



*The Western Seaboard Science Project:
An Innovative Model of Professional
Development to Enhance the Teaching
and Learning of Primary Science
(2008-2010)*

Rationale for Project

Concerns regarding primary science

- ▶ Teachers' confidence, competence and attitudes towards teaching science is a world-wide concern;
- ▶ Improving teaching of science focuses in particular on two areas:
 - (a) improving teacher subject and pedagogical knowledge
 - (b) support, in the form of PD

Structure of the Project

- ▶ 2 year research and development project between the College and fifteen rural primary schools (2/3 teacher);
 - ▶ 3 clusters with 5 schools in each;
 - ▶ 5/6 workshops per year for participating teachers;
 - ▶ Ongoing support from project facilitator for participants;
 - ▶ Virtual Learning Environment (Moodle);
 - ▶ School visits by facilitator (when requested)
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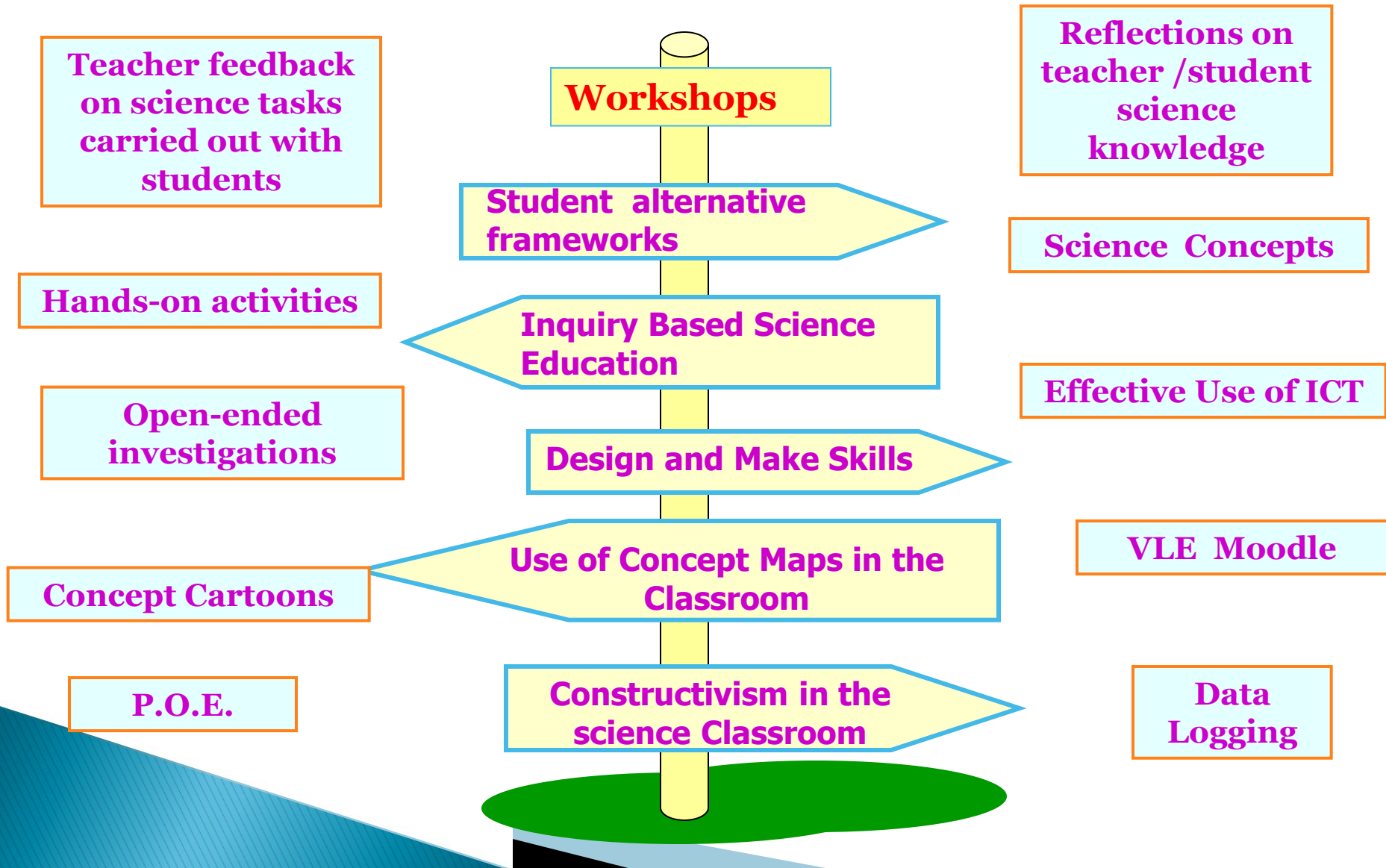
The project's main Aims

