# Familiar challenges and new approaches : necessary advances in theory and methods in research on teaching and learning

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# Familiar challenges and new approaches : necessary advances in theory and methods in research on teaching and learning

I take it that educational researchers are as committed as teachers, trainers and policy makers to the educational endeavour, to improving the efficiency and effectiveness of educational experiences. In my view, what earns research the adjective 'educational' is this moral commitment to putting learners in the way of a better lot in life through making some contribution to the effectiveness of educational processes. From this point of view, the purpose of educational research is to extend the knowledge base for teaching and learning using best social science practice. Clearly, the purpose goes beyond the normal social science objective of deepening our understanding of the human condition. Educational research, if it is to be judged effective, must make a difference to the experience of participants in educational settings.

The status of research deemed educational would have to be judged, first in terms of its disciplined quality and secondly in terms of its impact. Poor discipline is no discipline. And excellent research without impact is not educational.

In my analysis of the challenges that we face I want to focus on theory and method in the field of teaching and learning. I do not want to be delayed here on the detailed examination of what would count as an appropriate knowledge base. For now I shall simply take Shulman's (1986) paper as a seminal, working definition. In short, a knowledge base for teaching and learning would necessarily consider the conditions of learning, the properties of learning environments, (especially the lesson or activity content), the properties and characteristics of participants and the nature of their interactions.

Although Shulman considers only the teacher's knowledge base, it does no injustice to his analysis to extend the ownership of pedagogic knowledge. The proper owners of this knowledge base are the participants in teaching and learning and those with a responsibility for the settings in which learning is pursued. There is, of course, an extensive relevant knowledge base in existence in practice. Our remit is to enhance it on the basis of disciplined research.

I also do not want to be delayed by a consideration of recent and high profile criticisms of educational research. I refer to the papers by Tooley (1998) and Hillage et al (1998) and the responses from various scholars. I take these issues as substantial and important, referring as they do to matters of research strategy, research quality and quality assurance and to relevance and impact. And clearly this body of criticism has made its contribution to a Zeitgeist favouring evidence informed practice.

To this end, a number of initiatives have been launched including the DfEE, Centre for Evidence Informed Policy and Practice, the ESRC Evidence Based Policy and Practice Network, and the National Educational Research Forum. Significant as these developments are, their focus is on managerial solutions to a problem couched in managerial terms. I do not want to gainsay this approach. I simply suggest that it will not be enough to meet our objective. There are deeper and more difficult challenges in the field than those raised in the debate thus far. There are problems of theory and of method and I will sketch some of these and proffer some potential directions towards their resolution.

**Research and practice**

It is worth emphasising that it is teachers and trainers who are expected to deliver on educational aspirations. Educational research is a service industry. It is essential that we consider what teachers and policy makers want and need from research in so far as they consider that they want or need anything. It is difficult, with any confidence, to know what teachers want on the basis of strong, empirical evidence. That being said there have been a number of studies or consultation exercises in which teachers, trainers and educational managers and policy makers have made their views clear (Blunkett, 2000; Donovan et al, 1999; ESRC/TLRP, 1999; Everton et al, 2000; McLlaughlin, 2000; National Research Council, 1999). These exercises have used a wide range of methods and tapped into perhaps an even wider range of constituencies of practice. It is encouraging therefore that there is a remarkable consensus amongst respondents.

From research, teachers want,

1 standard and stable models of learning. They cannot work with models that change with the wind.

2 coherent, organised, well established findings. They do not have time for literature searches or for refined academic debates.

3 vibrant working examples of success. **That** something works is one thing. Examples of how it can be got to work are crucial.

4 research results converted as far as possible into the technologies of education - into curriculum or other pedagogic materials.

Teachers, like all other practical professionals, want to know, on the basis of clear evidence, that a proposed change of practice will be measurably and safely beneficial and then they want the best technology to be developed in support of their implementing it.

Policy makers want,

1 A clear, scientific basis to findings from research; a clear link between conclusions and safe evidence.

2 If a 'need for change' is argued they especially need a scientific base as explanation.

3 Like teachers, they want evidence based, working examples of success.

It all seems little enough to ask of people presenting themselves as engaged in research. Since most educational researchers are also teachers. I imagine we would write a similar wish list of anyone expecting us to change our tutoring practices.

Of course, it is one thing to have a sound knowledge base on teaching and learning and quite another to ensure its impact on practice. How might a knowledge base interact with research and practice? A useful working model has been drawn up by the National Research Council of the USA and is shown below.

Figure 1 here.

The potential interactions here are well known. They are not, however, well understood let alone well worked. One thing that is clear is that the links are exceedingly complex. This is not peculiar to education.

It is quite general across all research fields and their links to action in practical life. It has been well said that it took the medical professional 300 years to learn to wash its hands. Sepsis is still the greatest killer in hospitals. Not only must practitioners believe prescriptions from research. They must also be equipped with the material conditions for their practice. Any fond fancy that research links easily or readily to practice does a disservice to both exercises except, as I shall consider later, in the case where research and practice move together in lockstep. This cannot always be the case and where it is not, major effort needs to be applied to improve our understanding of the knowledge transformation processes involved in linking our best understandings of learning to the enhancement of professional practice. The concept of 'transformation' is crucial here. Dissemination and even communication are relatively trivial steps between research findings and practice.

The critical step involves the application of a great deal of other related knowledge if the findings of x are to be assimilated into the practices of y.

A particular challenge arises from the recognition that most educational research will never have its impact through material technologies. Rather it will be mediated through teachers' and trainers' conceptions of teaching and learning. The question is, how does evidence have its impact on intelligent action? A great deal is known about this matter and it is not encouraging (Chinn and Brewer, 1993).

Humans come to any setting or circumstance with well formed expectations, beliefs, attitudes, histories, anticipations. Put most strongly, these are embodied in theories. More weakly and commonly we adopt a perspective or operate to some scheme or script. Evidence which does not fit with our theory (however informal that theory might be) receives very rough justice.

