

PROFILES — promoting Inquiry-based Learning through Science

John Lucey



Background

As I recently reviewed the European Commission FP7 funding projects between 2009 and 2012, I noticed that eleven out of fifty four projects related to the promotion of **Inquiry Based Science Education**¹. One such project is PROFILES (Professional Reflection Oriented Focus on Inquiry based Learning and Education through Science).

PROFILES is a project network set up across Europe and beyond European borders. The network consists of 19 countries among them institutions in Austria, Cyprus, Czech Republic, Estonia, Finland, Germany, Ireland, Israel, Italy, Latvia, Poland, Portugal, Romania, Slovenia, Spain, Switzerland, Sweden, Turkey and the United Kingdom. Ireland is represented by the Eureka Centre, University College, Cork.

The project aims; through professional development for teachers and teacher self reflection to promote enhanced scientific literacy of students.

In terms of targeted outcomes, the project sets out to:

1. Establish a well managed, collaborative and well monitored consortium, which is able to introduce PROFILES ideas into a multitude of individual educational systems and cultures to which project partners relate
2. Ensure improved students' science learning by offering innovative learning opportunities for continuing professional development for teachers and teacher educators as well as for students within the school, teacher education institutions and non-formal centres
3. Take into account stakeholders' views in seeking effective ways to raise teacher ownership (and hence self-confidence) of innovative science teaching approaches and practices, particularly related to inquiry-based approaches and student centred teaching and learning
4. Develop methods to disseminate project ideas and successes on a wide scale within Europe (and beyond) and promote networking to raise teacher awareness throughout Europe.

Since 2006, the National Council for Curriculum and Assessment (NCCA) has been working on developing key educational skills right across the curriculum. In their recent publication 'Towards a Framework Junior Cycle'² literacy and numeracy are identified along with Managing Myself, Staying Well, Being Creative, Communicating, Working with Others, Managing Information and Thinking. At senior cycle 'Towards Learning – an overview of senior cycle education'³ five key skills have been highlighted – Information Processing, Being Personally Effective, Communicating, Critical and Creative Thinking and finally Working



with Others. These, as are stated, are in line with international trends and influenced by the OECD DeScDo (Defining and selecting Key Competencies).

A central focus in the PROFILES project is the philosophy of 'Education through Science'⁴ which could be interpreted to mean Education as the learning focus, approached through Science as the vehicle. This is very much in line with the NCCA proposal to embed key skills as a central element to teaching and learning across the curriculum. In each of the proposed revised syllabi, key skills are described in terms of learning outcomes as an essential component – what students might show as evidence of achieving the key skill. In other words components of the science syllabus are a vehicle towards achieving the specific key educational skill. Each module developed in PROFILES embeds the key skills outlined in the syllabus of each country in the teacher's own unique way through inquiry learning or inquiry based science education (IBSE) and promotion of enhanced scientific literacy. By necessity, IBSE encompasses student centred learning and PROFILES embraces this.



PROFILES associates at a conference in Tel Aviv: back row: Jack Holbrook (University of Tartu); Noel Brett (UCC); Claus Bolte (Berlin Free University); front row: Wolfgang Graber (EU evaluator); John Lucey (UCC); Avi Hofstein (Wiseman University Israel); Declan Kennedy (UCC)

As post graduate students and their colleagues in UCC work in developing modules using the PROFILES philosophy and structure, one aspect which is emerging is its close relationship with modular development in Transition Year and emerging curricula. The PROFILES modules when completed will be ideal for teaching Transition Year students.

Structure of Modules

Each PROFILES module consists of five components

1. Front page – consists of module title, abstract, relation to the curriculum, and learning outcomes
2. Student's activities – Three stages:
 - Stage 1 is introduced by a scenario from a socio-scientific perspective. Through strong student involvement, this stage moves towards student identification of a need –to–learn science, triggered by the students self motivation for wanting to learn more. This leads to sustained motivation through building on students' prior constructs and maximising student –constructed learning.
 - Stage 2 – Inquiry Based Science Education explores the scientific question arising from the scenario in stage 1. Through a process skill development (guided to a degree by the teacher) appropriate key skills identified in the curriculum and warranted by the socio-scientific setting chosen are achieved over time.
 - Stage 3 consolidates the science learning through appropriate decision making. Eventually in a whole class setting, consensus is promoted through argumentation and reasoning using suitable teaching approaches so as to integrate the science learning into a social decision-making frame.
3. Teacher Guidelines – consists of advisory, suggested activities, time allocation, sequence for student – constructed learning, worksheets and references
4. Assessment – Preferably formative
5. Teacher Notes – may or may not be included.

Examples of PROFILES teaching packages are available on <http://chemweb.ucc.ie/Pro2/PROFILES-ucc.htm>. These represent work in progress and will be finalised by June 2012.

Conclusion

It is inevitable over the next number of years that science teaching in Ireland will become very influenced international investigations, reports, educational research into science education and the financial commitment by the European Commission. Central to this change will be an enhanced emphasis on IBSE. Here in Ireland we have had a gentle introduction to IBSE via **Coursework B**, at Junior Certificate to date. The opportunity and challenge to teachers of Transition Year to develop their own modular programme has been a positive experience for some but not for all. I am confident that this PROFILES project will be successful and in time will be a tremendous and exciting new development both for teachers and their students in our system of education in Ireland.

I wish to acknowledge the following leading members of PROFILES:

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J. Holbrook, A. Hofstein, R. Mamlok-Naaman, F.Rauch.

John Lucey, Assistant Lecturer in Science Education, School of Education, University College Cork.

References

1. CORDIS – European Commission, community research and development information service, Seventh Framework Programme (FP7): <http://cordis.europa.eu/>
2. NCCA Towards a Framework Junior Cycle: <http://ncca.ie/framework/home.htm>
3. NCCA Towards Learning – an overview of senior cycle education : http://www.ncca.ie/en/Curriculum_and_Assessment/Post-Primary_Education/Senior_Cycle/Towards_Learning_an_overview_/Towards_Learning_an_Overview_of_Senior_Cycle_Education.pdf
4. Holbrook, J & Rannikmae M., (2007). Nature of science education for enhancing scientific literacy. *International Journal of Science Education*, 29(11), 1347-1362

Below: PROFILES team-building in UCC: The large gathering of teachers that received an update on the development of the PROFILES Project takes time out for a group photo.

