Evidence-informed pedagogical practice: ‘realising’ the value of research for teaching

Norbert Pachler
Educationalists at all levels need to be able to
- pose (...) answerable question(s) about education;
- know where and how to find evidence systematically and comprehensively…;
- retrieve and read such evidence competently and undertake critical appraisal and analysis of that evidence according to agreed professional and scientific standards;
- organise and grade the power of this evidence; and
- determine its relevance to their educational needs and environments

(Davies, 1999)
relationship between research and practice
Boyer’s four scholarships (1990):

- Scholarship of discovery (original research)
- Scholarship of integration (making interdisciplinary connections)
- Scholarship of application (applying knowledge to problems and situations)
- Scholarship of teaching (bridging and transforming knowledge for the purposes of student learning)
Scholarship of teaching:

- engagement with the scholarly contributions of others on teaching and learning;
- reflection on one’s own teaching practice and the learning of students within the context of a particular discipline;
- communication and dissemination of aspects of practice and theoretical ideas about teaching and learning in general and teaching and learning within the discipline

(Healey, 2005)
educational institutions as learning organisations in which students actively contribute to knowledge construction around notions of

- intellectual,
- social and
- organisational capital (Hargreaves, 2003)

teaching and research as forms of learning; learning as the link between teaching and research
A typology

Students as participants

- Research tutored
- Research-based
- Research-led
- Research-oriented

Emphasis on research content

Emphasis on research processes and problems

Students as audience

Cambridge Pre-U Global Perspectives aims to develop learners by:
- providing opportunities to acquire disciplined and scholarly research skills;
- promoting a critical, questioning approach to information that is often taken for granted;
- encouraging self-reflection and independence of thought;
- encouraging an understanding of and engagement with, some of the key global issues they will face wherever they live and work;
- encouraging an awareness and understanding of and respect for, the diversity of perspectives on global issues;
- encouraging an interdisciplinary approach to global issues.
Some issues with research
Some issues with research

- **unrealistic expectations** about research and its ability to offer clear-cut answers
- **what types of evidence** are considered **valid** and what research **methods are fit-for-purpose**?

“The ideal … is a merging of practitioner knowledge and persuasive research support: both are needed for effective instruction.” (Grabe, 2004)
Learning and teaching are highly complex fields influenced by many contextual factors and variables including:

- the physical environment
- the time of day
- the number of learners
- the personal characteristics of the teacher and the learners
- the proficiency of the learners, their age, their motivation
- the time available
- the teaching resources used
- the status of the subject in the educational institution and the society more widely etc
types of knowledge
Types of knowledge

- **knowledge for practice**: formal knowledge and theories generated by university researchers for teachers
- **knowledge in practice**: practical knowledge and expertise embedded in teachers’ work
- **knowledge of practice**: one’s own classroom and school are sites of inquiry and teachers treat the knowledge and (personal) theories produced by others as generative material for interrogation and interpretation

(Cochran-Smith and Lytle, 2001)
- know about problems
- know what works
- know how to put into practice
- know how to involve
- know why

(Nutley et al., 2003)
Teacher characteristics and effectiveness
Teacher characteristics

- focus on students’ cognitive engagement with the content of what is being taught;
- focus on developing a way of thinking and reasoning that emphasizes problem-solving and teaching strategies relating to the content that they wish students to learn;
- focus on imparting new knowledge and understanding, and then monitor how students gain fluency and appreciation in this new knowledge;
- focus on providing feedback in an appropriate and timely manner to help students to attain the worthwhile goals of the lesson;
- seek feedback about their effect on the progress and proficiency of all of their students;
- have a deep understanding about how we learn; and
- focus on seeing learning through the eyes of the students, appreciating their fits and starts in learning, and their often non-linear progression to the goals, supporting their deliberate practice, providing feedback about their errors and misdirections, and caring that the students get to the goals and that the students share the teacher’s passion for the material being learnt.