One way or another such evidence is readily and easily dismissed. This is not only the case for the person in the street.

It is certainly the case for high court judges (as many recent appeal cases reveal) and for the world's leading scientists. Theory and belief hold sway over evidence. Einstein is said to have observed that science does not progress on the basis of evidence - it progresses because 'old men die'. Priestly went to the grave clinging to his phlogisten theory. When Lord Kelvin first heard of x-rays he thought the reports were a hoax.

The privileged status of 'theory' belief, custom and practice in our every day and professional lives has considerable adaptive advantage. If we were to change our minds or actions every time discrepant data appeared on the horizon we would be considered insane.

Protecting a 'working' established view in the face of anomolous data takes many forms (Chinn and Brewer, 1993). It may be ignored - simply not seen. The theory of cognitive dissonance has explored this phenomenon.

Uncomfortable evidence may be rejected as errorful, irrelevant or lacking validity. It may be held in abeyance - seen as a 'blip' in a bigger picture - and likely to be explained at some later date. All these devices are common in the history of science and in the psychology of alternative conceptions. They constitute our account of normal psychology, of personal stability in a fractious world.

This is not to say that evidence never changes minds. Obviously it does and often profoundly so. The route from old to new theory or belief is shown below.

Figure 2 here.

Clearly the journey is arduous. Easy side turnings abound. And evidence never removes an old theory unless a 'better' theory is to hand.

The history of science teaching is overladen with examples of instruction failing to shift 'common sense' theory in regard, for example, to 'flat earth'; 'damp causes colds'; and, frighteningly, the conservation of substance. 15% of graduate engineers fail Piagetian tests of conservation of matter.

The point I want to emphasise here is that the policies and practices of those with front line responsibility for educational experiences are not whimsical. They rest on quasi theory, beliefs, or theory like conceptual structures which will not shift easily in the face of evidence. And this resistance is normal. It is an issue which requires extensive re-consideration in determining the nature and management of research and its findings.

We are not ignorant of the psychological processes which stand to privilege new data in the face of existing belief.

The new data, we can anticipate, will have to have considerable credibility in terms of source and content if it is to be considered at all. Once considered it will be subjected to searching examination. If there is ambiguity or any lack of logical or pragmatic credibility it will be dismissed. If it survives these tests, no practical purpose will be served unless practical theory flows from the data. It was easy to show teachers that pupils are constructivist learners. It is another thing entirely to arrange the practical consequences of this for teaching.

The implications of research on the impact of new data on old or existing beliefs have not yet been properly considered. Until this matter is progressed in a research based way arrangements for research impact will continue to be at best ad hoc and at worst amateurish.

One immediate task for educational researchers is to reconceptualise the transformation of our research findings in the light of Chinn and Brewer's review.

**A research agenda**

I want to turn now from the challenge of impact to the matter of content in terms of a research agenda and to some related challenges of methods. In order to draft the research specification for Phase II of the Teaching and Learning Programme, the Steering Committee required that an extensive consultation exercise be conducted to involve the widest possible range of stake holders in teaching and learning and to utilise a wide range of methods as necessary to reach the various parties (www.ex.ac.uk/ESRC-TLRP/).

We used questionnaires, discussion seminars, interviews and focus groups. In all instances, the key question was, 'given that our main purpose is to raise attainment, what do we need to know more about - what should be on the research agenda?' Almost regardless of method or of constituency consulted there was a remarkable uniformity of response.

The key issues, as you will recall from the subsequent specification, were 'how can motivation and engagement be enhanced? How can what we know about learning be transformed into pedagogic practice and how do institutions learn?' Perhaps even more noteworthy is the fact that a similar exercise amongst American professionals revealed exactly the same issues (National Research Council, 1999). In many respects it is an R and D agenda focussing on 'what works' or 'what might be got to work' in these areas. These matters have a pragmatic urgency. They are familiar and significant challenges and there is important work to be done here.

The US National Academy (Donovan et al, 1999) has proposed a strategic approach to making progress in this field. The strategy starts with the recognition that a great deal is known about the characteristics of an idealised learning environment. These are as follows:

Figure 3 here.

It is proposed to examine learning settings, educational materials and educational policies first to ascertain the degree to which these meet the criteria and, in so far as they do not, to ascertain and effect whatever needs to be done to achieve such properties. Put like that, the endeavour sounds to be developmental work rather than research. This is not the intention. If it were, it could never lead to the desired improvements in provision because the endeavour would be swamped by the range, diversity and ever changing settings and situations to be dealt with.

The intention, rather, is to conduct research to solve immediate practical problems whilst at the same time obtaining basic understanding of fundamental processes, an understanding necessary to the rapid, practical generalisation of solutions to similar problems. This approach has been referred to recently as 'Pasteur's Quadrant' (Stokes, 1997) and is illustrated below.

Figure 4 here.

Pasteur's approach may be contrasted with that of Bohr and of Edison. Bohr was interested in describing and understanding the basic structure of matter. He was not concerned with the implications of his work for the everyday world. Edison was determined to 'electrify' America; he was not interested in scientific understandings. Pasteur was motivated by problems of spoilage in beer, wine and milk and was seeking to prevent or cure diseases such as anthrax and rabies.

His work on the germ theory of these problems was not motivated merely be intellectual curiosity. There is enormous synergy in working on the dimensions of both practical use and fundamental understanding and rich pickings are to be had by adopting this strategy in educational research (Schoenfield, 1999).

A challenge to educational researchers resides in the reconceptualisation of research questions in terms of these two dimensions and the re-consideration of research designs in the same coin.

What practical problems are presented? What class of problem does this belong to? How is the problem to be understood - or, put formally, how is it to be theorised? Such work is of growing significance in the USA (Schoenfield, 1999). The research method of choice is the 'design experiment' (Brown, 1992).

