

TEACHING AT THE HEART OF LEARNING:

SUCCESSFUL EXPERIENCES AND GOOD PRACTICES IN CHEMISTRY TEACHING IN IRELAND

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Successful experiences and good practices

- **Initial teacher education:** correct balance between Subject Content Knowledge and Pedagogical Skills Training.
- **Continuing personal development:** adequate supports and relevant content.
- **Connections** between **chemical education research** and chemistry in the classroom to inform innovation in teaching.
- Implementing **Information Communication Technologies (ICTs)** as an aid rather than a substitute.
- **Networking and sharing of experiences.**

TEACHING AT THE HEART OF LEARNING:

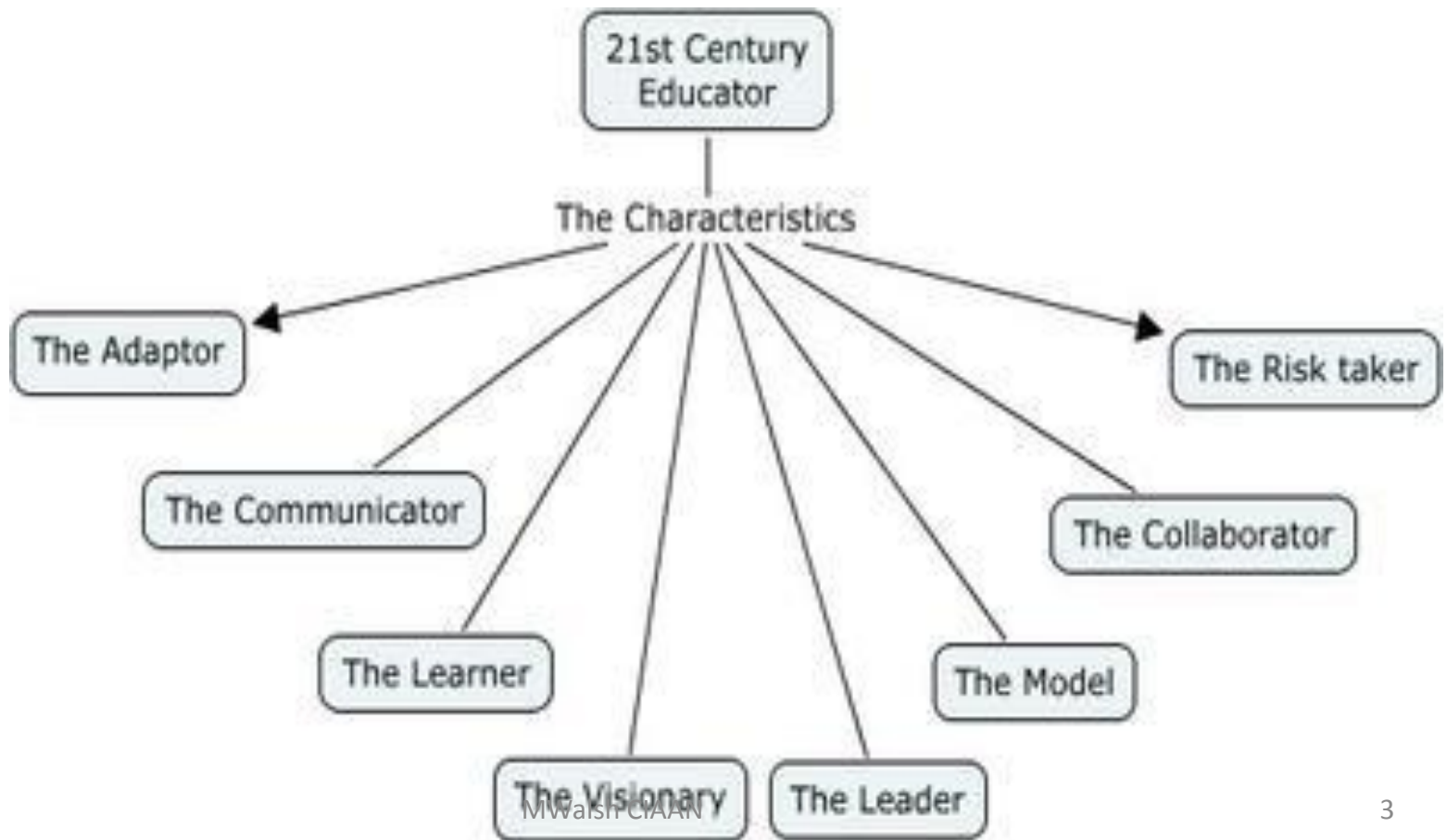
OLD VIEW

'He who can, does.