(Hattie, 2012)
### Key aspects of formative assessment

(Black and Wiliam, 2009)

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Where the learner is going</th>
<th>Where the learner is</th>
<th>How to get there</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Clarify and share learning intentions</td>
<td>Engineering effective discussions, tasks and activities that elicit evidence of learning</td>
<td>Providing feedback that moves learners forward</td>
</tr>
<tr>
<td>Peer</td>
<td>Understand and share learning intentions</td>
<td>Activating learners as learning resources for one another</td>
<td></td>
</tr>
<tr>
<td>Learner</td>
<td>Understand learning intentions</td>
<td>Activating learners as owners of their own learning</td>
<td></td>
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</tbody>
</table>

(Black and Wiliam, 2009)
Effective teachers I

- have high expectations for all students and help students learn, as measured by value-added or other test-based growth measures, or by alternative measures.
- contribute to positive academic, attitudinal, and social outcomes for students such as regular attendance, on-time promotion to the next grade, on-time graduation, self-efficacy, and cooperative behavior.
- use diverse resources to plan and structure engaging learning opportunities; monitor student progress formatively, adapting instruction as needed; and evaluate learning using multiple sources of evidence.
• contribute to the development of classrooms and schools that value diversity and civic-mindedness.
• collaborate with other teachers, administrators, parents, and education professionals to ensure student success, particularly the success of students with special needs and those at high risk for failure.

(Gore, Bell and Little, 2008)
Effective teachers II

- are clear about instructional goals
- are knowledgeable about curriculum content and the strategies for teaching it
- communicate to their students what is expected of them, and why
- make expert use of existing instructional materials in order to devote more time to practices that enrich and clarify the content
- are knowledgeable about their students, adapting instruction to their needs and anticipating misconceptions in their existing knowledge
- teach students meta-cognitive strategies and give them opportunities to master them
- address higher- as well as lower-level cognitive objectives
- monitor students’ understanding by offering regular appropriate feedback
- integrate their instruction with that in other subject areas
- accept responsibility for student outcomes

(Ko, Sammons and Bakkum, 2013)
Cost and impact estimates

Impact vs cost

Promising

May be worth it

1-1 tuition

Early Years

Not worth it

Smaller classes

After school

Teaching assistants

Aspirations

Mentoring

Summer schools

Parental involvement

ICT

Individualised learning

Small group tuition

Behaviour

Social

Homework (Primary)

Ability grouping

Performance pay

Homework (Secondary)

Collaborative

Phonics

Feedback

Meta-cognitive

Peer tutoring

Effect Size (months gain)

Cost per pupil

(Coe, 2013)
learning and teaching
1. Students are **busy**: lots of work is done (especially written work)
2. Students are **engaged, interested, motivated**
3. Students are **getting attention**: feedback, explanations
4. Classroom is **ordered, calm, under control**
5. Curriculum has been ‘**covered**’ (ie presented to students in some way)
6. (At least some) students have supplied **correct answers** (whether or not they have really understood them or could reproduce them independently)

(Coe, 2013)
Condition 1: BELONGING — effective learning engages the learner’s identity. It builds on the learner’s knowledge, experiences, interests and motivation. In any learning community, there is a broad range of difference, and this is because the everyday life-worlds from which students come are always varied.

Condition 2: TRANSFORMATION — effective learning takes the learner on a journey into new and unfamiliar terrains. However, for learning to occur, the journey into the unfamiliar needs to stay with a zone of intelligibility and safety. At each step, it needs to travel just the right distance from the learner’s life-world starting point.