In this approach research on teaching and learning is embedded in the activities of practical reform. Here it is postulated that teachers' practices are shaped by basic assumptions about teaching and learning and that such assumptions will have to be understood and related to the assumptions underlying preferred or advanced practices in order to identify the requirements for desired change.

The role of theory is, 'not to prescribe a set of practices that should be followed but rather to assist in clarifying alternative practices' (Greeno et al, 1996, p.40). The design experiment analyses, 'new possibilities for practice, not just to provide inspiring examples but also to provide analytical concepts and principles' (Greeno et al, 1996, p.41).

The approach through design experiments is not merely a simple combination of basic and applied research. Rather, it involves a reconceptualisation of what research and reform are.

The view is taken that reforming practice requires transformations of participants' understandings of the basic assumptions of teaching and learning. Research assists in identifying principled ways of accomplishing these transformations.

Design experiments are collaboratively planned and progressively adapted to meet desired goals through a partnership between teachers and researchers.

Such work constitutes a form of theory driven action research (for examples, see Collins, 1992; De Corte, 1998).

Ideas for interventions in practice are generated by teams of collaborating teachers and researchers. Interventions are pursued in the authentic settings of everyday classroom life. Practices are validated through observation and the collection of quantitative and qualitative data.

Refinement is continuous and consequent upon the analysis of monitoring data. Impacts on student engagement, motivation and achievement are evaluated in contrast to those of students in appropriate comparison conditions. Such experimental work, it is claimed, stands to produce not only desired enhancements of student learning experience and achievement but also, sustained enhancement of teaching practices. More importantly perhaps, the work is expected to produce a principled understanding of change in pedagogic processes and hence provide the foundations for a design science for education generally (Collins, 1992; Greeno et al, 1996).

Whilst design experiments have become popular in the field it is unlikely that they will make a significant contribution either to transforming psychological knowledge into effective pedagogic practice or to the general understanding of the transformation process as such.

On inspection, it turns out that design experiments are neither 'design' nor 'experiments' in the accepted sense of these words. 'Design' usually refers to a set of pre-specified plans concerning the methods and materials to be used in the study. In contrast, in design experiments there is a commitment to continuous revision of procedures and materials in the light of data produced from monitoring exercises.

In the same coin, an experiment entails random assignment of participants to controlled circumstances. This provision is absent in the examples provided by proponents of design experiments (Collins, 1992; De Corte, 1999).

Given the commitment to infinitely flexible revision of materials and methods and given the lack of commitment to and provision for experimental controls, it is difficult to see what credible scientific or pedagogic conclusions could be drawn from design experiments. It would not be possible, from these studies, as conceptualised or illustrated, to relate any particular outcomes to any particular interventions nor to say anything beyond the speculative about the processes of knowledge transformation.

More significantly there is no theoretical treatment of the issues of knowledge transformation or of scaling up. The first issue, knowledge transformation, is at the heart of the problem before us. In design experiments, what is 'knowledge' taken to be? How is it created in particular settings? How is its creation and application constrained or facilitated by the requirements of regulations and accountability? These questions are not on the design science agenda : the whole field of knowledge creation in design experiments remains un-theorised.

Finally, if design experiments were measurably effective in enhancing students' learning experience and attainment, how could the effects be scaled up from the experiments in order to have system wide impact? On what knowledge or theory base could such scaling up proceed? Given the earlier comments on the limitations of design experiments, it is clear that such a knowledge base is not likely to be generated in this approach. Research work in Pasteur's Quadrant will need more than design experiments if it is to lead to conceptual understanding.

**Blue skies research**

Thus far I have focussed on a research determined by 'presenting problems' whether these be perceived by practitioners or policy makers. But history will not thank us if we stay there. Our thinking cannot and should not be constrained by research challenges located merely in the prevailing circumstances of education and training. David Blunkett (2000) recognised that, '… there must also be a place for the fundamental 'blue skies' research which thinks the unthinkable. We need researchers who can challenge fundamental assumptions and orthodoxies and this may well have big policy effects further down the road … If academics do not address it, then it is difficult to think of anyone else who will' (p 23).

'Blue skies' are, of course, another familiar challenge. What new approaches or necessary changes to theory and method might be entailed?

After all, what is **not** called for is a set of alternative orthodoxies based on ideologies masquerading as social science. What are called for are alternative theories of education based on best practice social science.

In searching for a 'blue skies' agenda we are at once aware of our lost innocence in respect of teaching and learning and in awe of the complex multi-layered environments in which these processes operate. In regard to lost innocence we have learned of the massive significance of individual differences in learning; of the existence of potent and enduring misconceptions which learners bring to any setting; of the significance of specific knowledge in the development of any and all forms of expertise; of the critical role of mediated experience in learning; of the salient effects of the cultures and working practices of institutions (one can cite here the effects of classroom work, for example); and of the impact of the application of standards in the judgement of work (Gardner et al, 1996).

Figure 5 here.

Any attempts to transform educational processes must proceed in recognition of these hard facts. To ignore any one of these is akin to designing flying machines whilst ignoring gravity. But research aimed at educational transformation requires more than this. It requires a deep understanding of how the structures and practices of current systems operate. As Keating (1996) puts it '… our ability to guide educational transformations is dependent upon our ability to identify the points of leverage' (p 462).

But, in turn, our educational systems are caught up in a rapid techno-economic paradigm shift creating both the pressures and opportunities for social change. Three dynamic processes, the techno-economic, the social-institutional and individual adaptation interact with bewildering complexity.

To capitalise on human learning potential we need to know, 'how human competence and human coping actually develop in these interacting, self organising, complex systems' (Keating, 1996, p 473). Blue skies can be dizzying, vertiginous, even intoxicating.

The role of 'blue skies' research is to offer alternative, research based conceptions of provision and practice. I want to consider three candidates for this agenda chosen as offering fundamental and far reaching challenges to theory, methods and, crucially, practice which are, at the same time, researchable.

