



The Eureka Centre UCC

A Centre of Excellence in Science and Mathematics Education

Accredited by the *International Council of Associations for Science Education*

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1. Why was the Eureka Centre set up?

The two driving forces behind the setting up of the Eureka Centre in 2011 were Professor Áine Hyland, Head of Education and Vice-President for Teaching and Learning UCC and Professor Pat Fitzpatrick, Head of College of SEFS. Professor Hyland was responsible for appointing the first full-time lecturer in Science Education in UCC in 1998 in order to increase the number of qualified science teachers

graduating from UCC. At the time, UCC had no dedicated facilities for training science teachers and it was written into the strategic plan for the School of Education (then called the Department of Education) that laboratory facilities, microteaching facilities, office facilities and a science education Resource Centre were required for training our science education students.



The Bachelor of Science Education degree was set up in 2000 as a joint collaboration between the colleges of CACSSS and SEFS. Due to the fact that the need for dedicated facilities was written into the strategic plan of the School of Education, efforts were directed towards setting up a science education centre.

Professor Pat Fitzpatrick played an outstanding role in driving forward the project. His genuine interest in science and mathematics education and his enthusiasm for collaborating with the School of Education in setting up the Eureka Centre was apparent to all.

In 2006 a joint application for Strategic Innovative Funding (SIF) was successfully made by SEFS and by the School of Education UCC. Prof Fitzpatrick, Ms Mairead Loughman, SEFS administrator and Dr Declan Kennedy, lecturer in Science Education in the School of Education, travelled to the University of York (the top university in the UK for science education) to view the facilities of the Science Education Centre there. The Eureka Centre is modelled on the National Science Teaching and Learning Centre at the University of York. In addition to SIF funding, funding was obtained from various sponsors such as Pharmaceutical Ireland, the Royal Society of Chemistry and the Irish Science Teachers' Association.

Work began on the construction of the Eureka Centre in 2009 and was completed in 2011. The setting up of the Eureka Centre proved to be instrumental in increasing the numbers of students undertaking the BEd Science Education degree. From an initial intake of 10 student teachers, there is now an intake of 30 student teachers per year, i.e. a total of 120 students being trained as teachers of Biology, Chemistry, Computer Science, Mathematics and Physics.



Fig. 1 Professor Pat Fitzpatrick welcoming Professor David Waddington, Professor of Science Education, University of York, to the Eureka Centre in 2011. Professor Waddington assisted with designing the Eureka Centre.

2. What facilities are in the Eureka Centre?

The Eureka Centre is the home of Science Education in UCC. It is located in the Kane Building in space that became available when the Computer Science Department moved to the Western Gateway building. The Eureka Centre is where Science and Education meet in a very tangible and visible way and consists of four main components:

2.1. Science education laboratories.

The two Eureka Science Education laboratories are modelled on laboratories typically found in secondary schools and are thus ideal for training science teachers to carry out all the laboratory practical work associated with the teaching of Junior Cycle Science and Leaving Certificate Biology, Chemistry, Physics and Agricultural Science.

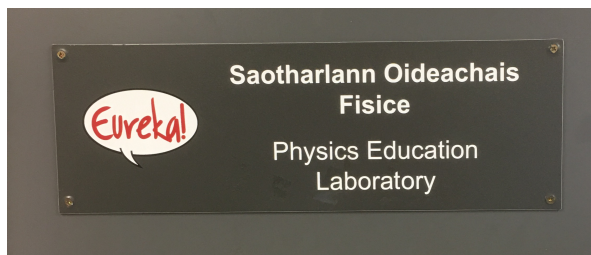


Fig. 2 The Eureka Physics Education Lab.

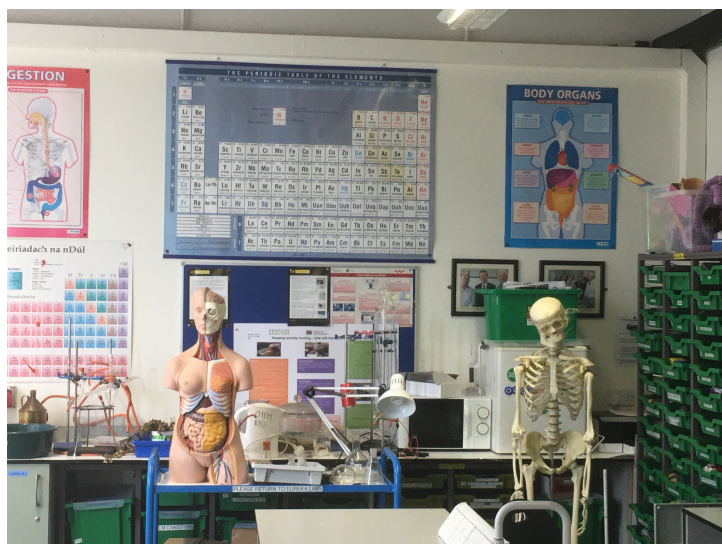
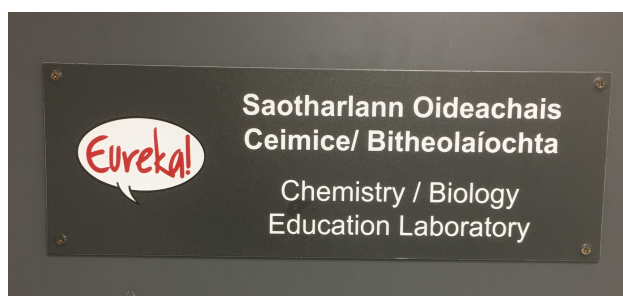


