PROFILES

Structure and Philosophy

Jack Holbrook

Welcome to PROFILES

- **PROFILES** is not curriculum development
  - although it impacts on the curriculum (in Estonia, we hope).
- **PROFILES** is not research (but it is likely to impact on, or by guided by, research – your research!!).
- **PROFILES** is COORDINATED ACTIONS.
  Partners work together !!

So What is PROFILES?

The acronym ‘PROFILES’ stands for

PROFESSIONAL (Innovation 1)

REFLECTION-ORIENTED FOCUS (Innovation 2)

on

INQUIRY LEARNING (Innovation 3)

and

EDUCATION (through) SCIENCE (Innovation 4)

Innovation 1

'P' stands for PROFESSIONAL and is promoted as an innovation in the sense that:

(a) science teachers, as professionals, need to approach teaching in a motivational, effective, evidence-based, professional way;

(b) as professionals, teachers need to interact with the 'community of practice' i.e. other teachers in discussing, sharing and promoting advances.

Innovation 2

'ROF' stands for Reflection-oriented focus, and is promoted as an innovation in the sense that:

- the project recognises the importance of guiding teachers **to reflect on their teaching**.
- the project sees **teacher ownership** *(of the innovations)* as a key focus of attention for this project.

Innovations 3 and 4

These relate to

Inquiry Learning

and the

Education through Science philosophy

Both of which will need elaboration at a later stage, but simply put: Inquiry Learning is asking and answering questions (by students), and Education through Science is meeting all the education goals (for the learning in school) through the context of science.

The Problem (EC, Science Education Now, 2007)

- In most European countries, science teaching methods are essentially **deductive** (*and guided by* **positivism** - *science is the truth*).
- The presentation of concepts and intellectual frameworks **come first,** followed by the search for operational consequences (*uses of the science*).
- **Experiments** are mainly used as illustrations (*teaching guided by verification* - **Behaviourism***)*

The focus of PROFILES

- PROFILES builds on the ideas and teaching materials developed in the **PARSEL project** (www.parsel.eu).

PROFILES particularly relates to:

- **A Societal focus - socio-scientific scenario approach.**
- **Using a 3-stage model to enhance students' STL.**
- **An Education through Science – education focus.**
- **An emphasis on student Relevance and Interest .**

STL Definition – is this the best?

Enhancing scientific literacy through science education is:

- Developing an ability, to creatively utilise appropriate evidence-based scientific knowledge and skills, particularly with relevance for everyday life and a career, in solving personally challenging yet meaningful scientific problems as well as making, responsible socio-scientific decisions.

Recognising enhancing STL depends on:

- Developing collective interaction skills, personal development and suitable communication approaches as well as the need to exhibit sound and persuasive reasoning in putting forward socio-scientific arguments.

THE PROFILES Intention

1. Continuous **Professional Development for Teachers** (first for self efficacy, then teacher ownership).
2. **Development of Teacher Networks** (local, regional, national, Europe-wide).
3. **Promoting Inquiry (questioning, especially student questioning/answering, approaches in schools) (IBSE) –** within a 3-stage approach to STE.
4. **New Pedagogies -** affecting student motivation.

(See - EC, 2007, Science Education Now)

PROFILES Background and Purpose

- PROFILES is currently one of the largest European FP7 funded project in the field of “Science in Society”.
- The consortium consists of 22 partners from 20 different countries.
- TARGET for Partners - cooperation between partners to promote PROFILES ideas to teachers to such an extent teachers adopt this approach.

Measures of Success

- Measures of success will be through determining:
  (a) the self-efficacy gained by science teachers to undertake up-to-date science teaching;
  (b) positive attitudes shown by students toward science and their learning (science education);
  (c) supportive reactions from a range of stakeholders;
  (d) teacher ownership through (i) developing own teaching modules, (ii) undertaking self-reflections such as through action research, or disseminating teaching portfolios;
  (e) networking (exchanging/commenting/suggesting) among science teachers.

