

Teachers and metacognition: drawing together evidence from systematic review and action research

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Abstract

This paper brings together the results from recent systematic reviews conducted for the UK government into teachers' learning (Baumfield, *et al.*, 2005; Cordingley, *et al.*, 2003, 2005) with evidence from a university- supported practitioner enquiry project to explore the relative importance of *networks* and *spaces* for teachers' learning, reflection and metacognition (Higgins *et al.* 2006). The content and intention of continuing professional development and action research will be considered as contributory factors to the level of impact from different approaches. In addition, the socially and individually mediated elements of learning will be included, in order to problematise ideas of universal application in teacher development. Teacher interviews, psychological test data (Tolerance of Ambiguity scale, Budner 1962) and field notes from network meetings provide resonant examples from the front line of the kinds of learning signposted by the systematic reviews.

Teachers and Metacognition

In this paper, we bring together views of teacher learning revealed by the different lenses of systematic review and of practitioner enquiry and suggest ways in which they are complementary. The Research Centre for Learning and Teaching at Newcastle University is committed to the creation and translation of knowledge about teaching and learning in a range of contexts: schools, universities, workplaces, families and communities. We are concerned to create and utilise activity and working spaces in which we and our partners can reshape thoughts and practices. These are achieved through a series of linked communities of practice, within the university and beyond, structured around project work and debates about research methods and epistemology. We believe that effecting change in learning and teaching requires an understanding of the connections and dissonance in systems, the roles that individuals can play within those systems and the iterative development of theoretical and practical knowledge. The direction of this paper is therefore shaped by our particular angle on several key questions:

- What strategies and approaches can help teachers to identify opportunities for metacognition in their classrooms?
 - How can they promote the development and use of these skills in learners?
- How can teachers explore their own strategic and reflective thinking?
 - What are the conditions needed to enhance teacher learning in this area?

The paper will draw on several sources: the systematic reviews completed by the Centre for Learning and Teaching at Newcastle University on thinking skills (Baumfield *et al.* 2005; Moseley *et al.* 2005a; Higgins *et al.* 2004; Higgins *et al.* 2005a) a review of collaborative professional development (Cordingley *et al.* 2005) and interview and other data arising from the Learning to Learn Phase 3 Evaluation action research project, funded through the Campaign for Learning (Higgins *et al.* 2005b: see www.campaignforlearning.org.uk). This synthesis posits possible directions forward for professional learning and an iterative, collaborative model of pedagogy, which gives equal respect to theory and practice. Systematic reviews are intended to give researchers and practitioners guidance on the most appropriate and evidence-supported approaches, while the data from qualitative studies can illuminate the importance of context and the complexity of systems and their ecologies. This paper, in essence, tries to weave together the findings of systematic reviews – that thinking skills promote teachers’ ability to focus on metacognitive thinking in their classrooms and that collaborative CPD is the most effective model for providing teachers with the space to think strategically and reflectively – with the experiences of teachers engaged in an action research project based around a collaborative network, the content elements of which placed a significant emphasis on reflection for teachers and learners.

Throughout this paper we are locating our discussion of metacognition within the model (Figure 1) described in *Frameworks for Thinking* (Moseley, *et al.* 2005a), which synthesises thirty-five conceptual frameworks of thinking and learning. For the purposes of this paper, our focus will be on learning behaviours and awareness which are located in the ‘top box’ of the model.

INSERT FIGURE 1 ABOUT HERE

Moseley and his colleagues criticised Marzano (2001) for making too sharp a distinction between *self-system* and *metacognitive system*, instead adopting a more holistic concept of *strategic and reflective thinking*. Although the model is not intended to be hierarchical, the authors are explicit in stating that strategic and reflective thinking

‘... is really about what makes for *good* thinking, especially through the use of self-regulation and metacognition....we make a distinction between *cognitive skills* and *strategic and reflective thinking*, i.e. between cognition on the one hand and self-regulation/metacognition on the other: ... strategic and reflective thinking may be used at any phase... strategic and reflective thinking are always highly conscious and are often experienced as involving will and/or emotion as well as cognition... require sustained concentration, not only on the matter in hand, but also on how a task is conceived and whether or not there should be a change of strategy in the light of new and previous experience... Most significantly, it changes what could be a routine process into a learning experience.’

(Moseley, *et al*, 2005b, 90)

Teachers’ awareness of metacognition will be categorised, therefore, in terms of these key characteristics. Clearly, however, there are degrees of metacognitive behaviour and while Moseley’s model resists the impulse to privilege one kind of thinking above another, it is nevertheless necessary, to attempt some kind of developmental

categorisation when talking about the development of metacognitive skills. In this respect, we have found the distinction drawn by Veenman and colleagues (1997) between *metacognitive awareness* and *metacognitive skilfulness* extremely helpful.