Fig. 3 The Eureka Chemistry / Biology Education Laboratory.

2.2 Eureka Office.

This consists of an office with two desks. This was set up initially for Mr Noel Brett who was employed as the UCC outreach officer for liaising with local secondary schools.



Fig. 4 The Eureka Office

2.3. Eureka seminar room.

This room comfortably seats 10 people and is used for a range of activities:

(i) Tutorials.

With 120 BEd(Sc) student science teachers and approximately 10 Professional Masters in Education (PME) students, it is necessary to provide additional support to students in teaching their specialist subjects. Graduates of the BEdSc programme are qualified to teach two subjects from the list of Biology, Chemistry, Computer Science, Mathematics and Physics. In addition, some Agricultural Science students enter the BEdSc via the Direct Entry route. Whilst all students attend science education lectures with the rest of their year group, it is also necessary to provide specialist support to students in each of the above subject areas. The Eureka Seminar Room is an ideal location for these tutorials.

(ii) Microteaching.

For many student teachers it can initially be rather daunting to stand in front of a class of 24 secondary school students to teach science or mathematics. Therefore, student teachers begin by teaching their peers in small groups in the presence of their teaching placement tutor who also has responsibility for supervising their classroom teaching throughout the year. Students are encouraged to use modern technology in their teaching and, hence, the School of Education has installed an interactive whiteboard with all the relevant software for use in the room.

(iii) Part-time staff room

The Eureka Seminar room is the focal point for all the part time staff employed by the School of Education to (a) supervise the student science teachers while they are undertaking school placement and (b) to assist our student science teachers as laboratory tutors during laboratory practical work. The room is regularly used for planning meetings between the part-time staff and full time staff. None of the part-time

staff has access to an office in UCC so the Resource Room is an ideal place for them to meet with their students and with each other.

It is also used for meeting visitors to the Eureka Centre, e.g. the Teaching Council accreditation team meets in this room on their visits to the Eureka Centre as part of the accreditation process for the BEdSc degree.

(iv) Peer Assisted Learning

Our student teachers are encouraged to become involved in the Peer Assisted Learning (PAL) programme run at evening time by the School of Chemistry and School of Physics to assist first year university students in these subjects. The Eureka Seminar Room is ideal for the type of small group work involved in these PAL activities

(v) ACCESS UCC Activities

The Eureka Centre works closely with the ACCESS UCC Office in providing support to Junior Cycle students and Leaving Certificate students. . In addition, student science teachers provide individual tuition to secondary school students in the UCC+ scheme to help students from disadvantaged background to prepare for the Junior Cycle and Leaving Certificate examinations.



Fig. 5 The Eureka Seminar room.

2.4 Eureka Resource Room

The Eureka Resource Room is the busiest room in the Eureka Centre as it is used seven days per week. It is at the very heart of the Eureka Centre. It is a good sized room (7 m x 4 m) and contains all the fundamental resources required by student science teachers to prepare lessons for the pupils that they teach. Items such as school textbooks, school workbooks, teachers' handbooks, teachers' guides to curricula, school laboratory manuals, school science syllabi are not usually found in university libraries. Every experienced science teacher would have these items in their study at home but trainee teachers would not even be aware of many of these resources. Science Education Resource Rooms are an integral part of science education centres throughout the world.

A view of the bookshelves in the Eureka Resource Room is shown in Fig. 6.



Fig. 6 View of the Eureka Resource Room showing the various science education resources stored on the bookshelves and in the cabinets.