(Kalantzis and Cope, 2004)
Conditions for learning

- interaction with others such as peers and experts in pairs, teams, or communities through different forms of external dialogue,
- interaction with oneself on the individual cognitive and metacognitive level via internal dialogue,
- the confrontation between internal and external dialogue including the social relationships that arise as a result of this, and
- the interaction between the individuals and others with the learning, training, and social environment in which learning and instruction is taking place, including the environment’s physical, temporal and emotional attributes (i.e., its affordances, constraints, and conventions)

(Kirschner, 2006)
pedagogy
<table>
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<tr>
<th>Focus on learning</th>
<th>LOOK</th>
<th>Develop diagnostic clinical approaches</th>
</tr>
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<tbody>
<tr>
<td>Identify the knowledge base for teaching</td>
<td>LISTEN READ</td>
<td>Build curiosity about teaching</td>
</tr>
<tr>
<td>When teaching or observing</td>
<td>QUESTION</td>
<td>Why do some things work, and others not?</td>
</tr>
<tr>
<td>Evaluate, evaluate and revise your actions</td>
<td>THINK</td>
<td>Think individually and collaboratively</td>
</tr>
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</table>

(Chris Husbands)
TLRP’s ten principles of effective teaching and learning

1. **Equips learners for life** in its broadest sense
2. **Engages with** valued forms of knowledge
3. **Recognises** the importance of prior experience and learning
4. **Requires the teacher to** scaffold learning
5. **Needs** assessment to be congruent with learning
6. **Promotes the** active engagement of the learner
7. **Fosters both** individual and social processes and outcomes
8. **Recognises the significance of** informal learning
9. **Depends on** teacher learning
10. **Demands consistent** policy frameworks with support for teaching and learning as their primary focus

(James and Pollard, 2011)
Productive pedagogy

- Intellectual quality
  - Higher order thinking
  - Deep knowledge
  - Deep understanding
  - Substantive conversation
  - Knowledge as problematic
  - Metalanguage

- Supportive classroom environment
  - Student control
  - Student support
  - Engagement
  - Explicit criteria
  - Self-regulation

- Relevance
  - Knowledge integration
  - Background knowledge
  - Connectedness to the world
  - Problem-based curriculum

- Recognition of difference
  - Cultural knowledges
    - Inclusivity
    - Narrative
    - Group identity

- Supportive classroom environment
  - Student control
  - Student support
  - Engagement
  - Explicit criteria
  - Self-regulation

- Intellectual quality
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<table>
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<tr>
<th>Intellectual quality</th>
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<tr>
<td>Higher order thinking</td>
<td>Are higher order thinking and critical analysis occurring?</td>
</tr>
<tr>
<td>Deep knowledge</td>
<td>Does the lesson cover operational fields in any depth, detail or level of specificity?</td>
</tr>
<tr>
<td>Deep understanding</td>
<td>Do the work and response of the students provide evidence of understanding of concepts or ideas?</td>
</tr>
<tr>
<td>Substantive conversation</td>
<td>Does classroom talk break out of the initiate – respond – evaluate pattern and lead to sustained dialogue between students, and between teachers and students?</td>
</tr>
<tr>
<td>Knowledge problematic</td>
<td>Are students critiquing and second-guessing texts, ideas and knowledge?</td>
</tr>
<tr>
<td>Metalanguage</td>
<td>Are aspects of language, grammar, and technical vocabulary being foregrounded?</td>
</tr>
</tbody>
</table>

(Goe, Griffiths and Ladwig, 2004)
ICT makes possible new forms of classroom practice. This is apparent in three particular respects:

1. The reconfiguration of space such that new patterns of mobility, flexible working and activity management can occur,

2. New ways in which class activities can be triggered, orchestrated and monitored,

3. New experiences associated with the virtualisation of established and routine practices – such as using multiple documents in parallel or manipulating spatial representations.

(Crook et al., 2010)
ICT creates the possibility of a wide variety of learning practices. Overarching this variety are three central activities which are significantly enriched by the increasingly ubiquitous availability of technologies:

(1) exposition which is animated by the opportunity to invoke rich shared images, video and plans,

(2) independent research which is extended by the availability of internet search opportunities, and

(3) construction which is made possible by ready-to-hand ICT-based tools.