The first proposition comes from Patricia Alexander (2000) who suggests that we conduct research to achieve a model of academic development. She argues that although the aims of education are many and various, the acquisition of knowledge is a core objective. A model of academic development across the life span would describe what it means to be educated.

It would afford a deeper appreciation of the impact of formal education and represent the changes that transpire in individuals over the span of their formal learning.

It would capture the gradual transformations that occur in individuals as they engage in long-term, complex learning. Alexander does not see this as a purely or 'coldly' cognitive phenomenon. Rather, it encompasses motivational, social and cultural factors. Nor is a 'content' approach to knowledge acquisition implied. The model would consider creative, imaginative and strategic processes as these develop in authentic learning settings.

One important product of such a model would be that for the first time, we would be able to describe and explain the effects of schooling using terms which go beyond those of the results from terminal assessments.

It is, in Alexander's view, unconscionable that in terms of scientific understanding, we know little or nothing about the effects of formal educational provision on learning broadly conceived, nor of its ramifications across the life span. As a corollary, a model of academic development would provide us with alternative means of assessing the effectiveness and efficiency of educational provision - alternative that is to the approaches based on a-theoretical standard setting which are widely considered to impede the best operation of schools and other educational institutions.

Alexander recognises that there are 'formidable obstacles' in researching towards such a model not the least of which are:

i the almost unbelievable complexity of learning and development

ii the dramatic range of contextual and socio-cultural variability

iii the dynamic nature of human existence

Nevertheless, she argues that it is a 'moral imperative' to achieve the understanding implicit in a model of academic development because not to do so is tantamount to subjecting people to compulsory education without really knowing what we are doing to them. In this ignorance credentialism reigns supreme and educational systems are driven by assessment systems operated more to feed the politics invested in 'standards' than to meet the developmental needs of learners.

The value of the idea of working towards a general model of academic development is evident and by no means beyond our ingenuity and industry. A great deal of theory and research is, no doubt, already available and waiting synthesis. Such a synthesis would lead to hypotheses as a foundation for further focussed work.

For the second candidate for our blue skies research agenda I turn to the work of Bruner and in particular to his work on the culture of education (Bruner, 1996). Bruner argues that we must develop a general theory of education if our mandated intrusions into people's lives are to have any intellectual or moral merit. Like Alexander, his view is that we must understand what we are doing in the name of schooling. He takes the view that a theory of education lies at the intersect between questions about the nature of the mind and questions about the nature of culture.

Educational research should concern itself with, ' … constantly enquiring about the interaction between the powers of individual minds and the means by which the culture aids or thwarts their realisation … a never ending assessment of the fit between what any particular culture deems essential for a … worthwhile way of life and how individuals adapt to these demands … relating directly to how a culture manages its system of education, for education is a major embodiment of a culture, not just a preparation for it' (Bruner, 1996, p 13).

The interaction between culture's demands and individual adaptation is played out, in Bruner's terms in several profound and large-scale contradictions (more strictly, 'antinomies') embodied in educational aims and evident in educational practices. These contradictions are summarised below.

Figure 6 here.

The practices and policies through which these are revealed become, in Bruner's terms, key research sites for a data based theory of education.

In the first contradiction, education aims on the one hand to enable individuals to operate at their fullest potential. At the same time, education is intended to reproduce and preserve the culture. Unfettered individualism risks cultural unpredictability and moral panic. Education as cultural reproduction risks conventialism or even stagnation.

This contradiction is particularly salient in a rapidly changing world. As Bruner observes, 'Effective education is always in jeopardy either in the culture at large or with constituencies dedicated more to maintaining a status quo than to fostering flexibility' (1996, p 15).

The second contradiction cited by Bruner consists of the clash between the intrapsychic and the interpersonal foci of teaching.

On the one hand, learning is taken to be an 'in the head', 'intrapsychic' process; education cultivates individual minds and develops personal talents. The opposing view is that all learning is socially situated and to be culturally enabled; education transmits the cultural tool kit. These conflicting propositions rest on fundamentally different epistemological foundations and demand contradicting practical arrangements.

The third contradiction refers to the processes of meaning making and the processes by which knowledge is validated. In one view, all meaning making is considered legitimate and not to be judged by reference to 'higher authority'. Attempts to impose authoritative meanings on local experience are perceived to be hegemonic, serving the ends of power and domination. In the contrastive view, there are universal truths. Human plight may be experienced and expressed locally but it is an expression of the universal human condition.

These profound contradictions are met everywhere when educational institutions meet individual learners or their cohorts. A theory of education would describe and explain, through empirical research, how these matters are played out and indicate those forces most profitable to the players and to the culture. Notice at this level of analysis, variables such as age, class, gender and ethnicity are absorbed in deeper waters. And the research strategy has grander ambitions than dealing with today's headline contingency. The objective is to generate a theory of education based on best social science practice of nothing less than the processes of cultural transmission and creativity as these may be evident in educational processes.

The research ideas proposed by Alexander and by Bruner take current educational practice as their starting point. Clearly there is merit in this. The system as a product of culture is not an accident. It has been generated to promote society's political ends broadly conceived.

But large systems generate their own momentum. They become inherently self organising and stable. In that respect they lose adaptability. Solutions to emergent problems tend to focus on the past rather than the future. There must be a role in our blue skies agenda for large scale experimentation with new ideas. As Bruner observers, '… when education narrows its scope of inquiry it reduces a culture's power to adapt to change' (1996, p 15).

This lack of adaptability has recently been significantly played out in the challenge of promoting life long learning. Here the 'key' to life long learning has been variously described as teaching 'learning dispositions' or 'information processing skills' or 'computer literacy' or 'media literacy' or 'cooperative learning skills' or 'more knowledge' or less knowledge' (see figure 7).

Figure 7 here.

These nostrums are not in the slightest bit understood in operational terms and have no track record of success anywhere in any system. None is based on any analysis in depth of the basic purpose of life long learning. The purpose is surely to equip us for progressive and productive adaptation to incessant change.