As many schools do not possess modern, high-tech equipment used in teaching science, the Eureka Resource Room also contains modern datalogging equipment which students can borrow and use in their teaching. This equipment is stored in the grey press on the right of Fig. 7. The loaning of this equipment is organised by two student helpers hired by the School of Education to act as supervisors of the Eureka Resource Room. (This equipment cannot be stored in the labs as students do not have access to labs without a lecturer being present). The room also contains a desktop computer purchased by the School of Education.



Fig. 7 The grey press on the right contains datalogging equipment purchased by the School of Education. This equipment is loaned on a weekly basis to student teachers who find themselves teaching in schools which do not possess this modern equipment.

Examples of typical resources available to students are shown in the sample of items illustrated in Figs. 8 - 12.

Fig. 8 Some textbooks available for the current science syllabus. Some older textbooks are also kept in stock to aid postgraduate students in research on curriculum development.

Fig. 9



Fig. 10



Fig. 11



Fig. 12



Who are the users of the Eureka Resource Room?

- BEd Sc student teachers (approx 120).
- Professional Masters in Science Education (PME) students (approx 10).
- Masters by research students and PhD students (approx. 5)
- Students from disadvantaged (DEIS) schools who, in collaboration with the ACCESS UCC office, are allowed to study there and use the resources mainly on Saturdays and at evening time.
- Small group tutorials for BEd Science students.
- Peer Assisted Learning activities are run in the evenings in the Eureka Centre by the School of Chemistry and Department of Physics. A whiteboard on the wall of the Resource Room allows small group teaching to take place there.

3. What was the source of funding to purchase the resources in the Eureka Resource Room?

- All funding for the purchase of the resources in the Eureka Resource Room was provided by the School of Education.
- In addition, with the exception of the table in the Eureka Resource Centre, all furniture (bookshelves, office desk, metal cabinet) were purchased by the School of Education. The table was obtained from General Services out of stock.
- All of the datalogging equipment in the Eureka Resource Room available for loaning to students was purchased by the School of Education.
- In addition to purchasing the resources in the Resource Room, all running costs of the Eureka Centre are paid from the annual budget of the School of Education, e.g. chemicals, consumables, physics equipment, safety equipment, etc.

4. Why are the Colleges of both CACSSS and SEFS so closely involved in the Eureka Centre?

- The BEd Science Education degree is the main route to qualifying as a science teacher in UCC.
- The School of Education is the lead department in the BEd Science Education degree.
- Of the 240 credits in the BEdSc programme, 120 credits are taught in SEFS and 120 credits are taught in CACSSS.
- In addition, the lab equipment in the Eureka labs and all of the running costs of the Eureka Centre labs and Resource Room are paid for by the School of Education.

5. What support provided by the Eureka Centre to students from disadvantaged backgrounds?

The initial proposal for funding to set up the Eureka Centre was made to the Strategic Innovation Fund under the strand of improving access to third level education for student from disadvantaged backgrounds. Hence, the staff in the Eureka Centre have always worked in close collaboration with the ACCESS UCC office which carries out all the administration work in liaising with school principals to identify the students from DEIS schools who attend the Eureka Centre. Among the activities for these students are:

- Saturday classes and lab practical sessions in Leaving Certificate biology, physics and chemistry. These sessions have a particular exam focus to help students whose parents would not be in a position to obtain grinds (extra tuition) for them. In some cases, these students are studying science subjects on their own as an extra subject as physics and chemistry are not taught in every secondary school.
- Junior Cycle science seminars are run each year to encourage students to choose science subjects for their Leaving Certificate. These one-day events consist of lessons on topics on the Junior Cycle science curriculum, lab sessions in the Eureka labs and chemistry magic shows.
- In some cases, Leaving Cert students are living in conditions which are not conducive to study. Hence, they are allowed to use the Eureka Resource Room to consult textbooks and other resources and to study in the room after school.

In the early years of the Eureka Centre, funding was available to employ Mr Noel Brett as Eureka Centre Manager. Mr Brett was an outstanding secondary school science teacher who took early retirement and organised classes in the Eureka Centre and visits from schools to the Eureka Centre. Unfortunately, Mr Brett was not replaced when he retired. It is hoped that the vacancy left by his retirement will be filled in due course.