In addition, we are reaching a developing understanding about the need to understand the actual and conceptual spaces in which metacognition occurs and the kinds of spaces which privilege this kind of thinking. The literature on reflection and action research is suggestive of the need to step away from the day to day pressures and procedural concerns of school life and the taken for granted nature of automated practice (Zeichner, 2003; Wien, 1999). In this ‘space exploration’ we will focus first on the potential to create spaces with powerful pedagogic strategies (Leat and Higgins, 2002).

Thinking skills interventions: promoters of metacognitive awareness?

Thinking skills initiatives have been used in schools in the UK since the early 1980s and have been in existence for somewhat longer, but the term itself is ambiguous and there is disagreement about how it relates to aspects of pedagogy more broadly. Our working definition for the purposes of the EPPI systematic reviews was that thinking skills interventions are approaches or programmes which identify for learners translatable mental processes and/or which require learners to plan, describe and evaluate their thinking and learning. These can therefore be characterized as approaches or programmes which:

- require learners to articulate and evaluate specific learning approaches
- identify specific cognitive, affective or conative processes that are amenable to instruction.

Thinking skills approaches not only specify the content of what is to be taught (often framed in terms of thinking processes such as understanding, analysing or evaluating) but also require substantial changes in pedagogy (Baumfield *et al.* 2005). The teacher plays a crucial role in implementing a programme to encourage thinking skills and must master a greater variety of didactic strategies as they reorganise the way they teach students (see also Hamers and Van Luit, 1999).

Thinking skills approaches are generally welcomed by teachers and there is evidence that they seem to support changing patterns of interaction in classrooms (Baumfield and Oberski, 1998; Higgins and Leat, 1997; Leat and Higgins, 2002). This understanding is influenced by concepts and ideas derived from cognitive acceleration (Adey and Shayer, 1994), Instrumental Enrichment (Feuerstein *et al.*, 1980), Philosophy for Children (Lipman, *et al.*, 1980), 'probes' for understanding (White and Gunstone, 1992) reciprocal teaching (Palincsar and Brown, 1984), scaffolding and social constructivism (Wood and Wood, 1996), research on classroom talk (Edwards and Westgate, 1987, Mercer 1995), self-theories (Dweck, 1999) and collaborative group work (Webb and Farrivar, 1994; Galton *et al.*, 1999). This work has been used in research and development work with trainee and practising teachers as a means by which teachers could put into practice or 'enact' findings from educational research (Higgins, 2001; Higgins and Moseley, 2002; Leat and Higgins, 2002).

The literature suggests that using thinking skills strategies has significant implications for pedagogy as it involves teachers in developing new roles (e.g. Leat and Higgins, 2002; Leat and Lin, 2003). A brief summary of the key impacts on teacher behaviour is presented below.

Teacher questioning

There is evidence that teachers change the quality and quantity of their classroom interactions (Donnelly *et al.* 1999; Wilks, 1997), leading to better quality, more extended student responses and higher professional satisfaction. There are levels of complexity, however: a study focussing expressly on questioning in science classes (Koufetta-Menicou and Scaife, 2000) suggests that teachers who asked 'how' questions were more successful in promoting metacognition in their pupils and there was some evidence of the transfer of questioning style by teachers to other lessons. The strategy of adapting the pace of discussions and used more focused questions and examples from pupils' daily lives (MacArthur, *et al.* 2001) implies that a scaffolding of students' skills will lead to more complex and frequent pupil questions and responses (Naisbett, 1997). The quality of questioning was also variable and others (McGregor and Gunter, 2001) posit the need for structured training support, which can encourage teachers as they become mediators of learning.

Perceptions of pupil ability

There is evidence from the reviews that the adoption of thinking skills programmes and approaches has an impact on teachers' perceptions of pupils ability. Pupils not previously identified as gifted and talented were identified as showing considerable ability when a thinking skills approach was adopted (Naisbett, 1997). The shift in the patterns of classroom interaction has also led to teachers being more aware of the capacity of their pupils to contribute extended and sophisticated responses (Wilks, 1997; McGregor and Gunter, 2001). Whilst this shift in teacher expectations is based

largely on qualitative data, mainly interviews, it is nevertheless a significant theme in the evaluation of thinking skills programmes.