He who cannot, teaches.'

George Bernard Shaw

CURRENT REALITY





AN CHOMHAIRLE MHÚINTEOIREACHTA

The Teaching Council

Initial Teacher Education

- Concurrent *or* consecutive training.
- Better symmetry between **Subject Content Knowledge** and **Pedagogical Skills Training**.
- Study of Chemistry as a major subject in the degree extending over at least 3 years and of the order of 30% minimum of that period.
- Degree course content to show that the knowledge and understanding required for teaching Chemistry to the highest level in post-primary education has been acquired.

Support for Newly Qualified Teachers and Non-specialist Teachers

- **Induction and Registration:** defined programmes.
- **Professional Development Service for Teachers - PDST**
- **Royal Society of Chemistry - RSC**
- **The National Centre for Excellence in Mathematics and Science Teaching and Learning**

The National Centre for Excellence in Mathematics and Science Teaching and Learning



- Projects in the Centre address important issues such as adapting good practices in science teaching and learning for use in Ireland - by research interventions in schools and other institutes and piloting such practices.
- These are then disseminated through Continuous Professional Development events organised by the Centre and all materials are made available on the NCE-MSTL website.

Supporting the Practising Teacher

Continuing Professional Development

- **Workshops**
- **Supports**
- ***iChemistry*: annually updated resource CD**
- **Amgen Teach**
- **School-based support**



Supporting the Practising Teacher

Continuing Professional Development



- PDST links to Scientix - promotes and supports a Europe-wide collaboration among STEM teachers, education researchers, policymakers and other STEM education professionals.

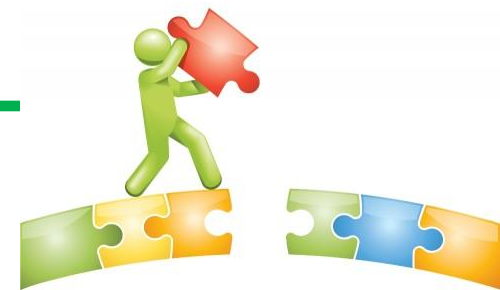
Sharing through association



The Irish Science Teachers Association

- Chemistry sub-committee that reacts to proposed syllabus updates, curriculum changes, examination papers and generally lobbies for the betterment of Chemistry teaching.
- Meetings and workshops where teachers hear about state-of-the-art ideas for teaching all science subjects.

Chemistry Education Research - bridging a gap



Chemistry Education Research should address how students learn, the factors affecting learning, and the methods for evaluating that learning.

The results reported should be understandable to practicing chemistry teachers and directly applicable to the teaching/learning process.

Bunce and Robinson

Chemistry Education Research – bridging a gap

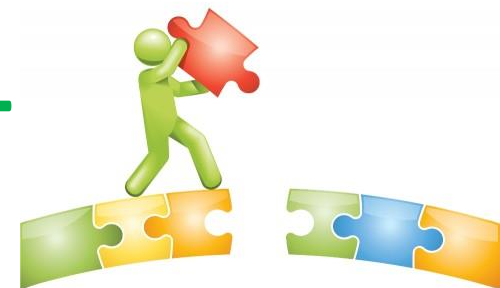


The research must be theory based; the questions asked should be relevant to chemical educators and able to be tested through the experimental design proposed;

the data collected must be verifiable; and the results must be generalizable.

Bunce and Robinson

Chemistry Education Research – sample of groups in Ireland



Research Group	themes
Chemistry Education Research Group (CERG) in the University of Limerick	Misconceptions in chemistry teaching and learning, Language in chemistry education Inquiry-based initiatives for teaching and learning including the SALiS project.
Chemistry Education Research Team (CERT) in Dublin Institute of Technology	CERT has very close links with the Royal Society of Chemistry Technology Enhanced Learning
CASTeL in Dublin City University	‘Skills Auditing’ for new students. Multidisciplinary Approaches. Inquiry-based science education.

Chemistry Education Research – access to international research



Chemistry Education Research and Practice (CERP) - a journal for teachers, researchers and other practitioners at all levels of chemistry education.

- To **bridge the gap** between the two groups so that researchers will have their results seen by those who could benefit from using them, and teachers will gain from encountering the ideas and results of those who have made a particular study of the learning process.