6. Why cannot the resources in the Eureka Centre Resource Room be placed in the university library?

Science Education centres throughout the world always contain a Resource Centre. Why is this necessary? Could not the resources simply be placed in the university library? There are several reasons why a university library is not a suitable location for resources in science education:

- The cataloguing system in libraries would mean that the physics textbooks would be allocated to the physics section of the library, the chemistry textbooks in the chemistry section, biology textbooks in a different section, general science textbooks in another section, government syllabi in another section and science education resources in a different section. Hence, student science teachers would have great difficulty trying to find the resources so badly needed to help them plan lessons. In addition, exemplar materials such as sample lesson plans and teaching resources created by former student teachers and UCC lecturers would be difficult to locate in a university library.
- The opening and closing times of the library, especially at weekends, are unsuitable for student teachers who frequently use the Eureka Centre for lesson preparation in the evenings and at weekends.
- Secondary school students from disadvantaged backgrounds who participate in the ACCESS UCC activities use the resources in the Eureka Centre. These students have no access to the UCC library but have full access to the Eureka Resource Room for studying and consulting a wide range of school textbooks.
- University libraries generally do not stock items such as primary and secondary school textbooks, workbooks, school syllabi and other resource materials. In fact, university libraries would not even be aware of resources sent to schools by various agencies such as the Department of Education, the State Examinations Commission and the National Council for Curriculum and Assessment. All of these resources that are sent to schools are stored in the Eureka Resource Room.

7. Social interaction in Eureka Resource Room

The COVID-19 pandemic has shown the importance of the "UCC experience" and the need for students to meet each other face-to-face, discuss progress, share good teaching ideas and support each other. The Eureka Resource Room and Eureka Seminar room are the only places in UCC which student science teachers can identify as their "home" in UCC and enables them to:

- Meet each other to discuss lessons plans and progress being made in their teaching and compare experiences of teaching in difference types of schools and at different levels in secondary school.
- Hold informal face-to-face meetings and discussions. This is particularly important for our Direct Entry student teachers. These are typically mature graduates working in the pharmaceutical and electronics industries who decide on a career change and enter the BEd Sc programme through the Direct Entry system into third year.



8. International Recognition of the Eureka Centre as a Centre of Excellence

UCC is the only university in Ireland that has received accreditation from the International Council of Associations for Science Education (ICASE) for the high quality of its professional development programme in science education.



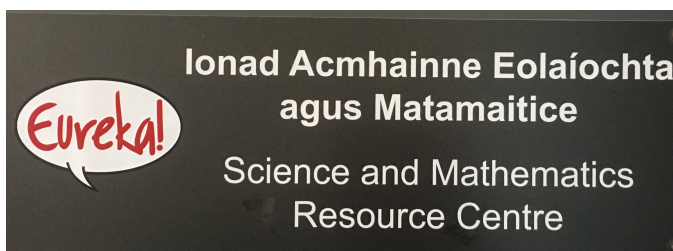
Fig. 13. Prof. Jack Holbrook, University of Tartu, Estonia, President of ICASE presenting the ICASE accreditation plaque to Prof. Pat Fitzpatrick, Head of College of SEFS. Also in the photograph are (left to right) Noel Brett, Manager Eureka Centre, Jill Haynes, SEFS Office, Prof. Teresa Kennedy, University of Texas, USA, President Elect of ICASE, Dr Declan Kennedy, School of Education UCC, John Lucey, School of Education UCC.

The Eureka Centre received ICASE accreditation in 2013. The fact that the Eureka Centre is one of the recognised ICASE Science and Technology Centres at international level is one of the factors leading to the fact that UCC has been chosen to host the ICASE World Conference on Science and Technology Education on 22nd – 25th June 2026.

9. Accreditation of BEd Science Education programme by Teaching Council.

The BEd Science Education degree is fully accredited by the Teaching Council. As part of the accreditation process, the Eureka Centre is visited at regular intervals by the accreditation panel of the Teaching Council. In all accreditation reports, the

visiting accreditation panel have written in glowing terms of the facilities available in the Eureka Centre for training science teachers. The members of the accreditation panel are drawn from national and international experts in education and it is no surprise that in a recent report they mentioned the "wide variety of teaching resources to aid in the preparation of lesson plans" that are available in the Eureka Resource Centre.



Our science education graduates are among the best ambassadors that we send into our secondary schools. It is these graduates who will encourage a love of science among their pupils and encourage these pupils to come to UCC to study science subjects.

The BEd Science Education degree is a perfect example of a degree programme that involves close collaboration between the colleges of SEFS and CACSSS. Hence, it is important that a collegiate approach be adopted and discussions held with all stakeholders before any decisions are made about changing the facilities available to the student science teachers who use the Eureka Centre.



Fig. 13. Declan Kennedy presenting Martyna Byrdziak with the *Declan Kennedy Award* for outstanding teaching. Also in the photograph are Stephen Murphy, Dr. Ryan Gallagher, Prof. Nicola Ingram and supervisor Ronnie McCarthy.