Facilitation of greater pupil responsibility and autonomy

There is evidence that thinking skills approaches have a significant impact on teachers' views on pupil's ability to work autonomously (Franke, *et al.* 1998) and some studies report on the successful creation of a classroom climate in which all students felt safe to participate and in which they believed that their contributions were valued.(MacArthur *et al.* 2001). There are also reports from teachers suggesting that they were now teaching in a more creative way and giving as an example of this that they now encourage pupils to design their own experiments in science rather than simply copy what the teacher had demonstrated to the class (Zohar 1999).

Access to pupil learning

Teachers' awareness of their own and their students' metacognitive thinking appears to be facilitated by open-ended discussions and philosophical inquiry (Wilks, 1997), the classroom conversations of pupils (MacArthur, *et al.* 2001), thinking skills activities in science (Zohar 1999) and feedback from pupils (Franke, *et al.* 1998). Teachers report that they realize that students are capable of more independent learning than they had previously assumed and there appears to be a virtuous circle whereby teacher enthusiasm and empowerment is intrinsically linked with pupil enthusiasm and empowerment (Hojnacki and Grover 1992).

The review of thinking skills also concludes that the kind of professional development underpinning the implementation of thinking skills approaches is critical to success, not merely in terms of fidelity of implementation, though this is important. Key features of CPD which promote metacognition appear to include those which encourage reflection (Taverner 2001; Naisbett 1997); provide explicit support in making sense of students' responses (Franke, *et al.* 1998) and give the opportunity for discussion with other teachers (Wilks, 1997). This leads us into a discussion of the findings of the review on effective CPD for teachers.

Collaborative CPD: a good method of providing teachers with metacognitive opportunity?

The systematic review of collaborative continuing professional development (CPD) (Cordingley, *et al.*, 2005) suggests that this form of professional learning brings about substantial change in classroom practice, enhances teachers' motivation, confidence and attitudes and builds stronger and more effective learning networks between teachers. Teachers engaged in collaborative work bring with them a desire to work in this way but this is enhanced by the process, even when the focus of the training is not on working relationships. The role of joint-planning and team teaching is referred to in the findings of a number of the studies and specifically mentioned as an important aspect in four (Crump *et al.* 1988; Donnelly *et al.* 1999; Zohar 1999; MacArthur, *et al.* 2001) and can be further supported from other EPPI reviews on teachers' professional development (Cordingley *et al.* 2003). The review concludes that technicist, delivery models of implementation will not only reduce the professional

involvement and motivation of teachers but may also reduce the effectiveness of the interventions in terms of pupil impact.

Both reviews cite the importance of inquiry supported by researchers as critical friends in not only promoting the professional development for teachers in terms of establishing both better theoretical understanding and a more sustained model of classroom practice but also in achieving maximum effect in terms of pupil gains .

Learning to Learn: the evolution of working spaces and the potential for metacognition

The Learning to Learn Phase 3 Evaluation is a research project funded through the independent charity Campaign for Learning (CfL) and facilitated by the Centre for Learning and Teaching at Newcastle University. This project involves 33 primary and secondary schools in three local education authorities (LEAs), representing a wide range of socio-economic contexts across England (Higgins *et al.* 2005b; 2006). All of the schools have implemented action research interventions under the umbrella term of *Learning to Learn* (L2L). Working definitions of L2L exist, drawing on ideas of metacognition, thinking skills, self-regulation, self-efficacy and self-esteem (see, for example, Claxton, 2002 and the dispositions model used by the Campaign for Learning, Figure 2 below). However, within this project definitions remain fluid and changing, because through the process of research and through the connections made as part of the project the teachers themselves are creating new understandings of what L2L is in practice. The Campaign for Learning's definition: "a process of discovery

about learning. It involves a set of principles and skills which, if understood and used, help learners learn more effectively and so become learners for life. At its' heart is the belief that learning is learnable" is used pragmatically within the project and we see this as applying to pupils, teachers and ourselves as a research team.

INSERT FIGURE 2 ABOUT HERE

Teachers involved in the Learning to Learn Phase 3 evaluation have completed two years' of collaborative practitioner enquiry and during that time they have produced yearly case study reports detailing both the outcomes of their enquiry and their own learning (<http://www.ecls.ncl.ac.uk/I2I/>). Interviews and construct generation exercises at training events and project conferences have been conducted to explore further the opportunities for teacher learning and extent to which teachers have felt the process to be transformative (Hall *et al*, 2006) and this process is continuing in the final year of the project. Most recently, the team have explored with teachers the idea that innovative teachers are better *psychologically prepared* for learning and change through the use of the tolerance of ambiguity scale as a tool for unlocking how teachers view their work (Hall and Wall, 2006).

