

Chemical Education in the Republic of Ireland 2011-2012

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1. Abstract

Major changes are underway in the second-level system in Ireland, with a major revision of the Junior Cycle which may mean that schools do not need to offer science to everyone. The senior cycle science syllabi are under revision and were sent out for consultation. There will be major changes in the way practical work and theory will be assessed, and it is intended to bring in assessment of practical work for the first time. The training of teachers at primary and secondary level is under review and there is a major discussion underway on entry to higher education. The economic cutbacks are taking their toll on schools, with the loss of teaching posts and potential loss of minority subjects like physics and chemistry. However, this year the numbers taking LC chemistry have increased again. Dublin is European City of Science in 2012 and is hosting the Euroscience Open Forum. The first Chemistry for non-specialists courses was run and a new 3-year programme to train out-of-field maths teachers was launched by the government.

2. National educational policy

Ireland is in the middle of a major economic crisis and all levels of education have been affected: teacher's salaries have been reduced and jobs have been lost. It is reported that some schools will drop minority subjects like physics and chemistry because of this. The birth rate in Ireland has gone up and is now the highest in Europe and a bulge in numbers is starting to move up through the education system. In addition, Ireland now has over 10% of non-nationals in the population and the influx of non-native speakers into classrooms is creating problems, especially in some areas. Despite the poor economic situation, a programme of building new schools has been announced to meet this increase.

However, a number of educational initiatives have taken place at a national level over the last year or so:

- the introduction of a National Literacy and Numeracy strategy 2011-2020 (http://www.education.ie/admin/servlet/blobServlet/lit_num_strat.pdf);
- the introduction of bonus points for higher level mathematics (from Sept. 2012);
- a major revision of the Junior Cycle to start in 2014, but at the moment Science is not a core subject (http://www.ncca.ie/en/Curriculum_and_Assessment/Post-Primary_Education/Junior_Cycle/Junior_cycle_developments/);
- the publication of draft syllabi for LC Biology, Chemistry and Physics and a consultation on them (available at http://www.ncca.ie/en/Consultations/Senior_Cycle_Science/Senior_Cycle_Science_Consultation.html);
- the new Maths syllabus, Project Maths, was rolled out across the country at junior cycle and senior cycle in 2011, in part to counter concerns of low numbers doing Higher Level mathematics, even though >95% of students staying on to the end of senior cycle take mathematics.

A new 3-year programme has been funded to up-skill out-of-field mathematics teachers and this project will be coordinated by the National Centre for Mathematics and Science

Teaching and learning at the University of Limerick (www.nce-mstl.ie). However, concern continues to be expressed at the low numbers taking HL maths and the physical sciences. The National Council for Curriculum and Assessment (NCCA) has been working with teachers and science educators to develop new ways of assessing practical work and content for the new LC science syllabi.

A review is underway of teacher training at primary and second level. Initial Teacher training is being increased from 3 to 4 years at primary level and from 1 to 2 years for the consecutive Post Graduate Diploma in Education. Concern has been expressed at the amount of time spent in primary teacher training on religion at the expense of subjects like science. A report on ‘*Entry to Higher Education in Ireland in the 21st Century entry*’ was published in September 2011 as a discussion paper for a conference on entry into third level. (http://www.heai.ie/files/files/file/News/1335_HEA_Conference_01.pdf) Universities were asked to respond within 6 months with their proposals for revising the system of university entry.

A paper has been published by the Higher Education Authority on ‘*Towards a future higher education landscape*’ and one of its proposals was for regional strategic groupings of higher education institutions, and a number of these have already been announced. (<http://www.heai.ie/files/TowardsaFutureHigherEducationLandscape.pdf>)

Criteria for the Institutes of Technology (IoT) to apply for Technological University status have been published, as a number of IoTs have been pressing for an upgrade to universities.

The 2012 figures for LC Chemistry have shown an increase to 15.45% of the LC cohort, an increase in numbers of 9.2%.

3. Events in chemical education for a range of audiences.

There have been a number of science/chemical education conferences, often with a research theme:

For teachers:

- The 30th ChemEd-Ireland conference in Cork (October 2011) with the largest-ever attendance of over 140, held in the new Eureka Science Education Centre at University College, Cork.
- The 50th ISTA Annual Conference held in Trinity College, Dublin, April 2012.
- The 6th Chemistry Demonstration Workshop was run at the University of Limerick, June 2012, for a group of chemistry teachers and newly qualified science teachers.
- The first Chemistry for Non-Specialists courses was run in June by the RSCs Education Division Ireland Region, modelled on the courses run in the UK, and it is hoped to run more in the 2012-13 school year.

For science education researchers:

- The N-W Europe IOSTE Symposium on “*Science and technology education research and its impact on practice*” in the University Limerick, April 2012. The Proceedings are available on line at <http://ioste-nwe.wikispaces.com/>
- SMEC 2012 conference, ‘*Teaching at the heart of learning*’, in Dublin City University, June 2012, combined with a meeting of European teachers working on the ESTABLISH project. (<http://www4.dcu.ie/smec/2012/index.shtml>)

For school pupils:

- The BT Young Scientist and Technology Exhibition, Jan. 2012 – a major showcase for science projects by school children. (<http://www.btyoungscientist.ie/>)
- SciFest is a national science fair for primary and second level students, held around the country in April or May. (www.scifest.ie)

Winners from these competitions have been unusually successful at European and International science fairs, considering the size of Ireland.