Should the above list of approaches ever be practised they would equip us at best only to access and absorb more 'knowledge'. And yet adaptability will necessitate creativity, judgement, wisdom, appreciation. It will require us to learn how to build new knowledge and how to capitalise on interactions between formal education and experience (Bereiter and Scardamalia, 1996).

The fact is that we have not yet a clue how to teach any of these - hence we perseverate; like the ever nagging teacher we repeatedly do what we know does not work.

It is not that humans do not have the capacities more or less to be creative, to build new knowledge and to exercise judgement and wisdom; it is that we do not know how to teach these processes. This observation brings me to the third and final item on my blue skies agenda. It is perhaps the most profound, certainly the most difficult and without doubt the most pervasive obstacle to educational progress in the book. As Bruner puts it, 'there is one presenting problem' that is always with us in dealing with teaching and learning, one that is so pervasive that we often fail to notice it … it is the issue of how human beings achieve a meeting of minds' (1996, p 45). Psychologists have described this as 'intersubjectivity'. Primary teachers frequently assert of their pupils ‘I wish I could see inside their minds’.

Our interactions with others are deeply affected by our everyday intuitions about how other minds work. These common intuitions have been described as 'folk theory' and folk theory has powerful pedagogic corollaries. Bereiter and Scardamalia (1996) has recently characterised the prevailing folk theory of mind as follows:

Figure 8 here.

Folk pedagogy has had remarkable success at teaching through 'show and tell'. But where the 'stuff' metaphor breaks down - as it does with wisdom, creativity, knowledge creation, appreciation, a 'feel' for a subject, we are left floundering. Through our current understandings of the minds of others we cannot access these crucial processes.

If we can advance our understanding of intersubjective exchange we would enhance our pedagogic capacity by a quantum leap and massively extend our abilities to teach through a 'pedagogy of mutuality'.

Space does not permit me to extend my commentary on this point. Useful starting points will be found in Bruner (1996) and in Bereiter and Scardamalia (1996). Some of the work conducted in David Wood's centre (CREDIT) is surely relevant too.

I should perhaps emphasise that in placing research on 'intersubjectivity' firmly on the agenda I am not suggesting a retreat into the laboratory or into the earliest stages of infant development. The proper sites for educational research in 'intersubjectivity' are the locations of authentic educational practices - as ever.

**Research methods**

I turn now, briefly, to some general issues of research methods for our new and not so new agenda. In all important respects, questions of method are second order - and relatively simple. The really difficult business in research is to get the question right, to get it clear, researchable and relevant to the practice of education. All commentators currently attempting to set the educational research agenda are consistent in their prescriptions for method; they are eclectic. They ask for multi-disciplinary, multi-method approaches. Every major issue, it is argued, requires the full treatment.

It is not the case that every single research **question** needs the full research tool kit; each individual question should be treated with the appropriate research tool.

Taken collectively however, and given the multi-layered, multi-facetted and dynamic nature of the challenges we face, the general wisdom is that we will, as a field, make best progress by cooperating in multi-methods research designed at the strategic level and with subsequent synthesis in mind (Alexander, 2000; Bruner, 1996; ESRC, 1999; Keating, 1996; Schoenfield,1999).

Now this is quite clearly not accepted and perhaps not even acceptable in the field. One piece of evidence in favour of this disappointing observation is that multi-methods research is frequently urged and invited by funding bodies and just as frequently ignored by researchers.

A second piece of evidence is the inordinate amount of time and energy spent in 'methods wars' or 'discipline wars' or 'paradigm wars'. It is one thing - and a fine thing – to have experts in particular methods. It is another thing entirely that they spend a significant portion of their lives denigrating others' methods and extolling the virtues of their preferred approach.

Not only is this a most dreadful waste of time in terms of advancing our understanding - it is also a profound component of our collective loss of credibility.

Just as the public have been turned off from important matters in politics by the unedifying and predictable squabbles of politicians, so teachers and policy makers are depressed by our methods-related wars. This is particular sad because there really are no substantive issues involved. There has been, and continues to be endless points scoring and mutual antipathy between exponents of quantitative and qualitative methods for example. The intellectual bankruptcy of this stand off has recently been exposed by Richard Pring (2000).

The characteristics of arrogant, dismissive war mongering are evident as ever between disciplines. I recently set out enthusiastically to read a modern and highly rated text on the sociology of childhood (James et al, 1998) looking forward to it in particular because the early part of the book covered the work of 'other disciplines'. Here was the promise of interdisciplinary integration – or if not that then some useful cross-referencing and building. Sadly not. There was a category, 'The pre-sociological child' where I read 'This spacious category contains the dustbin of history. It is the realm of common sense, classical philosophy … developmental psychology' (p 9). A few dismissive pages later I found the category, 'The naturally developing child' which was designated thus, 'It is in this model that we encounter the unholy alliance between the human sciences and human nature. Psychology, unlike sociology, never made the mistake of questioning its own status as a science and, in the guise of developmental psychology, firmly colonised childhood in a pact with medicine, education and government agencies' (p 17).

One is left to wonder what possible scholarly purpose could be served by this purple prose. It is important to consider what advances in method and theory will be necessary for fruitful interdisciplinary work. The hint is that it is to do with humility and serious scholarship in pursuit of a moral imperative.

A case study of such an approach is offered by Sfard (1998) in regard to recent developments in learning theory. Over the past decade or so a 'social' view of learning has emerged and been placed in juxtaposition with the well established 'cognitive' perspective. A virulent debate has broken out between the proponents of these perspectives. This can be traced in issues of Educational Researcher since 1996.

Intemperate language has been used on both sides (one wonders why editors accept it). In one eminent attempt to work for progress the then president of AERA set out by proposing, 'In an effort to be fair, I shall try to be equally nasty to both camps' (Schoenfield, 1998, p 7). This is not the stuff of mature academic debate. In the event, Schoenfield's task had already been done (Sfard, 1998). Digging beneath the language of 'theory' Anna Sfard identified two metaphors for learning – one of acquisition and one of participation.