Understanding L2L

As part of the Learning to Learn project teachers were invited to explore the different approaches they understood as being consonant with the *Learning to Learn* heading within their school or classroom. These were based on a diverse body of practice and approaches including assessment for learning, parental involvement in learning, paired talk and peer support, ICT-supported strategies, circle time, mind mapping,

changes in class groups and curriculum organisation and the use of stimuli such as Brain Gym and T'ai Chi. The fundamental principle of teacher autonomy within the project encouraged and supported this diversity, since, although the research team might have favoured a smaller set of approaches as more effective, or at least more evidence-based, it was considered more important to harness the enthusiasm and commitment of the teachers than to have a greater uniformity in the projects. However, teacher interviews revealed that, despite the apparent heterogeneity of focus, there were key themes in the way that teachers described how they, their pupils and their schools were changing. These themes (Figure 3 below) were generated in the analysis of interviews at the end of the first year of the project and validated a year later in the interviews conducted at the end of the second year. They indicate goals of clarity and transparency, where the purposes of learning are made clear to all, where discussion and multiple routes to common goals are prioritised and where there is an overarching culture of experimentation.

INSERT FIGURE 3 ABOUT HERE

This focus on process and feedback produces conditions in which teachers are confronted with dissonant responses and are forced to reflect, act and reflect in increasingly tight systems. This virtuous cycle, observed and highlighted by Hattie and colleague's meta-analysis (ref??) and by their observations of expert teachers, appears to generate the *necessary* conditions for metacognitive awareness and the development of skilfulness, though of course not necessarily *sufficient* conditions. We have tried to tease apart some of the factors at various levels – individual and within schools and networks – which might facilitate the creation of working space for teachers to focus on metacognitive thinking.

Is being an L2L teacher a 'spectrum disorder'?

Learning to Learn teachers have made significant changes to their curriculum, school organisation and pedagogy. We presented our understandings of their work to them in a series of regional training meetings and at the yearly residential. We characterised the work from all the projects to them as radical and, to an extent, risky. As a body, the teachers were very uncomfortable with this description of themselves: they felt that the work they were doing was rooted so strongly in their particular contexts, so supported by the process of enquiry and so iterative and developmental as to be not risky at all (see also Ecclestone and Field, 2003 for a discussion of some of the difficulties associated with using this language). This is one of the major problems of participatory work, when you ask people to validate your understanding and instead they challenge it!

Nevertheless, there were clear indications from the teachers that Learning to Learn was a *different* and *distinctive* teacher behaviour, one that was linked to individual personalities. One teacher described it as being on a spectrum of behaviours, like autism and many reported difficulties in 'scaling up' within their schools, with debate raging around whether it was possible for a teacher to 'become' L2L without the experiences of the project, or without certain key beliefs or characteristics. Clearly, there are lots of reasons why scaling up is problematic which are structural – there are a lot of things going on in complex institutions like schools and not everyone can be interested in the same thing. However, the business of engaging colleagues to try something new, something which would involve experimentation, enquiry, 'risk' suggested to us the question: were our teachers, the happy enthusiastic innovators, psychologically different from their colleagues?

Risk is driven by context and individual understanding: there is a considerable difference between thrill-seeking behaviour and an awareness of the risk of doing nothing, for example. As teachers were so opposed to the idea of risk, we began looking to the individual psychology literature for something that might help us and alighted upon tolerance for ambiguity. Tolerance for ambiguity is the extent to which individuals are comfortable with the unknown. Risk aversion and ambiguity aversion are closely associated (Keller, *et al*, 2002) but they are not the same thing. “Under risk, the likelihoods of alternative outcomes are fully known. Under ambiguity, these likelihoods are unknown.” (Smith *et al*, 2006).

Intolerance of ambiguity is associated, in students, with the desire for greater course structure, so one might hypothesise that teachers with low tolerance might seek out or attempt to maintain more structured experiences in their professional lives (DeRoma, *et al*, 2003). Sherrill (2001) argues that tolerance of ambiguity is a necessary component for professionals in an age of change. Tolerance of ambiguity is also associated with key interpersonal skills for working with parents successfully, including negotiation and the ability to accurately reflect on information presented during encounters (Yurtsever, 2001) and with creativity (Tegano, 1990). Bowen and colleagues (1994) indicate that most people are relatively tolerant of both risk and ambiguity in the mid-range, but intolerant of large amounts of ambiguity, but other authors argue that this ignores issues of context and role, and for many individuals in the caring professions, even relatively small amounts of ambiguity may be highly stressful (Wittenberg and Norcross, 2001), particularly in individuals with tendencies towards perfectionism.