For the general public:

Dublin is the European City of Science in 2012 and a host of events has been arranged throughout the year culminating in the Euroscience Open Forum (ESOF), Dublin, July 2012 (<http://www.esof.eu/>) A Robert Boyle festival was held in Lismore, his birthplace, in Nov. 2011 and there will be Robert Boyle Summer School in July 2012. (<http://www.robertboyle.ie/robert-boyle-festival>) The 2012 Atlantic Corridor STEM Education conference, March 2012 (<http://www.eventelephant.com/atlanticconference2012>) included a workshop for school children. Science Week Ireland in November each year is a national celebration of science. There is also an Engineering Week and a Mathematics Week. (<http://www.scienceweek.ie/index.asp>)

4. Activities of the Institute of Chemistry of Ireland (<http://www.chemistryireland.org/>)

The Institute's publication, *Irish Chemical News*, has moved to an all-electronic publication from 2012. The main events in the year are the Annual Congress (May), the Postgraduate Chemistry Colloquium (June), the Boyle-Higgins medal and lecture, and the Eva Philbin Lectures aimed at the general public. It runs a Chemistry Newsletter competition for school children. It recognises achievement in chemistry by presenting awards to the students with the top marks in the LC Chemistry examination and in chemistry degree courses. The Institute is hosting the EuCheMS General Assembly in 2012.

5. Publications

CRANN, a research centre for nanoscience in Trinity College, Dublin, has produced a teaching pack on Nanoscience for schools. (<http://www.crann.tcd.ie/Education-Outreach.aspx>)

The National Centre for Excellence in Mathematics and Science Teaching and Learning at the University of Limerick has continued to produce its series of 4-page Research and Resource Guides for teachers, which are available on-line (www.nce-mstl.ie)

The ISTA magazine *SCIENCE* is published three times a year and some back issues are now available on-line at <http://www.ista.ie/publications/science-journal>

Irish Chemical News is now only published on-line from 2012

(<http://www.chemistryireland.org/docs/news/Irish-Chemical-News-2012-Issue-1.pdf>)

Chemistry in Action! is aimed at Irish and UK chemistry teachers and is published three times a year. The Spring issue contains the Proceedings of the previous ChemEd-Ireland conference and it also publishes an annual review of results in the LC science and maths examinations.

Science Spin is a commercial science magazine for the general public and is available on-line <http://www.sciencespin.com/>)

6. Liaison with the chemical industry

The previous President of the ISTA was Matt Moran, Director of Pharmaceutical Ireland, and he was replaced in April by Charles Dolan, who works for Eli Lilly. Despite the helath of Ireland's chemical industry relatively little is invested in science education, except through local or small-scale initiatives. The Eureka Centre in Cork received substantial funding from local pharmaceutical industries.

Pharmaceutical Ireland provided scholarships for 7 recently qualified science teachers to attend the 6th. Chemistry Demonstration Workshop in Limerick.

Eli Lilly and Merck Sharpe and Dohme supported the *Organic Chemistry in Action!* action research project at the University of Limerick.

Dublin City University in conjunction with Amgen is running a series of IBSE workshops under the Amgen Science Teacher Training Initiative for teachers in the Dublin area.

Pharmaceutical Ireland has an Education Officer and provides resources for teachers:

<http://www.pharmaceuticalireland.ie/Sectors/PCI/PCI.nsf/vPages/Home~Education?OpenDocument>.

7. International or European initiatives

Dublin City University is the coordinator for the ESTABISH project (<http://www.establish-fp7.eu/>) and in 2011 was also successful in a bid to coordinate the new SAILS project (<http://www.sails-project.eu/>) University College Cork is involved in the PROFILES project, St, Patrick's College, Dublin in the Fibonacci project (<http://www.fibonacci-project.ie/>) and the University of Limerick in the Tempus SALiS project (<http://www.salislab.org/>) . Limerick Institute of Technology is a partner in the new 'Chemistry is all around' Life-Long Learning project (<http://projects.pixel-online.org/chemistrynetwork/info/partnership.php>).

8. Science/chemistry education research

The level of research activity in science/chemistry education has increased in the last few years, with major groups in Dublin City University (CASTEL, www.castel.ie/), the University of Limerick (NCE-MSTL, www.nce-mstl.ie , CERG), Waterford Institute of Technology (CALMAST, <http://www.calmast.ie/>) and Dublin Institute of Technology (the Chemical Education Research Team (CERT), <http://www.dit.ie/colleges/collegeofsciencesandhealth/chemistry/research/cert/#d.en.16764>), and the Eureka Centre in University College Cork (<http://www.ucc.ie/en/sefs/>)

Three MSc courses for science teachers are currently running in Ireland.

The number of postgraduate awards, published papers, conference presentations at national and international meetings and involvement in EU projects have all increased.

Dr Michael Seery, from the Dublin Institute of Technology, won the RSC HE Award in 2012 for his work in bringing into e-learning into 3rd level chemical education.