Within Country Approach

1. Establish close cooperation **with stakeholders**.
2. Provide professional teacher development through a **needs-driven approach**.
3. Develop **teacher self-efficacy** through interventions in the classroom using teaching modules.
4. Promote **teacher ownership** of innovative PROFILES teaching **(reflects, disseminates & leads others**).
5. **Evaluate and Disseminate (Networking)** the PROFILES ideas, materials and outcomes to other teachers, stakeholders through publicity mechanisms, seminars, workshops, conferences, publications

Professional Development

- This is planned as longitudinal (one year).
- Enabling familiarity with philosophy and approaches.
- Addressing teacher identified ‘needs’ with respect to PCK.
- Supported by invention opportunities (trying out modules in the classroom), and
- Emphasis on collective reflection between teachers from classroom experiences.

Professional Development model

Promoting teacher's Self-efficacy

- 1 year as mixture of group seminars and school-based intervention (*actual model to be determined*)

Promoting teacher Ownership

- (Not for all teachers – 20%?)
- Additional year – school-based
- Emphasis on self-reflective practices
- Acting as Lead teacher

A Gateway Instrument for determining levels of Self-Efficacy (Confidence and Competence)

Potential PCK Topics for a Professional Development Programme under PROFILES	**Level of confidence in ability to incorporate within teaching in a meaningful manner**	**Degree of Emphasis for the component within a PROFILES In-service Course to support teaching**
Part 1 (administered before session 1)		
A Nature of Science		
B Scientific and Technological Literacy		
C Goals of Education/Science Education		
D Inquiry-based Science Education		
E Classroom Learning Environment		
F Student Motivation		
G Assessment (especially formative) strategies		
Part 2 (administered towards end of programme)		
H Self reflection on success of teaching		
I Teacher ownership of meaningful science teaching		
J Education theories		
K Lead teacher		

Role of Lead Teachers

Interested teachers have the opportunity for further involvement, by:

- Practicing reflective teaching as steps towards Teacher Ownership of PROFILES teaching.
- Developing teaching modules.
- Lead professional development for other teachers.
- Setting up networking -sharing/dissemination through face-to- face and/or electronic means.
- Offering seminars, workshops to stakeholders.

Operation of PROFILES

The Partners within each country will carry out PROFILES under a common thrust, based on:

- stipulated WORK PACKAGES (WP1-WP8);
- meeting specified milestones;
- producing required deliverables.

Work Package	Short title	Coverage
1	WP1 Management and evaluation	Project management and external evaluation.
2	WP2 Partner co-operation and professional support	Partner professional support to guide PROFILES as per the intended philosophy, goals, outcomes and stakeholder views.
3	WP3 Stakeholder involvement and interaction	Bridging the gap between science education researchers, teachers, and local actors (Stakeholders network and co-operation).
4	WP4 Learning Environment	Preparing of teacher training programme materials and identification of IBSE related teaching modules plus their modification and enhancement based on evaluative feedback and involvement of additional teachers in PROFILES.
5	WP5 Teacher Training and Intervention	Planning and Implementation of the (longitudinal) teacher training programme and inter-related teacher intervention.
6	WP6 Teacher Ownership	Building on WP5 and reflecting and evaluating the effectiveness and impact of the (longitudinal) teacher training programme with special emphasis on teacher ownership and reflective practices.
7	WP7 Student Gains	Evaluating the effectiveness and impact of the teacher training programme/intervention and development of teacher ownership by focussing on student outcomes.
8	WP8 Dissemination and Networking	Dissemination on a national, international and worldwide level and establishment of a PROFILES teachers' network which is interrelated to other teachers' networks operating on a local, regional national or Europe-wide scale.

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Milestones and Deliverables

- **Milestones** are indicators to guide the progress of PROFILES (In England distance is measured in miles and stones (stone placards) are placed at intervals to indicate distance or progress made)
- **Deliverables** are attainments, results, outputs, reports which specify achievements.

PROFILES Intended Outcomes

- **The first essential PROFILES step, and** perhaps the only step for many teachers, is to gain **self-efficacy** (especially in terms of competence and confidence) in using and adapting PROFILES teaching materials so as to enhance STL of students.
- PROFILES promotes **teacher's self-efficacy** through a longitudinal teacher professional support programme based on self-identified teacher needs.
- It also endeavours to inform teachers of **stakeholder views** on student expectations from teaching, and more explicitly from teaching through science subjects.