Some of the main characteristics of each metaphor are shown below. Sfard has shown that neither metaphor can account for all we know about learning nor answer our outstanding questions. She concluded, '… relinquishing either metaphor may have grave consequences whereas metaphorical pluralism embraces a promise of better research and more satisfactory practice' (Sfard, 1998, p 10).

Figure 9 here.

'The basic tension between seemingly conflicting metaphors is our protection against theoretical excesses and … the sooner we accept that our work is bound to produce a patchwork of metaphors rather than a unified theory of learning … the better for us and for those whose lives are likely to be affected by our work' (p 12). At the heart of this argument is the view that perspectives, metaphors or theories may be 'incommensurable rather than incompatible' (Rorty, 1979), entailing the possibility of their peaceful coexistence. The moral imperative of educational research demands that we enhance educational experience : the acid test in any comparison of perspective is the degree to which they inform discussions of educational practice more productively. In general we will travel further by running multiple perspectives together at the empirical level than squabbling about their evident incompatibilities at the theoretical level. If physicists can do this for the phenomenon of light we ought to be able to do it for learning.

**Summary**

I have proposed that what makes research educational is its commitment and contribution to educational goals. The main goal regarding teaching and learning is to enhance the knowledge base for pedagogy broadly conceived.

I identified a basket-full of familiar challenges and new approaches at the level of theory and method as follows:

i transforming research findings through various mediating mechanisms and agencies into practices demands research on processes of transformation.

ii working on practical problems whilst at the same time developing basic understandings through substantive theorising demands the reconceptualisation of theories and methods.

iii enhancing the potential of 'design experiments' requires (a) developing theories of knowledge production and (b) embedding design experiments in other research methods.

New research agendas should include:

iv work on a theory (evidence based) of academic development.

v the development of a cultural theory of education.

vi work on intersubjectivity towards a pedagogy of mutuality.

And tactically we must avoid fundamentalisation and seek, at the very least, a peaceful co-existence in methodology.

None of these is an easy matter. Each requires high level and disciplined work.

When it is all done we will not necessarily have achieved an evidence based teaching profession – but we will have achieved an evidence base in critical areas of teaching and learning.

Having a profession that uses this goes beyond our remit and raises questions of teachers' job descriptions, pay and condition, teacher professional development and accountability. All this is work for other agencies.

**References**


Alexander, P. A. (2000) Toward a model of academic development : schooling and the acquisition of knowledge. Educational Researcher, 29, 2, 28 – 33.

Bereiter, C., and Scardamalia, M. (1996) Re-thinking learning. In D. R. Olson and N.Torrance (eds) The handbook of education and human development : new models of learning, teaching and schooling (New York; Blackwells).

Blunkett, D. (2000) Influence or irrelevance : can social science improve Government, ESRC lecture. (London, DfEE).

Brown, A. (1992) Design experiments : theoretical and methodological challenges in creating complex interventions in classroom settings. Journal of the learning sciences, 2, 141 0 178.

Bruner, J. (1996) The culture of education (Cambridge, MA; Harvard University Press).

Chinn, C. A, and Brewer, W. F. (1993) The role of anomolous data in knowledge acquisition : a theoretical framework and implications for science instruction. Review of educational research, 63, 1, 1 – 49.

Collins, A. (1992) Toward a design science for education. In E. Scanlon and T. O'Shea (eds) New directions in educational technology (p15 – 22) (Berlin; Springer).

De Corte, E. (1998) Marrying theory building and the improvement of school practice : a permanent challenge for instructional psychology. Presidential address to 24th International Congress of Applied Psychology, San Francisco, CA, August 1998).

Donovan, M. S., Bransford, J. D., and Pellegrino, J. W. (eds) (1999) How people learn: bridging research and practice (Washington, DC; National Academy Press).

ESRC-TLRP (www.ex.ac.uk/ESRC-TLRP).

Everton, T., Galton, M., and Pell, T. (2000) Teachers' perspectives on educational research, knowledge and context. Journal of Education for Teaching, 26, 2, 167 – 182.

Gardener, H., Torff, B., and Hatch, T. (1996) The age of innocence reconsidered : preserving the best of the progressive traditions in psychology and education. In D. R. Olson and N.Torrance (eds) The handbook of education and human development : new models of learning, teaching and schooling (New York; Blackwells).

Greeno, J. G., Collins, A. M., and Resnick, L. R. (1996) Cognitive and learning. In D. C. Berliner and R. C. Calfree (eds) Handbook of Educational Psychology (New York; Macmillan).

Hillage, J., Pearson, R., Anderson, A., and Tamkin, P. (1998) Excellence in research on schools (London; DfEE).

James, A., Jenks, C., and Prout, A. (1998) Theorizing Childhood (Cambridge; Polity Press).

Keating, D. (1996) Habits of mind for a learning society : educating for human development. In D. R. Olson and N.Torrance (eds) The handbook of education and human development : new models of learning, teaching and schooling (New York; Blackwells).

McLaughlin, M. W. (2000) Theory-based change and change-based theory : going deeper, going broader (draft private communication from McLaughlin at Stanford University).

National Research Council (1999) Improving Student Learning (Washington DC; National Academy Press).

R.Pring (2000) Quantitative and Qualitative Research Methods: A False Dualism. Unpublished paper presented at a research seminar at the School of Education, Exeter University May 2, 2000.

Rorty, R. (1979) Philosophy and the mirror of nature (Princeton, NJ; Princeton University Press).

