

An interview with Norman Reid

La entrevista con Norman Reid

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Abstract

Professor Norman Reid got his BSc degree, he was the first in the class. One year later he finished the Teacher Education (Dip Ed.) with honor. In 1978 he got his PhD at the University of Glasgow. He studied theology at the University of Sheffield, where he got MA degree. He became fellow of the Royal Society of Chemistry and the Royal Society of Arts. He worked as a high school principal, then he became the leader of the Science Education Centre at University of Glasgow. From 2008 he is a professor emeritus and honorary senior research fellow, and honorary professor of Science Education at the University of Dundee. He has numerous publications, in the last 15 years he published more than 40 articles in international journals, 5 monographs and 6 book chapters. He is a member of the editorial board of international science journals. He was the supervisor of more than 50 MSc, PhD and Postdoctoral students', international PhD examiner. Research fields: attitude research, information processing, curriculum, learners' cognitive characteristic, quality, problem solving and teaching statistics

Key words: science teaching, chemistry-related pedagogy, teacher education

Resumen

Profesor Norman Reid obtuvo su licenciatura, que fue el primero en la clase. Un año más tarde terminó la formación de docentes (Dip Ed.) con honor. En 1978 se doctoró en la Universidad de Glasgow. Estudió teología en la Universidad de Sheffield, donde obtuvo el grado MA. Se convirtió en miembro de la Sociedad Real de Química y la Royal Society of Arts. Trabajó como director de la preparatoria, a continuación, se convirtió en el líder del Centro de Ciencias de la Educación de la Universidad de Glasgow. Desde 2008 es profesor emérito y honorario investigador principal y profesor honorario de ciencias de la educación de la Universidad de Dundee. Tiene numerosas publicaciones, en los últimos 15 años ha publicado más de 40 artículos en revistas internacionales, 5 monografías y 6 capítulos de libros. Es miembro del consejo editorial de revistas científicas internacionales. Él era el supervisor de más de 50 MSc, estudiantes de doctorado y postdoctorales, examinador internacional de doctorado. Los campos de investigación: el desarrollo actitud, procesamiento de información, programas de estudios, característica cognitiva alumnos, la calidad, la solución de problemas y enseñanza de la estadística

Palabras clave: enseñanza de la ciencia, la pedagogía relacionada con la química, la formación del profesorado



NORMAN REID

“Chemistry education research conducted in university chemistry departments tends to be of higher quality...”

INTERVIEW

Why did you take up chemistry?

My best school subject was mathematics but, at about age 15, I was taught mathematics by a very poor teacher while being taught chemistry and physics by two outstanding teachers. My interests moved more towards the two science subjects.

Why did you choose chemistry for your BSc, MA and PhD thesis?

For the BSc, in Scotland you do not enter a subject department but you enter a Faculty. In the Science Faculty, I took courses in chemistry, physics and mathematics, eventually specialising in the chemistry. However, I also completed what was known then as ‘inter-honours’ mathematics as well. After school teaching for some 10 years, I submitted for a PhD as part of a research contract I was undertaking for the Scottish Office (Scottish Government Department). The work focussed on attitudes in relation to studies in chemistry, essentially built around social psychology. The theme was mandated by the Scottish Office. While researching, I also undertook teaching chemistry at undergraduate level.

The Masters was undertaken in theology and following much later. I undertook this mainly by distance learning.

Can you tell us what do the acronyms FRSC and FRSA stand for?

FRSC - Fellow of the Royal Society of Chemistry: elected on evidence of leadership in the pursuit of chemistry

FRSA - Fellow of the Royal Society of Arts: invited arising from my leadership in the field of education (I was at that time the headteacher of a Scottish secondary school - ages 12-18).

How and why did you become an educational researcher?

For five years in the 1970s, I undertook contract research for the Scottish Office - I found research exciting and rewarding. Later, I was invited to be Director of the Centre for Science Education, in the University of Glasgow where I was supervising up to 20 research students in all areas of research relating to the teaching and learning of the science subjects and mathematics, half based on school learning, half on university learning.

Why did you choose an academic career?

In all honesty, I rarely chose anything! It just happened to me. I was invited to most of the jobs I ever undertook.

How had you come to your appointment at Universities of Glasgow and Dundee, Scotland?