The PROFILES hypothesis

It is hypothesised that teachers' professionalism,

(i.e. the effective and sustainable improvement of teaching through the promotion of self-efficacy and teacher ownership)

- can be strengthened by means of *collaborative interactions and through self-evaluative measures focussing on the teachers' reflective practices,*
- *as well as through formative and summative assessment of students' cognitive and affective learning.*

3 stage model

The teaching approach and the teaching material are based on the PHILOSOPHY behind the familiar 3-stage model.

The approach and materials recognise the key role played by

- motivation (intrinsic motivation of students);
- the need for student involvement and constructivism;
- inquiry-based science education;
- learning, with respect to knowledge, skills, attitudes and values, especially in transferring to unknown situations (and not just seen as acquisitions in a classroom or a scientist's preferred expectation).

All Teaching Stages

In all stages of the teaching approach, **generic education skills** are promoted, such as

- personal attributes - ingenuity, initiative, safe working;
- social skills such as cooperative and collaborative working; leadership abilities;
- motivational attributes, identified by such means as ‘willingness to’ and ‘perseverance’.

Theoretical Constructs

- The teaching is based on **constructivism** rather than **behaviourism** (often a common preference for teachers).
- The teaching rejects **logical positivism** and a **scientist's approach**, and supports a societal, interdisciplinary **frame of reference** where relativism and 'education through science' promote a competency-based, holistic and interdisciplinary view of the total educational provision.
- **Social constructivism** is favoured, aligned with activity theory, while recognising the **motivational** importance of the teaching being challenging and purposeful, yet within the Vygotskian '**zone of proximal development**.'

Teaching Modules

These are of the PARSEL –type (www.parsel.eu)

This means:

1. Carefully chosen titles.
2. Use of an introductory scenario.
3. Emphasis on being student centred.
4. Follows the 3-stage model.
5. Includes (K,S,A,V) learning outcomes.
6. Puts forward student learning tasks.
7. Includes a suggested Teacher's guide.
8. Includes suggested Formative Assessment strategies.
9. Provides NOTES FOR TEACHERS.

Thank you

I hope this was helpful

In PROFILES

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'ROF' stands for

Reflection-oriented focus, in the sense that:

- the project recognises the importance of guiding teachers **to reflect on their teaching**.
- the project sees **teacher ownership** *(of the innovations)* as a key focus of attention for this project.

'IL' stands for

'Inquiry learning, or **IBSE** (Inquiry-based science education)

- This is a recognised need by the European Commission and will thus form **a major focus of PROFILES**.
- By necessity, IBSE encompasses **student-centred learning**. PROFILES embraces this.

'ES' stands for

Education through Science (EtS).

(see Holbrook & Rannikmae, IJSE, 2007, 29(11), 1347-1362)

- *This unique feature of PROFILES is* taken as an approach in which **Education is the focus, while the context** in which this education is to be achieved is taken to be science.
- EtS introduces a **new PROFILES philosophy**.
- PROFILES recognises that Science Education is about **'EDUCATION first'** and the science is the **'vehicle'** to promote this education.

How will PROFILES operate ?

The PROFILES project operates by:

1. Establishing a well managed, collaborative and well monitored consortium, which intends to –

- introduce PROFILES ideas into a multitude of individual educational systems and cultures,

- but especially into the systems to which the project partners relate.

PROFILES sets out to

2. Ensure improved **students' science learning** by:

- offering **innovative professional development** opportunities for in-service teachers and teacher educators,
- as well as **meaningful and challenging education** for students within the school, pre-serve teachers in teacher education institutions and all in non-formal education centres.

PROFILES sets out to

3. Take into account a large variety of stakeholder's views

(those persons with an interest in the educational outcomes of students)

in seeking effective ways to **raise teacher ownership** (and hence self-efficacy - confidence and competence of teachers) of innovative science teaching approaches, based on IBSE and EtS.

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PROFILES sets out to

4. Develop methods and enhance approaches to **disseminate project ideas and successes** on a wide scale within Europe,

   and **promote networking** to raise teacher awareness and sharing Europe-wide.

Indicators of Success

Attaining the intended PROFILES outcome is exhibited *initially* by greater teachers' competence and self-confidence (**self-efficacy**) to promote IBSE-related science teaching

(*which students find motivationally stimulating and of value for their development and future aspirations).*

The Ultimate Goal

- Interested and motivated students, enjoying science lessons and gaining greater STL.

- with Teachers taking up
  - (**Teacher) ownership** of the PROFILES way,
  - Exhibited by **self-reflection** and **leadership**,
  - And willing to undertake **dissemination practices** to support other teachers.