We explored the question: *are our innovative teachers relatively more ambiguity tolerant?* We asked the teachers to complete a sixteen-item Tolerance of Ambiguity scale (designed by Budner, 1962) which has acceptable content, concurrent and construct validity (Furnham and Ribchester, 1995) and sub-divides tolerance of ambiguity into Novelty, Complexity and Insolubility. The teachers were critical of its design, the wording of the items and questioned the validity, much to our delight, since a key goal of the project is their critical thinking in relation to research methods. The results were that the cohort fell within the normal range of distribution of scores given by Budner, with only one respondent scoring below the 'normal' curve. Most (36/45) of our respondents cluster quite closely about the mean – within 1 standard deviation – with three demonstrating relative intolerance and six relative tolerance. What was interesting for the teachers, however, was that it was possible to get the same total score, with very different subscale scores, particularly for the scales Complexity and Insolubility. For example - at the margins - two of the six people who had high tolerance for insolubility also had high tolerance for complexity, but the other four didn't and the three different people who had high tolerance for complexity, didn't feel so tolerant of insolubility. This has implications for how problems are presented to groups of people and for how teams can be managed when tackling complex enquiry projects. We are currently collecting more data from teachers outside the project to investigate this variation.

Further reading and discussion suggests that the role that ambiguity plays in teacher innovation is probably more complex. Bennett and colleagues (1990) indicate that while ambiguity-tolerant individuals experience less job-related anxiety, they are also

less likely to seek feedback on the nature of tasks or on their performance – and feedback loops are key elements of Learning to Learn and to expert teaching (Bond, *et al*, 2000).

Durrheim and Foster (1997) present evidence to suggest that ambiguity tolerance is content-dependent, rather than a fixed personality trait, which sits well with our prejudices against psychological labelling but also connects with an important finding from Frone's (1990) meta-analysis is that tolerance for ambiguity is a strong predictor of job satisfaction where there is role ambiguity. This also connects to the finding that experienced teachers have 'crystallised' expertise – a mastery of content and procedure that is heavily context (and therefore role) dependent, whereas expert teachers are more likely to have 'fluid' expertise – where knowledge and skills can be readily adapted to new demands and situations (Berliner, 2001). While Day and colleagues (2006) allude to locus of control in their discussion of teacher effectiveness, we contend that it is important to extend this analysis to an assessment of the variations in *psychological capital* that individual teachers and groups of teachers bring both to their everyday work and to their encounters with centrally directed innovation, personally identified change and the ongoing debate about the development of teachers' professional role(s). This appears to be key: teachers involved in enquiry are stepping out of their traditional roles. Tolerance for ambiguity in relation to professional role might be the perspective which unlocks our understanding of how easy it is for individuals to begin the process of creating working spaces for metacognition through enquiry.

Collaboration, status and the 'external eye'

Moving on from a focus on individuals, it is important to restate the importance of ‘field’ or context: there are important cross-cultural differences in ambiguity tolerance (Atkins, 2000; Furnham and Ribchester, 1995) and studies also imply that there are ‘group effects’ in ambiguity aversion – that is that individuals reinforce one another’s aversions when making collective decisions (Keller, *et al*, 2002), which could be a significant lever for understanding the conservatism of staffrooms. Looking at individuals within schools, McLaughlin & Yee (1988) identify level of opportunity as one key determinants of teacher learning, which can be formal or informal. Personal beliefs and characteristics play an important part in the extent to which they exploit these openings and teachers’ beliefs and understandings about their learning were a key focus in the year two interviews, quotes from which appear in this section. The other determinant is level of capacity, which they equate to the level of power and control teachers have to access resources, to participate in decision making with regard to issues important to them and the availability of the resources, such as time, money and materials to bring ideas to fruition. We get the sense here of the interface between the individual and the organisation.

‘only schools where learning opportunities and learning space are created in a professional way and without denying teachers’ individuality ...can guarantee that teachers’ much needed professional development will take place.’