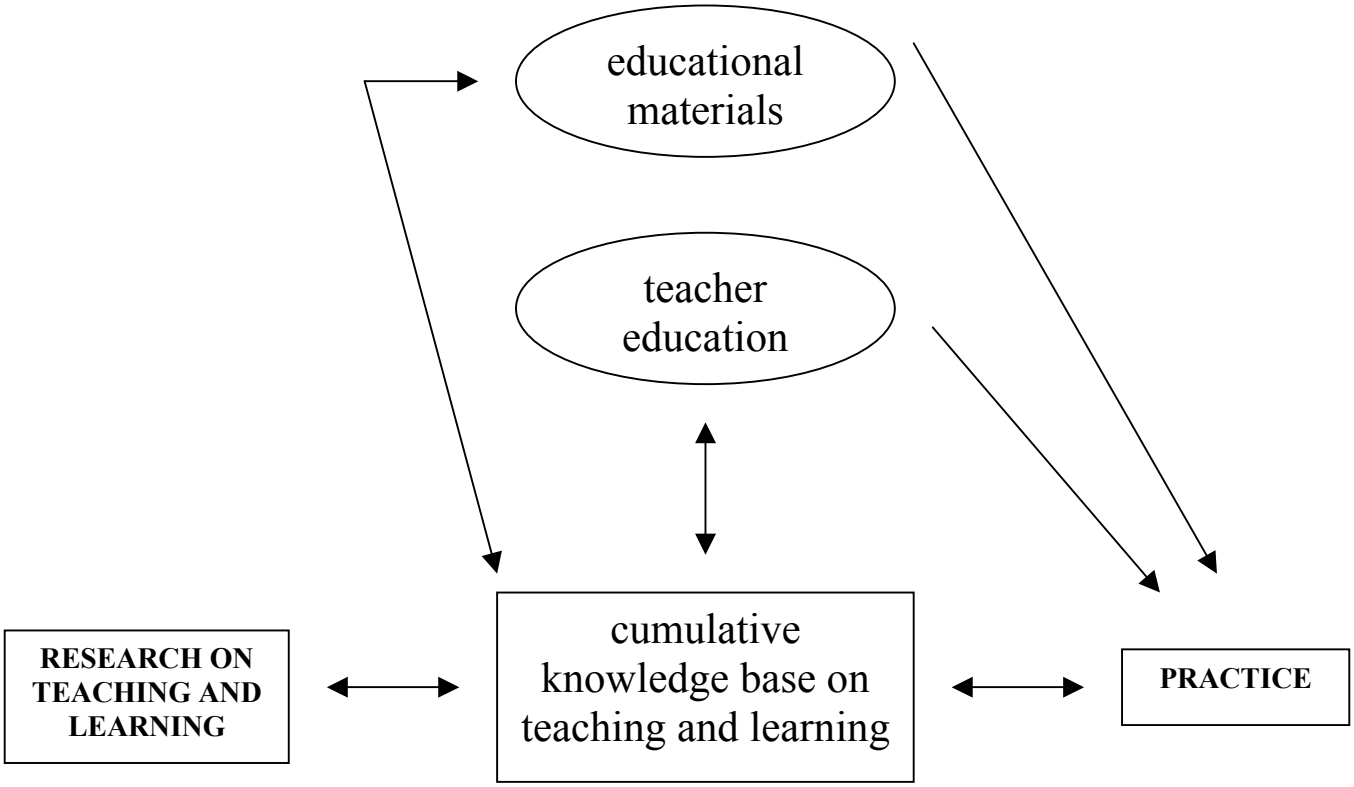
Schoenfield, A. H. (1999) Looking towards the 21st century : challenge of educational theory and practice Educational Researcher, 28, 7, 4 – 14.

Sfard, A. (1998) On two metaphors for learning and the dangers of choosing just one. Educational Researcher, 27, 2, 4 – 13.

Stokes, D. E. (1997) Pasteur's quadrant : basic science and technical innovation (Washington DC; Brookings).

Tooley, J. (with Derby, D.) (1998) Educational research – a critique : a survey of published educational research (London : Ofsted).

Woods, D. (ongoing) CREDIT (www.psychology.nottingham.ac.uk/research/credit/)



