricular Activities Ratings AY 2021/2022.

Activity/Event Number	Event Title	Improve students' extrinsic motivation	Boost students' learning experience	Strengthen students' professional links	Grow students' networking skills	Engage students with employability world beside	Total for each activity
1.	IEEE Empowering Women in the Triple Helix Model (Virtual).	4	3	3	2	3	14/25 = 56%
2.	IEEE Xmas Lecture at Regent Street Cinema.	4	4	5	4	3	20/25 = 80%
3.	Ofcom Presentation (at UWL).	5	5	5	3	4	22/25 = 88%
4.	Smart Wires Inc. Presentation (Virtual).	3	2	4	3	4	16/25 = 64%
5.	Sky Legal Insight Day at Sky HQ.	3	3	5	5	5	21/25 = 84%
Total sum for academic year		19/25 = 76%	17/25 = 68%	22/25 = 88%	17/25 = 68%	19/25 = 76%	

Comments on Activities Ratings:

Triple Helix Model: The event hosted several female academics who are undertaking innovative research. Students could see many examples of engineering applied to real world problems. The average ratings suffered due to the virtual nature of this event and the short time given for each speaker to explain their research. This particularly affected the learning experience and networking ratings.

IEEE Xmas Lecture: The main part of the event was an extended lecture on the history of computing. Students found the topic of the lecture to be interesting and it gave another dimension to their learning. The ability to interact with professional engineers who are members of IEEE has raised the ratings relating to networking and professional links. The low audience due to a new COVID variant meant that certain networking opportunities were missed.

Ofcom Presentation: Students gave very positive reviews on this event, with a consensus being that it has improved their learning experience and motivated them. The presence of an important professional from Ofcom has brought up the average rating further. Not much attention was given to networking opportunities in this event.

Smart Wires Inc. talk: This virtual event consisted of an engineer from Smart Wires Inc. who talked about intelligent methods of managing power systems. The learning experience was limited by a lack of detail on power flows and other power topics. This also impacted on students' motivation as a result. On the other hand, this event gave another taster on engineering in a professional environment outside of university.

Sky Legal Insight: This full-day event at Sky HQ attempted to give students a taster of careers in law within Sky. Engineering students talked about how it was not focussed on engineering and therefore did not directly complement their learning. There were also fewer interactive activities than expected that might have piqued students' interest in the field of law. On the other hand, this event gave students first hand experience of a professional environment. There were ample opportunities to meet and network with professionals.

Students' Comments

The students who participated in these events have found each of them enlightening in that it exposed them to many different areas of engineering and its diverse applications. The events have given the students an appreciation of all the areas of engineering and of engineering as a profession/career. The events give a broad perspective on Engineering as a profession and outside of a university setting. Most found the Ofcom event to be the most interesting in terms of the topics covered and the wide influence of Ofcom on all aspects of our daily lives. In addition, the information provided by the Ofcom speaker complemented their studies in Communication Systems. Other interesting aspects of the Ofcom event included the way that phone companies would compete for ownership of phone masts to obtain more coverage.

Conclusions

After almost two whole years under strong pandemic restrictions, these extra-curricular events provided final year engineering students with a taster of engineering outside a university environment, especially in a professional context. It also largely complemented students' learning experience by introducing them to different aspects of engineering that they may not have known about in university.

References

Buckley, P. and Lee, P., 2018. The impact of extra-curricular activity on the student experience. *Active Learning in Higher Education*, 22(1), pp. 37-48.

Walsh, A. and Powell, P., 2018. Supporting student innovation through an engagement, employability and employment ecosystem. *Higher Education, Skills and Work-Based Learning*, 8(1), pp. 15-28.