Clement & Vandenberghe (2000, p. 98)

All of the teachers in Learning to Learn have chosen their own research focus and research methods, as a baseline, their schools are already operating with a degree of distributed autonomy, unusual in these days of standardisation and conformity, which

represents significant support for these teacher-researchers. All of the schools, therefore create the supportive structure depicted as a purple curve in Figure 4 below, where teachers are supported and encouraged to make changes without fear that the experiment *must* work:

‘I mean we are so lucky here in that the whole staff are really keen to take risks and to try things out. There’s a couple of things that haven’t worked and we just say well forget that and do something else. It doesn’t matter, we don’t feel guilty, so I think I’m probably really lucky here in that we’ll have a go at things, and parents have been really supportive’ (Teacher interview)

However, there is considerable variation beyond this basic level in terms of the culture and climate of support: some teachers in L2L are working in schools which explicitly support and extend their space for working, learning and reflection, others are engaged in trying to convince sceptical colleagues – a position which encourages articulation and reflection, although there are tensions and challenges – and yet other teachers are working in isolation, with little active support or interest from colleagues or management. Necessarily, the working space available to the last group is smaller and hedged around with competing agendas and the extent of this area (represented as a green circle in Figure 4) will impact on the extent and complexity of teachers’ metacognitive awareness and skills.

INSERT FIGURE 4 ABOUT HERE

Within the project, many schools in the project have a small team of teachers working on L2L, while colleagues are engaged in different innovations or on mainstream practice, other schools have embedded L2L into their management and planning so that all staff are to some extent engaged. In July 2004, nine of our teachers were working alone in their schools, 18 were working with one or two colleagues and six were involved in whole school Learning to Learn projects. There is emerging evidence to suggest that this can be represented as a continuum, along which some schools have moved during the project, so that there are fewer ‘lone rangers’ and more in the ‘whole school’ group. This suggests that the L2L process has some attractions to other staff or to management. It appears that this is supported by a combination of factors *internal* to the school, including the personalities of the ‘early adopters’, the goals of the school and the relevance of the project across ages and subject disciplines – all these are crucial to the ‘spread’ of L2L. However, interview and fieldnote evidence from meetings and conferences suggests that the role of the local and national networks is also an important factor.

For all teachers the amount of working space available within school is extended and enhanced by the external networks, both regional and national (Figure 5). The role of the network in teacher learning has been already explored in earlier sections, but it is important to emphasise its particular power in enquiry projects, where confronting dissonance, negotiating ‘*risk*’ and change, the re-framing of relationships and roles (Hall, Wall, et al 2005) and the need to reflect on professional ideals are all heavily dependent upon a collaborative community of learners.

‘[We were doing] an oral feedback and I was just struck, it was really sort of a moment for me, I was struck by the quality of the discussions of the teaching and learning and the feeling that the teachers have got really underneath what was happening. That was a wow moment for me, so that there’s a really good coaching model’ (Teacher interview)

We have tried to represent the way in which the individual working spaces, or green circles, overlap (Figure 5, below), reinforcing the motivation and focus of the individuals and adding to the intellectual capital of the group.

INSERT FIGURE 5 ABOUT HERE

From the perspective of the school, this is where the wider network introduces extrinsic motivational factors, such as the concept of the ‘external eye’: indeed, many schools were originally recruited to the project by the use of ‘you’ll be the only one not doing it’ techniques (Fieldnotes, 2006). Funding from the project, through the local Education Action Zones and the Campaign for Learning gives the project and the individuals involved in it status and helps to protect the working space from other pressures and agendas.

There is a further dimension to this networking within Learning to Learn however, which raises the stakes for teachers and that is the role of the University as critical friend (Figure 6). The project is conceptualised as a community of learners, a collaborative community in which practice and theoretical knowledge are not privileged over one another but it is by no means intended to be cosy. The

community is critical and reflective and the specific role of the university team is to bring in a range of theoretical and epistemological perspective to challenge our understanding of learning.

This has been the most obviously developmental aspect of the project. In the early stages of the project, it was necessary for the team to give teachers a considerable amount of support in terms of research methods, in order to give them a level of procedural autonomy in conducting an enquiry – however, as the teacher below exemplifies, this procedural understanding fed immediately into reflection upon ideas and beliefs:

‘What’s been really good for us has been the support with how to collect data from the Newcastle Team, all the different ideas on the kinds of data, the importance I think of soft data and when we push so hard all the time your [exam] data or whatever, and the feeling that you know, there are other benefits for our children especially, and that’s you know, how can we collect them and present those, so that people understand that you are developing the whole child and not just the child who takes a test.’ (Teacher interview)

Inputs to early meetings from the team and from outside speakers were politely and uncritically received and there were noticeable impacts on the content of individual research projects based on the content of these presentations (Fieldnotes, 2005). More recently, speakers have been seriously challenged by the community and the expectations in relation to evidence, rigour and applicability to context for any idea,

approach or strategy have become significantly higher (Fieldnotes, 2006). The impact of the sessions has been, for some teachers, transformative:

‘being on the Bristol residential was quite a big thing for me, in my thinking about my role in the classroom, in terms of ... I’d previously viewed my role as to deliver this, this and this and that the children would be learning this, this and this, whereas now I’m thinking more about ‘how can I explain to the children about how they’re going to learn about this’. So as opposed to it being a process, that is done to them by me, I’m thinking more now about how I can involve them in the learning process so it’s kind of a complete switch round in my brain of what my role is, because I want the children to be able to understand, not just what it is that I’m teaching them, but how they’re going to take it in and reclaim the knowledge’ (Teacher interview)

Many teachers have described these interactions with the university as key learning experiences. The critical and reflective space created by the residential weekends in particular has been identified as a series of crucial opportunities to synthesise new understandings with colleagues.