Achieving the Goals

This will be dependent on **convincing teachers that** methods studied and tried out in the PROFILES training are designed to:

- ***improve the quality of their own science teaching for the benefit of students;***

convincing teachers that:

- those who participate in the longitudinal training programme experience gain in ***self-efficacy*** to such an extent that they feel they have a future role in convincing other teachers of the need to interact with PROFILES and seek support (e.g. science colleagues in their schools, from 'nearby schools', etc);

convincing teachers that:

examining their teaching reflectively and exploring concerns or negative impacts on students

can impact on their teaching and be achieved, first guided by partners, but later by specific teachers (referred to as '***lead teachers***').

This step is designed to follow-on from the initial PROFILES teacher development and intervention, so as to raise **teacher ownership of developments** through self-evaluative approaches.

convincing teachers that:

- creating and participating in teacher networks (and other forms of dissemination e.g. describing their successes and student gains in publications or seminars, running workshops, talking about PROFILES teaching to pre-service teachers),

- can play an important role in aiding promotion of a **teacher's self-efficacy** and, through disseminating teacher ownership of PROFILES ideas, leads to greater **enhancement of the scientific literacy of students**.

The PROFILES hypothesis

It is hypothesised that teachers' confidence,

(i.e. the *effective and sustainable improvement of teaching through the promotion of self efficacy and teacher ownership)*

- can be strengthened by means of ***collaborative interactions and through self-evaluative measures focussing on the teachers' reflective practices, as well as through formative and summative assessment of students' cognitive and affective learning.***

Issues we face

Reforms, which do not appreciate the **important role teachers' play** in change, often experience difficulty.

Imposed programmes run the risk of failing, if **teachers do not accept** and **understand the innovation** (Fullan, 1992).

A central issue is that improvement in educational programmes depends on concurrent processes of **teacher development,** which in turn implies work in a setting that enables **self-organisation and reflective practice** (Stenhouse, 1975; Schön 1983).

Operationalising PROFILES

PROFILES is designed, in the **Description of Work,** to be put into operation via **eight work packages**

WP 1 Management and Evaluation

As the name suggests, this is about Project Management and Evaluation especially finance, meeting deadlines for deliverables and responding to European Commission expectations.

It will also handle interactions with an External Reviewer and maintenance of the PROFILES website.

- **Lead partner FUB**

WP2 Partner support

This work package focuses on ensuring

Professional support and guidance for partners in being familiar with, meeting operational needs and interpreting project goals and actions, overcoming difficulties and cooperating with other partners, especially in sharing of experiences.

- Lead partner UTARTU

WP3 Stakeholders

Bridging a potential gap between science education researchers, teachers, students and local actors (various levels of stakeholders such as parents, company leaders and scientists) through networking and co-operation during the life of PROFILES.

- Lead Partner FUB

WP4 Learning Environment

Preparation guidelines to:

Ensure needs-related, teacher professional development training programme materials are available, plus

Identification of appropriate IBSE-related, ‘education through science’ enabling teaching modules (which can be modified and translated)

- Lead partner UTARTU

WP5 Teacher Professional Development

Planning and Implementing (based on teacher-needs) the (longitudinal) teacher development programme and inter-related classroom interventions through which teachers try out new ideas and approaches leading to teacher self efficacy in PROFILES intentions.

- Lead Partner WEIZMANN

WP6 Teacher Ownership

Builds on WP5 and, through self-reflection, case studies self-evaluation, support other teachers,

raise the effectiveness and impact of PROFILES operations with a special goal of teacher ownership of PROFILES practices.

- Lead Partner WEIZMANN

WP7 **Student Gains**

Evaluating the effectiveness and impact of the PROFILES teacher professional development programme/intervention,

[and the development of teacher ownership under PROFILES],

In student outcomes, especially affectively (attitudes, interest) but also in cognitive development, self-achievement and peer-peer interactions

- Lead Partner FUB

WP8 Dissemination and Networking

Dissemination of PROFILES outcomes on a national, international and worldwide level

And the establishment of PROFILES teachers' networks interrelated to other teachers' networks operating on a local, regional national or Europe-wide scale

- Lead partner UNI-KLU (and ICASE)

Thank you

I hope this was helpful