(Crook et al., 2010)
curriculum
1. All material in the Universe is made of very small particles.
2. Objects can affect other objects at a distance.
3. Changing the movement of an object requires a net force to be acting on it.
4. The total amount of energy in the Universe is always the same but energy can be transformed when things change or are made to happen.
5. The composition of the Earth and its atmosphere and the processes occurring within them shape the Earth’s surface and its climate.
6. The solar system is a very small part of one of millions of galaxies in the Universe.

7. Organisms are organised on a cellular basis.

8. Organisms require a supply of energy and materials for which they are often dependent on or in competition with other organisms.

9. Genetic information is passed down from one generation of organisms to another.

10. The diversity of organisms, living and extinct, is the result of evolution.

   (Harlen et al., 2010)
Iris awhut about science

1. Science assumes that for every effect there is one or more causes.
2. Scientific explanations, theories and models are those that best fit the facts known at a particular time.
3. The knowledge produced by science is used in some technologies to create products to serve human ends.
4. Applications of science often have ethical, social, economic and political implications.

(Harlen et al., 2010)
Key mathematical domains

- relations between quantities and algebraic expressions;
- ratio and proportional reasoning;
- connecting measurement and decimals;
- spatial and geometrical reasoning;
- reasoning about data;
- reasoning about uncertainty;
- functional relations between variables

(Watson et al., 2013)
reflection, learning and research
Levels of reflection

- Description: revisiting
- Reflective description: revisiting with explanation
- Dialogic reflection: exploring relationship
- Transformative reflection: fundamental change
- Critical reflection: wider implications

(Fleck and Fitzpatrick., 2010)
<table>
<thead>
<tr>
<th>Do</th>
<th>Active learning</th>
<th>Collaborative Learning</th>
<th>Learner responsibility</th>
<th>Learning about learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review</td>
<td>Learners stop to notice what happened, what was important, how it felt, etc.</td>
<td>Learners bring ideas together and review how the group has operated</td>
<td>Learners monitor their progress and review their plan</td>
<td>Learners are encouraged to notice aspects of their learning as they engage in tasks</td>
</tr>
<tr>
<td>Learn</td>
<td>New insights and understandings are made explicit</td>
<td>Explanations of topic and of how the group functioned are voiced across the group</td>
<td>Factors influencing progress are identified and new strategies devised</td>
<td>Learners describe what they notice and review their learning (goals, strategies, feelings, outcomes, context)</td>
</tr>
<tr>
<td>Apply</td>
<td>Future action is planned in light of new understanding. Transfer to other situations is examined</td>
<td>Future possibilities for group and community learning are considered</td>
<td>Plans are revised to accommodate recent learning</td>
<td>Richer conceptions of learning are voiced and further reflective inquiry is encouraged</td>
</tr>
</tbody>
</table>

(Watkins, Carnell, Lodge, Wagner and Whalley, 2002)
SAMR

Redefinition
Tech allows for the creation of new tasks, previously inconceivable

Modification
Tech allows for significant task redesign

Augmentation
Tech acts as a direct tool substitute, with functional improvement

Substitution
Tech acts as a direct tool substitute, with no functional change

research and teacher education and development
Key principles of effective professional development (PD)

Shared practice, collaborative and critical

- a wide range of participants, locations and formats for collaborative work underpins PD activities
- a variety of stakeholders have a role to play (local authorities, commercial providers, higher education)

Enquiry-based

- PD needs to be focused on individual learner needs. Critical, reflective processes should be embedded in learning activities.
- Universities have a role to play in supporting teacher enquiry which is embedded in PD
Embedded within school ethos of learning and teaching

- School leaders need to be fully engaged with PD processes throughout
- Leadership which is informed, distributed and principled

Integration of personal and professional use of technologies

- access to Web 2.0 and flexible and informal as well as formal learning
More than an 'exchange' of practice. It leads proactively to changes in practice.

Draws on learning networks that are classroom-focused, non-hierarchical.

A critical, independent stance towards 'best practice'. The fusion of theory and practice, involving active enquiry into innovation as part of professionalism.

Scholarly reflection on practice.
references