INSERT FIGURE 6 ABOUT HERE

The interaction of the various networks and support structures is different for each individual in the project, though there is commonly a sense in which they support and promote one another:

‘I think that actual conference was the biggest sort of critical moment really because both of us have felt that we’ve been tinkering around the edges. It’s to do with where we are and the situation our school is in and so on. We felt for a long time, we hadn’t moved forward. Then of course when you go to something like that, you start thinking and talking to other people and hearing the latest thinking in education and it just all began to fall into place and then gradually I think it has just come about that our school had moved forward so that what we’re doing now in this year’s research links in with our school improvement project and also we’re also part of a network and that is just so interesting because we’re now working with other schools and moving everybody forward. I can’t say it’s one single experience really, it’s the fact that one thing has led to another and it’s all falling into place.’ (Teacher interview)

Ways forward?: ecological understanding in a ‘roll-out’ world

This paper has amassed a variety of data to come to some rather tentative conclusions. There are some key positive conditions attendant upon thinking skills programmes, collaborative continuing professional development and enquiry projects which appear to support opportunities for teachers to develop their metacognitive awareness and skilfulness. These positive conditions include: explicitness of intention, clarity in relation to process, high levels of personal autonomy for teachers, engagement with feedback, support from critical collaborative networks with high status and a diverse membership.

The lessons from the empirical data are that the impact of these positive conditions is extremely variable and that the individual ecologies of schools, perhaps even the individual psychologies of teachers are *at least* as important in facilitating metacognition. The evidence does not support a model of implementing programmes, however well-designed, to encourage metacognitive behaviours. Metacognitive development appears to be dependent of the extent of 'fit' between the positive conditions and the context in which they operate. The degree of salience between conditions and context is the next level of the problem to explore.