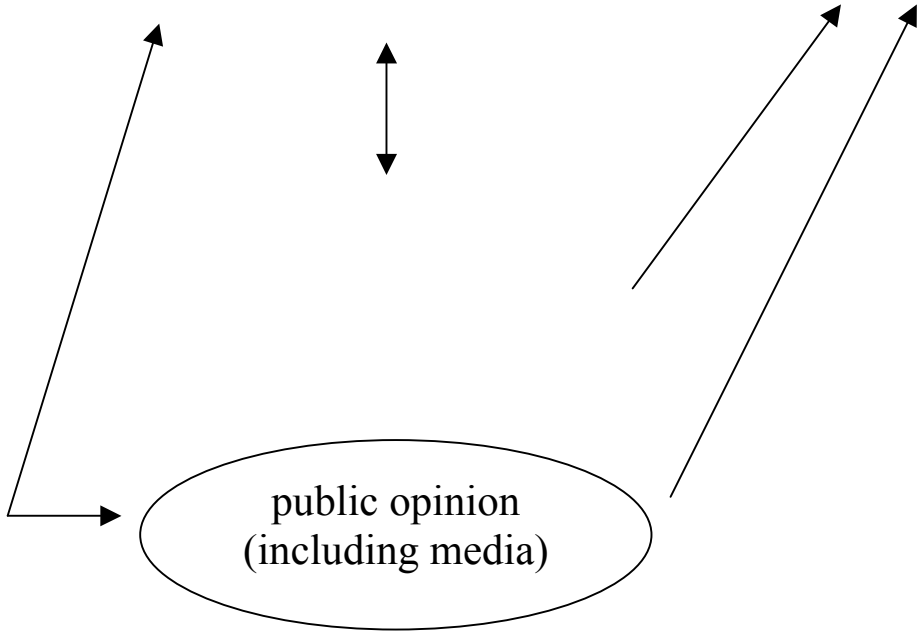



**Figure 1 Some links between research and practice**
(after Donovan et al, 1999).

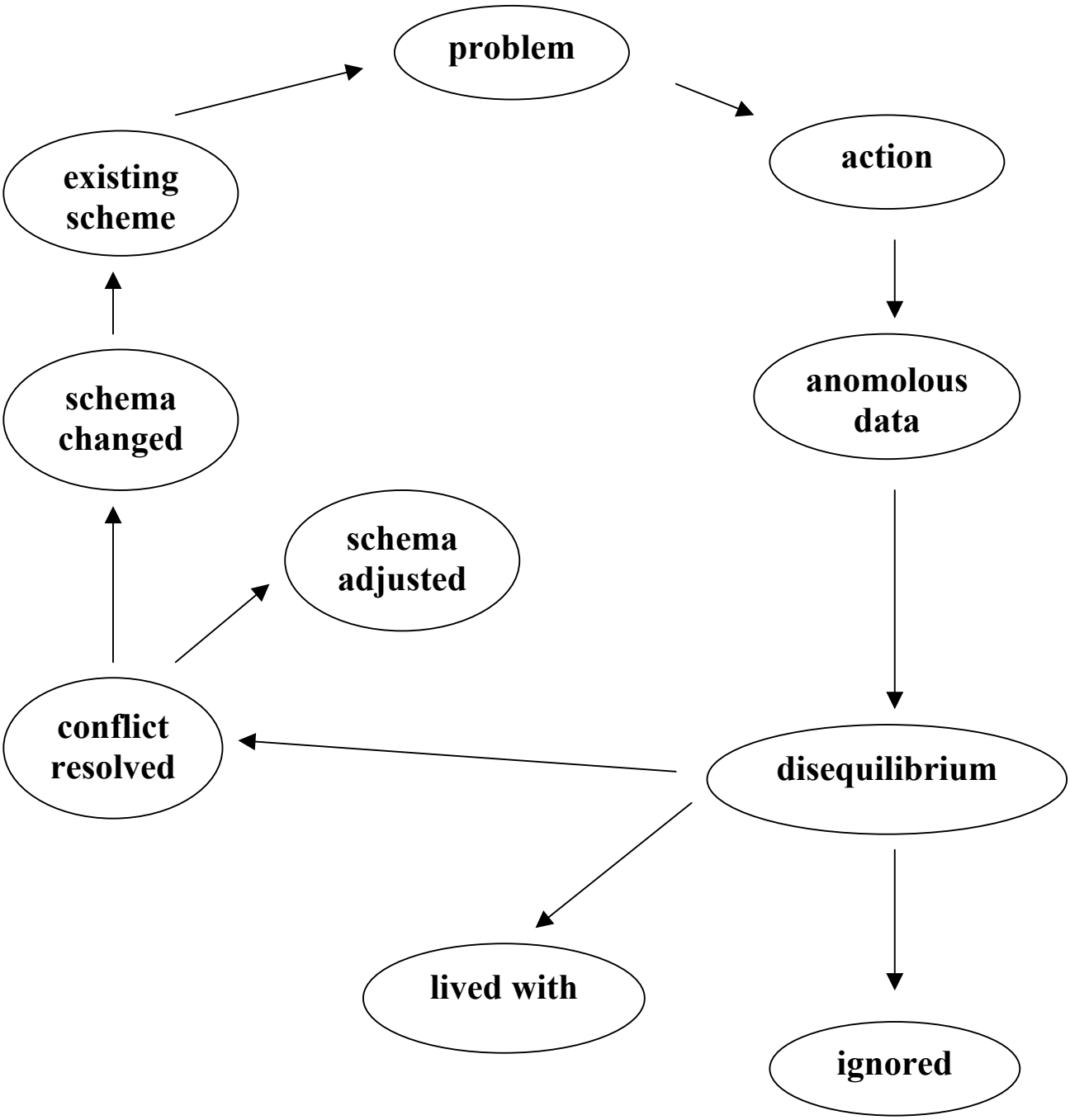



**Figure 2 Adjustment to anomolous data**
(after G. Brown, 1996).

**Learning environments must be**

i student centred

ii knowledge centred

iii assessment centred

iv community centred

**Figure 3 Characteristics of an idealised learning environment** (from Donovan et al, 2000).

| Quest for fundamental understanding? | Consideration of use? **yes** | Consideration of use? **no** |
|---|---|---|
| **yes** | use inspired basic research<br><br>(Pasteur) | pure basic research<br><br>(Bohr) |
| **no** | pure applied research<br><br>(Edison) | |

**Figure 4 Pasteur's quadrant : basic and applied research** (after Schoenfield, 1999).

i individual differences

ii learners' misconceptions

iii role of specific knowledge

iv impact of mediating factors

v impact of assessment/standards

**Figure 5 Knowledge based loss of innocence in teaching and learning** (after Gardner et al, 1996).

i individual realisation vs cultural preserving

ii talent centred vs tool centred

iii particularism vs universalism

**Figure 6 Basic educational contradictions**
(from Bruner, 1996).

teach : more knowledge ….
or less?

: media literacy

: computer literacy

: learning dispositions

: information search skills

: information processing skills

: cooperative learning skills

**Figure 7 The key(s) to life long learning?**

i knowledge is 'stuff '

ii mind is a container

iii learning involves putting stuff in the container

**Corollaries**

| | | |
|---|---|---|
| i | pedagogy : | a craft for stocking minds |
| ii | educational testing : | a process for inventorying mental contents |

**Figure 8 'folk' theory of mind**

| **acquisition metaphor** | | **participation metaphor** |
|---|---|---|
| acquisition of something | learning | becoming a participant |
| (re-)constructor | student | apprentice |
| provider, facilitator, mediator | teacher | expert participant |
| property, possession | knowledge, concept | aspect of practice |
| having, possessing | knowing | belonging, participating |

**Figure 9 Two metaphors for learning**
(after Sfard, 1998).