I was invited to the post of Director of the Centre for Science Education at Glasgow University in 1996. On retiring in 2008, the Centre was closed (against all my advice) despite making much money and despite protestations from many countries. I was then given emeritus status at Glasgow and invited to join Dundee University (where a key academic was interested in taking the research work further).

Can you tell me something about your chemical and science education research, especially about thinking skills and the complete understanding of all aspects of learning?

This is best seen in terms of history: my earliest work was in attitude measurement and development. I started to supervise students in cognitive areas later. The attitudinal work led to a model explaining how and why attitudes develop, later evidence supporting the model strongly. Much work showed how traditional methods to measure attitudes were flawed and revealed better ways forward (which are still sadly neglected in many countries!) In the cognitive area, the early work built on the breakthrough insights demonstrated by Professor Alex H Johnstone in relation to the central role of working memory and the related concept of extent of field

dependency. This has led to the conclusion that the limitations of working memory capacity hold the KEY to more or less all aspects of learning in conceptual areas as well as the way attitudes towards the sciences form. This is now well-supported in the broader findings of educational psychology. More recent work has moved into learner characteristics where some very unexpected findings were observed. The whole area of skills developed from this, with key thinking skills (including critical thinking and scientific thinking) now leading to some recent publications which offer clear-cut insights. The work has now covered formal lecturing, group working, learning in the laboratory as well as large numbers of studies relating to assessment.

What did you explore about teaching and learning science (especially chemistry) concepts?

With most conceptual research merely identifying problems, the insights coming from information processing have not only explained why conceptual learning is demanding but also offered ways to make it more accessible. These have now been tested and found to be very effective.

Can you tell me what is the speciality of the Scottish chemistry curriculum?

Several features:

- Universal education stems back to an Act of the Scottish Parliament in about 1560, thus giving Scottish Education a long history;
- By the early 16th century, Scotland had four universities making it one of the best educated countries in the world;
- Education at all levels is not specialised and this has allowed chemistry to flourish;
- Chemistry is a very popular subject at school level and the uptakes in universities are high and of high quality;
- The standards at all levels are high but there is less emphasis on rote learning and more emphasis on the way chemistry is used in society;
- University chemistry research ranks among the best in the world.

How do the chemists relate to your research in Chemical Education?

There are many who are sceptical but increasing numbers take the research seriously. Sadly, educational research has a poor reputation (worldwide, not just Scotland) and the quality of educational research compares unfavourably to that in cognate disciplines.

What do you think about the present Chemical Education?

Of very variable quality overall, much research in schools of education is of poor quality and rarely moves beyond the descriptive, often publishing findings that any experienced schoolteacher would know anyway! By contrast, chemistry education research conducted in university chemistry departments tends to be of higher quality. Sadly, fundamental research that explores the question 'why?' is far too rare. The pattern seems to be worldwide.

What do you think about the modern chemistry textbooks?

Most are clones of each other and most reflect very traditional approaches. However, the quality of presentation is high with graphics and photos featured highly. Sadly, textbooks betray two weak features: they almost never take into account the extensive research findings related to learning; they tend to reflect the logic of chemistry as a discipline while ignoring the psychology of the way learners actually learn. Overall, unimaginative and boring!

How do you see the status and the future of subject related pedagogy research?

There is a world wide trend for quality educational research to be moving away from schools of education and into university subject departments. This reflects increasing frustration with the poor quality of work in education faculties and education schools worldwide. Overall, education research has become a kind of pseudo-science and much so-called 'research' is not really research by any definition of that word.

What do you think about the relation of the research and everyday practise?

In my travels in many countries, I find school teachers are enthusiastic to take up new ideas founded on clear evidence. Their aspirations are often an inspiration to me. By contrast, school chemistry education is hindered by national policies and decisions taken by those who have out-of-date or no school teaching experience. Specifically, the teaching of chemistry at school level is being stifled by the control of national examinations which seem almost universally to give most of the rewards for recall.

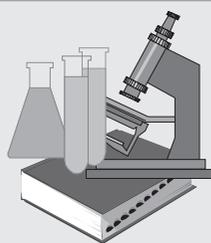
As I know you are retired, but what are your current and future plans?

Uncertain. My last PhDs completed in Dundee last June. Post-doctoral work goes on in Glasgow. I have now withdrawn from conferences worldwide although I still undertake more extensive lecture tours and have numerous consultancies.

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