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Figures

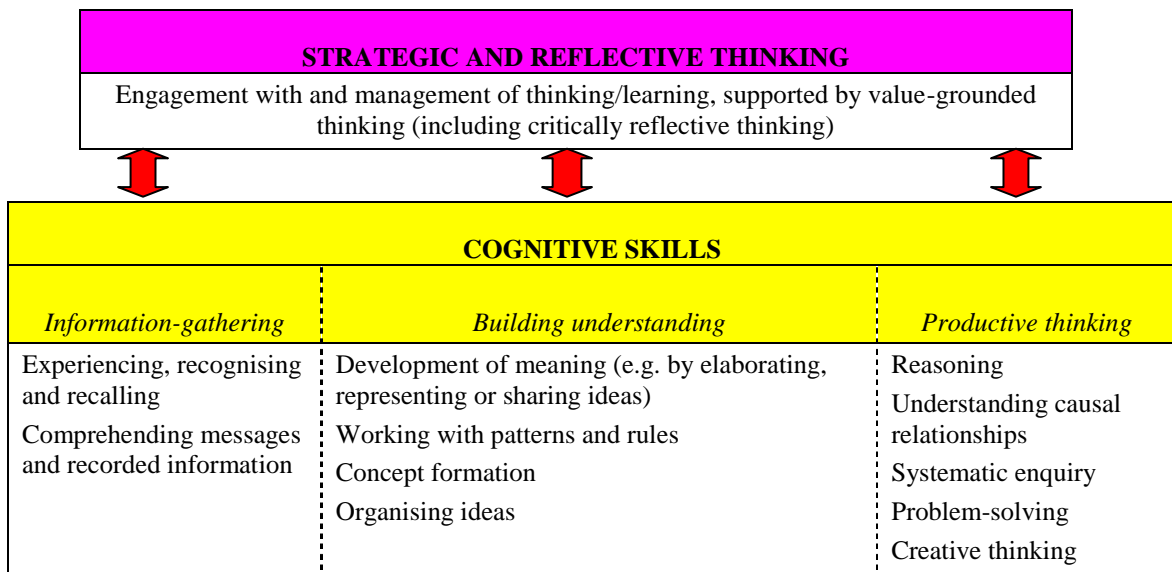


Figure 1: Moseley *et al.*'s (2005a) Model of frameworks for thinking



Figure 2: The Campaign for Learning's model of Learning to Learn

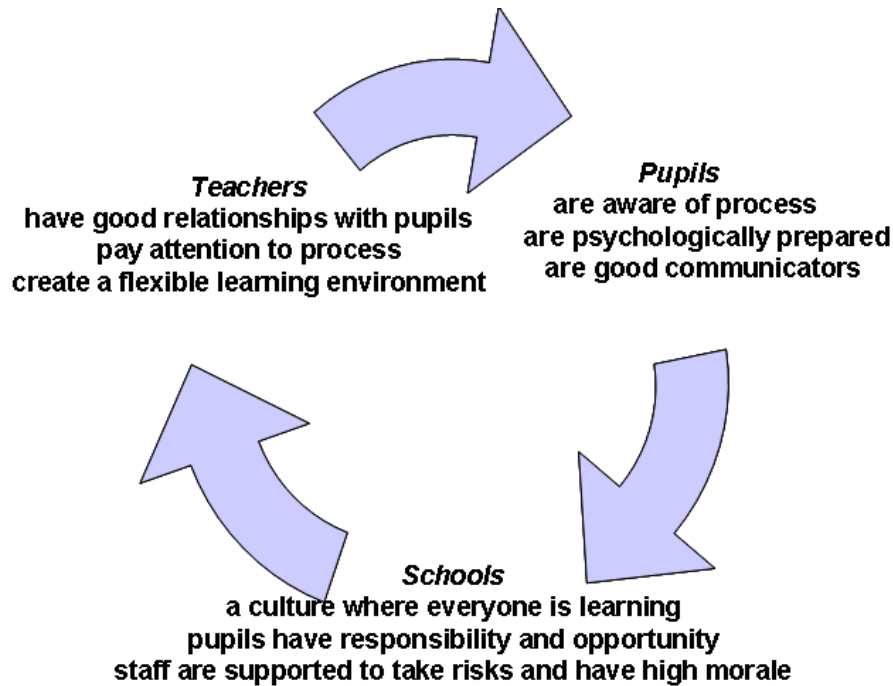


Figure 3: Mutually supportive processes identified by teachers within Learning to Learn

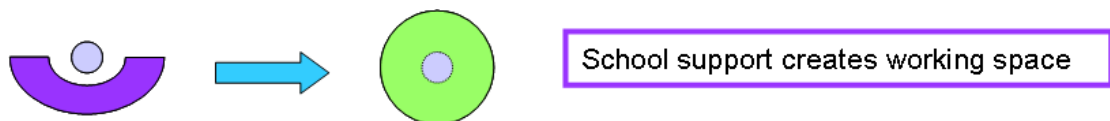


Figure 4: Descriptive model of the development of 'working spaces': school level

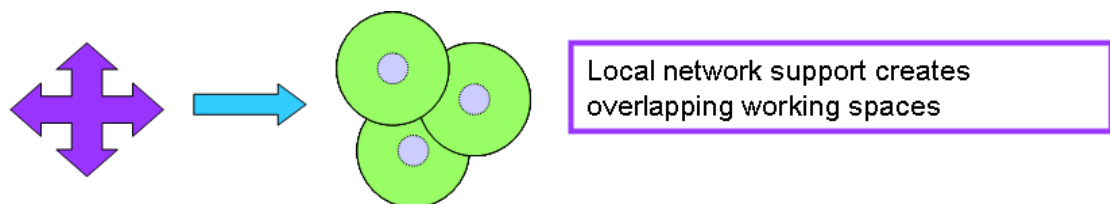


Figure 5: Descriptive model of the development of 'working spaces': network level

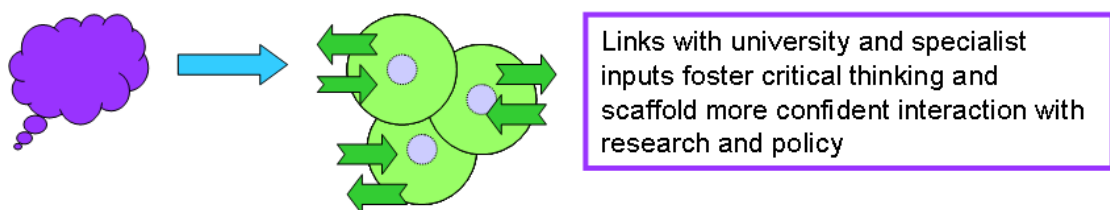


Figure 6: Descriptive model of the development of 'working spaces': national level