10. Testimonials re important role of Eureka Centre

Lisa Mac Sharry, Education and Public Engagement Officer, APC Microbiome Ireland:

The Eureka Centre has very kindly hosted APC Microbiome Ireland's children's digestion workshops in their two laboratories over the last few years. APC Microbiome Ireland, regularly host 'Food is Funky' digestion workshops for primary school classes throughout the year. We welcome primary classes from all around Cork (in particular DEIS schools) to join us for a morning of experiments in a laboratory setting, followed by a tour at UCC.

We would never have been able to offer these workshops without the Eureka Centre's full support and the use of their wonderful facility. We hear regularly from teachers about how much the children have enjoyed the Eureka Centre and the profound effect it has had on them.

Ryan, Declan and Stephen have given so generously their time over the years, resulting in many successful workshops. We look forward to continuing this relationship and thank them sincerely for their time and continued support.

Deirdre Madden, Assistive Technology Outreach Co-Ordinator, Disability Support Service, UCC.

The Eureka Centre has been invaluable to outreach work for Access UCC Disability Support in the past year.

Ryan, Stephen and the BEd students had hosted a range of science activities for secondary school students with disabilities who were visiting campus as part of our outreach workshops. These workshops are designed to give students fun experiences on campus, to show them how accessible UCC and our courses can be. Students and staff at the Eureka Centre have been exceptionally welcoming and inclusive to these students who are Deaf/hard of hearing, who have low/no vision, who have physical disabilities or who are on the autistic spectrum.

Students, parents and teachers were all impressed by how inclusive staff and students in the Eureka Centre made science which is such a practical subject. They ensured students, who are wheelchair users, had access to the lab equipment and experiments at their physical level. Assistive technology tools were employed for students with low vision to maximize their independence in engaging with the excellent activities laid on for students. Automatic captions were employed in PowerPoint presentations to ensure students who are hard of hearing had full access to the presentation and instructions.

In addition staff at the Eureka Centre have been very open to empowering teachers in using Assistive technology to enable and include students who learn differently because of their disability/learning difficulties. Work is ongoing to embed assistive technologies in initial teacher training for the BEd in Science.

Gillian Butler, Mature & QQI Pre Entry Student Advisor, Access UCC:

Ryan Gallagher and Stephen Murphy in the Eureka Centre have been a tremendous support to our work in Access UCC to widening participation for under-represented groups. They have facilitated workshops at several events, helping to break down barriers and show that UCC is an inclusive, welcoming place for every learner. They have consistently met requests with enthusiasm and have engaged brilliantly with the groups we support, including diverse learners who are no longer involved in mainstream education, such as Youthreach centres across Cork and the Cork Life Centre.

The feedback from participants has always been extremely positive, with many leaving inspired and beginning to consider pathways into science and related areas of study."

Maeve Minihane, ACCESS UCC

Access UCC works in close collaboration with colleagues specialising in Science within UCC's Department of Education, with the Eureka Centre playing a central role in supporting science engagement and progression for students from DEIS schools.

Through our Schools Outreach Programme, the Access UCC Schools Outreach team works with 33 DEIS secondary schools across Cork City, Cork County, County Kerry and Waterford. This comprehensive programme, now running for over 25 years, supports students studying Science and helps build aspiration, confidence and academic preparedness. Our strong partnership with colleagues in the Department of Education, through a range of outreach initiatives, lays important foundations for students engaging with Junior and Senior Cycle science curricula.

A key example of this collaboration is the one-day 2nd Year Science Camps hosted by UCC's Eureka Centre. These camps connect Junior Cycle science learning to hands-on laboratory experiences, while giving students the opportunity to visit University College Cork and engage in real experiments in a fun, supportive learning environment.

Students also have the opportunity to further explore science pathways during Transition Year, through engagement with the School of Chemistry and Microbiology as part of the Access UCC Easter Schools programme. This college taster experience allows students to gain an authentic insight into life as a science student in UCC, helping them to make informed decisions about future study.

For Leaving Certificate students from Access UCC-linked DEIS schools, targeted Leaving Certificate Master Revision Classes in Biology, Chemistry and Physics have been delivered for many years by UCC staff from the Eureka Centre. These revision days are highly valued by students and schools and form a vital part of our collaborative work with the Department of Education Science Team in UCC, supporting students in their preparation for State examinations.

Access UCC, together with our Eureka partners, has also provided tailored academic support where needed. In one instance, additional Chemistry tuition was provided to two DEIS students, including one student from a minority background, to enable them to sit the Leaving Certificate Chemistry examination. Both students began Chemistry in the

second semester of 5th year and successfully passed the Higher Level LC Chemistry paper, opening up further progression opportunities in Further Education. This outcome would not have been possible without the expertise, commitment and support of staff in the Eureka Centre.