- ▶ Develop an innovative model of professional development in science education in 15 schools;
 - ▶ Breakdown the insulation and isolation of teachers;
 - ▶ Improvements in confidence, competence, attitudes and knowledge among primary teachers where the teaching of science is concerned;
 - ▶ Encourage positive attitudes to primary science among pupils
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Defining features of the WSSP workshops

- ▶ Active participation;
 - ▶ Clearly defined tasks;
 - ▶ Meaningful collaboration;
 - ▶ Continuity;
 - ▶ Feedback.
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Sample of Workshop Activities



Design of the Study

Mixed methods (quantitative and qualitative)

- ▶ Teacher and pupil questionnaires (pre/post);
 - ▶ Teacher interviews (post);
 - ▶ Pupil interviews (pre/post);
 - ▶ Assessment of teachers' understanding of key science concepts (pre/post);
 - ▶ Monitoring project development template
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Changes in teachers' confidence across seven subject areas (pre- and post- intervention)

Subject	Pre		Post		Sig
	Intervention (N = 24)		Intervention (N = 22)		
	Mean	Standard Deviation	Mean	Standard Deviation	
English	4.50	0.598	4.55	0.510	0.665
Irish	4.23	0.813	4.32	0.646	0.427
History	4.41	0.734	4.50	0.512	0.427
Geography	4.41	0.734	4.50	0.598	0.492
Mathematics	4.41	0.590	4.45	0.596	0.665
Science	3.23	0.869	4.05**	0.486	0.000
ICT	3.41	0.959	3.73	0.703	0.016

Changes in teachers' perceived confidence across the four strands of the science curriculum (pre- and post-instruction)

	Pre		Post		Sig
	Intervention (N = 24)		Intervention (N = 22)		
Science content	Mean	Standard Deviation	Mean	Standard Deviation	
Living things	3.69	0.805	3.89	0.544	0.047
Forces and energy	3.14	0.836	3.89**	0.524	0.000
Materials	3.22	0.839	3.59**	0.811	0.009
Environment	4.11	0.899	4.43	0.623	0.069

How often teachers used innovative teaching methodologies (pre- and post-intervention)

	Pre		Post		Sig
	Intervention (N = 24)		Intervention (N = 22)		
	Mean	Standard Deviation	Mean	Standard Deviation	
Teacher questions	4.23	0.813	4.68**	0.646	0.009
Co-operative learning	3.59	1.098	4.14	0.774	0.015
Predict-Observe-Explain	3.23	1.343	4.14**	0.889	0.008
Concept Cartoons	1.59	0.734	3.41**	1.098	0.000
Concept Mapping	2.23	1.110	3.18**	0.958	0.001
Discussion in class	4.09	0.921	4.41	0.908	0.016
Using children’s ideas to start a topic	3.41	1.008	4.18**	0.795	0.001
Using hands-on science	3.91	0.921	4.18	0.664	0.110
Using ICT	2.64	1.217	3.05**	0.999	0.004

Percentages of teachers responding correctly to questions of basic science concepts (before and after intervention programme)

Statements (True or False)	Pre Intervention (% Correct)	Post Intervention (% Correct)	Change + / -
Gravity only acts on objects when they are falling	68	95	+
Friction only acts on moving objects	53	89	+
Heavy things fall to the ground quicker than light things	21	100	+
The moon is luminous	63	100	+
Less current returns to the battery when it passes through say a bulb (it is used up)	26	89	+
Current flows from battery to bulb but not from bulb back to battery	53	100	+
All metals are attracted to a magnet	69	100	+
Heat travels from a cold body to a hot body	74	100	+

Interview/monitoring template findings

Responses indicated WSSP impacted positively on teachers classroom practice:

- ▶ Carrying out more hands on science;
 - ▶ Greater understanding of science concepts;
 - ▶ Using a variety of approaches to teach science;
 - ▶ Pupils' attitudes to school science more positive;
 - ▶ Shift of emphasis from help with knowledge to pedagogy
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Impressions of WSSP as model of CPD

Effective characteristics:

- ▶ Active engagement during workshop;
- ▶ Duration of programme;
- ▶ Relevance of content to their needs;
- ▶ Collaboration with colleagues;
- ▶ Challenge – *time/curriculum overload*

Issues of wider concern

- ▶ Tackling teacher insulation and isolation – meaningful collaboration;
- ▶ Cultivating reflective practice – teachers developed their capacity for self and group reflection;
- ▶ Promotion of teacher networks (formal and informal)
 - Workshops, VLE, exchanging/sharing resources

Implications for the PD of primary teachers in science

Experience of study indicates that PD should:

- ▶ On-going and long term;
- ▶ Emphasise relevant content and pedagogy;
- ▶ Actively engage teachers;
- ▶ Be collaborative in nature;
- ▶ Provide feedback and reflection.

Personal / Social / Professional Development