Chemistry Education Research – access to international research

Chemistry Education Research and Practice (CERP)

- Published free of charge, electronically, four times a year.
- Researchers can publish their work in full in a journal exclusively dedicated to chemistry education;
- Teachers of chemistry can share effective ideas and methods for the teaching and learning of chemistry.

Chemistry Education Research: Language as a barrier

The Monotillation of Traxoline



It is very important that you learn about traxoline. Traxoline is a new form of zionter. It is monotilled in Ceristanna. The Ceristannians gristerlate large amounts of fevon and then bracter it to quasel traxoline. Traxoline may well be one of our most lukised snezlaus in the future because of our zionter lesceledge.

1. What is traxoline?
2. Where is traxoline monotilled?
3. How is traxoline quaselled?
4. Why is traxoline important?

Chemistry Education Research: The 5E Learning Cycle

- Spiralling the curriculum from the broad concepts in relevant contexts to the abstract micro level may increase student engagement and participation in the Chemistry class.
- The 5E learning cycle may be one method of focussing on and achieving Good Practice.



ICT and Chemistry Teaching

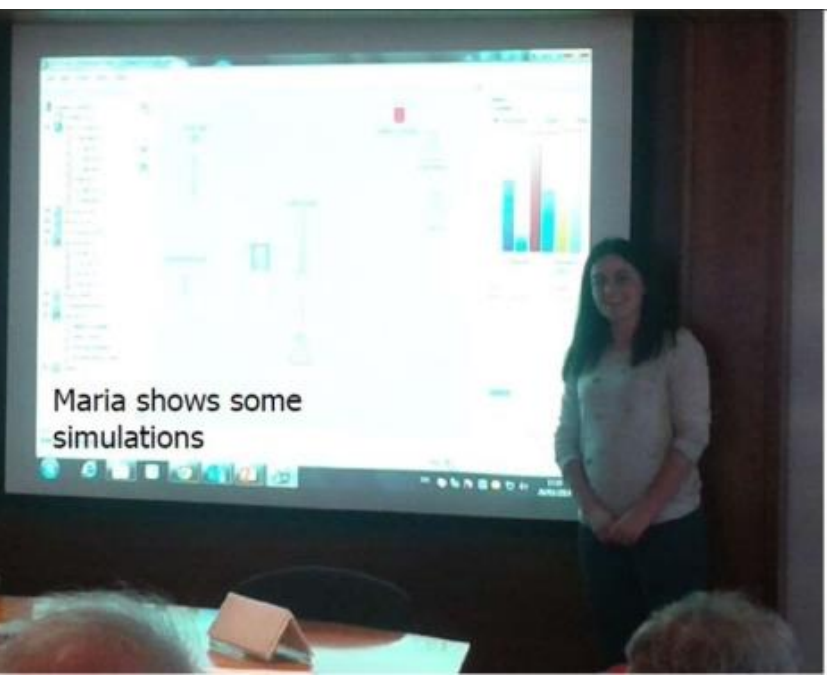
- Virtual Learning Environment (VLE): When asked about “e-learning”, students reported that it was the least effective and least enjoyable teaching method.
- A similar result was derived from institutional use of virtual learning environments across several institutions in Ireland’.
- While students value imagery and active components of the work, they see them as an add-on (sometimes taking up to much of their education time) rather than a replacement for the classroom experience.



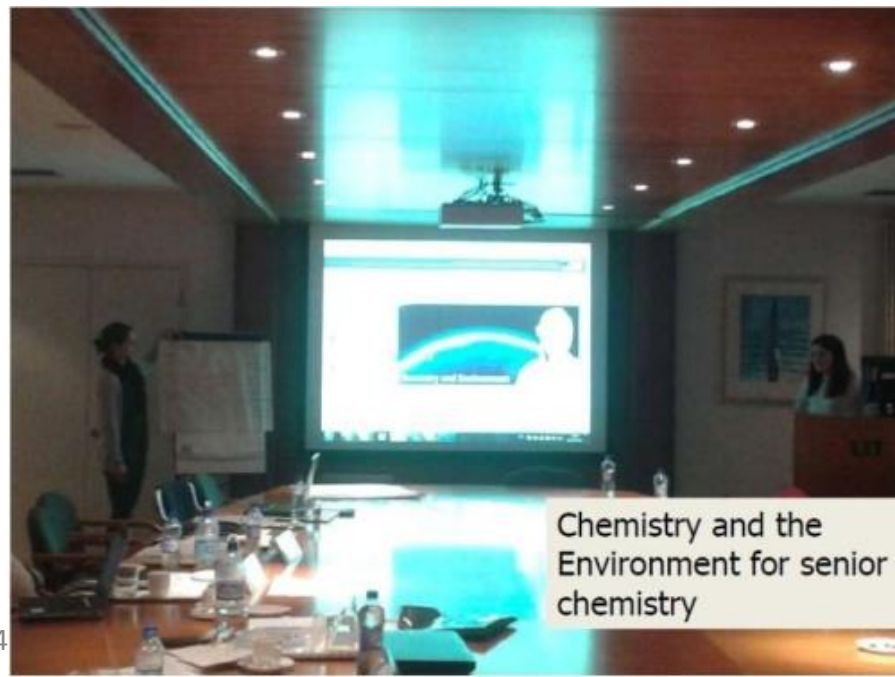
Mr Salks Periodic Table from 50 cool things for science teachers



Angela demonstrated a titration virtual lab



Maria shows some simulations



Chemistry and the Environment for senior chemistry

Results of Testing of Teaching Resources:

TEACHERS

Varying applicability of resources.

- Simulations can be difficult to download and activate.

Support tools for extra classwork, revision and homework.

- Not all students have access to ICT or internet at home!

Noted positive responses from students....

- Resources can motivate students, especially videos, animations, etc.

Good Practices

- Preparation and advance testing by teachers is important.
- Students must also see where the resource ‘fits’ with their coursework.
- For example, one teacher tested an Acid-base titration simulation with a group of upper secondary level students.
- The teacher and student evaluations showed that while the resource was helpful, it was best used as revision after the actual laboratory and theoretical work had been completed, to reinforce the concepts covered.
- Some students liked the fact that they were given instant feedback to calculations, but others complained about it being too time-consuming.

One most excellent resource:

RSC Learn Chemistry



- 2859 resources for teaching chemistry, categorized for pupils from early primary to post-secondary level.
- Presentations, Videos, Handouts, Worksheets, Wikis, Quizzes, Experiments, Games, Tutorials, Websites, Substances, Podcasts, Simulations, Articles.
- This wealth of material is astonishingly well-selected and reviewers from six other countries in CIAAN were highly positive about this fantastic resource.

Successful Experiences and Good Practices – Lessons learned

- The group of experts, teachers and associates in the Irish CIAAN team are colleagues who have previously collaborated in one or more of a number of ways.
- We all have a number of things in common – we love teaching Chemistry/Science, we value and participate in CPD, we appreciate the value of networking and sharing.
- Our workshops have followed the practice of active participation and the comments of the teachers and experts in their testimonials evaluate their experiences of the project:

Learning from Networking

- *'I use the teaching resource section of the portal almost every day when preparing classes or looking for new ways to teach a particular topic. The interactive resources are particularly useful, as ICT is now an integral part of the teaching and learning experience.'*

Mairead Glynn

- *'Each time we met I left feeling energised and enthusiastic about teaching and had lots of New ideas to try in the classroom.'*

Michelle Herbert

- *'Being involved in a European project of this nature has been a very worthwhile experience. It provided both my students and me with more resources and a greater understanding of how chemistry could be taught and learned in the classroom.'*

Ciara O'Shea

Irish Network Teachers



Ciara O'Shea



Maria Sheehan
Angela Gammell



Mairead Glynn



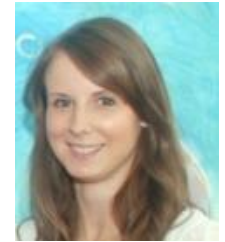
Brian Dillon & Grace Kenny



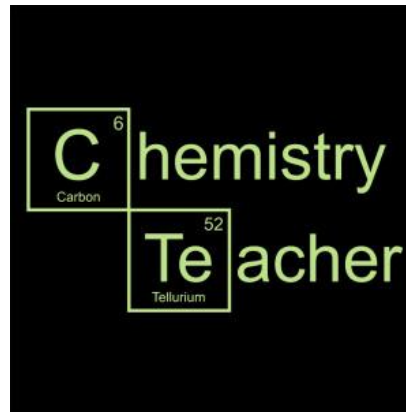
Diane Condon Rose Lawlor



Michelle Herbert



Ciara O'Driscoll



What is networking?



- **Developing relationships or contacts**
- **Building partnerships that support**
- **Sharing information**
- **On-going and reciprocal in nature**

Thank you for your attention