



Understanding metacognition through the use of pupil views templates: Pupil views of Learning to Learn

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ARTICLE INFO

Article history:

Received 30 May 2007

Received in revised form 3 March 2008

Accepted 9 March 2008

Available online 20 March 2008

Keywords:

Pupil views

Metacognitive skills

Metacognitive knowledge

Learning to Learn

ABSTRACT

As part of the Learning to Learn Phase 3 Evaluation [for full detail see Higgins, S., Wall, K., Baumfield, V., Hall, E., Leat, D., Moseley, D., et al. (2007). *Learning to Learn in Schools Phase 3 Evaluation: Final Report*. London: Campaign for Learning. Available at: www.campaignforlearning.org.uk; Higgins, S., Wall, K., Falzon, C., Hall, E., Leat, D., Baumfield, V., et al. (2005). *Learning to Learn in Schools Phase 3 Evaluation Year One Final Report*. London: Campaign for Learning. Available at: <http://www.campaignforlearning.org.uk>; Higgins, S., Wall, K., Baumfield, V., Hall, E., Leat, D., Woolner, P. et al. (2006). *Learning to Learn in Schools Phase 3 Evaluation: Year Two Report*. London: Campaign for Learning. Available at: <http://www.campaignforlearning.org.uk>] teachers across three Local Authorities in England were supported in using an approach fitting ideas of professional enquiry through action research [Baumfield, V., Hall, E., & Wall, K. (2008). *Action research in the classroom*. London: Sage]. In this complex project, teachers have explored different innovations that they believe to fit under the umbrella term of Learning to Learn, implementing and investigating approaches ranging from cooperative learning [Kagan, S. (2001). *Cooperative learning*. Kagan Publishing. www.kaganonline.com] to Assessment for Learning [Black, P. J. & William, D. (1998). Assessment and classroom learning. *Assessment in Education*, 5, 7–73] to Thinking Skills [Baumfield, V. & Higgins, S. (1997). 'But no one has maths at a party: Pupils' reasoning strategies in a thinking skills programme. *Curriculum*, 18(3), 140–148]. As part of these enquiries teachers have increasingly involved pupils and their perspective for providing critical insight to processes associated with Learning to Learn. This corresponds to debates around pupil voice [for example, Flutter, J. & Ruddock, J. (2004). *Consulting pupils: What's in it for schools?* London: Routledge Falmer], and also the fact that teachers in the project see pupils as having characteristics that can support the development of a Learning to Learn philosophy [Hall, E., Leat, D., Wall, K., Higgins, S., & Edwards, G. (2006) Learning to Learn: Teacher research in the zone of proximal development. *Teacher Development*, 10(2)] This paper will use the method of pupil views templates [Wall, K. & Higgins, S. (2006). Facilitating and supporting talk with pupils about metacognition:

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A research and learning tool. *International Journal of Research and Methods in Education*, 29(1), 39–53] used by teachers as a pragmatic tool [Baumfield, V., Hall, E., Higgins, S., & Wall, K. (2007). Tools for enquiry and the role of feedback in teachers' learning. *Paper presented at the European Association for Research in Learning and Instruction Conference*] to research pupils' perspectives of Learning to Learn and the processes they perceive to be involved. It will use an analysis frame to examine and explore data about pupils' declarative knowledge of the process of learning and therefore aspects of their metacognitive knowledge and skilfulness [Veenman, M. V. J. & Spaans, M. A. (2005). Relation between intellectual and metacognitive skills: Age and task difference. *Learning and Individual Differences*, 15, 159–176].

1. Introduction

The Learning to Learn in Schools Phase 3 Evaluation was a research project funded through the Campaign for Learning (CfL) and supported by the Research Centre for Learning and Teaching at Newcastle University. The project involved 33 primary and secondary schools across three Local Authorities (LAs), representing a wide range of socio-economic contexts across England (for further details see Higgins et al., 2007, 2006, 2005). The study extended over four years, ending in 2007 and during this time teachers undertook three annual cycles of research using Stenhouse's (1981) model of 'systematic enquiry made public'. This process was supported by the University team (Wall & Hall, 2005), described more fully elsewhere (Baumfield, Hall, & Wall, 2008).

All of the schools implemented interventions under the general heading of 'Learning to Learn' (L2L) drawing on ideas of metacognition, thinking skills, self-regulation, self-efficacy and self-esteem (see for example, Claxton, 2002). However, within the project the definition remained relatively fluid and flexible since the teachers themselves were creating new understandings of what L2L is in practice through the process of research and through the connections made as part of the project. The actual interventions investigated by the teachers varied depending on their own understandings of Learning to Learn and how they believed they fit with the context of their classroom. Teachers have innovated with approaches ranging from Cooperative Learning (Kagan, 2001) to Assessment for Learning (Black & Wiliam, 1998) to Thinking Skills (Baumfield & Higgins, 1997) and more. The locus of control for these decisions has always been with the teachers and, from the project perspective this diversity has been embraced as a necessity of the professional enquiry approach (Wall & Hall, 2005). It is enough to say that across all of the approaches used there have been a priority placed on pupil talk about learning and that the Campaign for Learning's definition has been consistent as a starting point:

... 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. (Higgins et al., 2007, p. 13)

Participant teachers produced a case study at the end of each of cycle of enquiry, at the end of each school year. Within these reports the involvement of pupils and the inclusion of their perspective have been very apparent. Indeed, this has become an increasingly privileged element of the teachers' evaluation and data collection (Higgins et al., 2007). The teachers have indicated that the role and characteristics of pupils in a L2L school or under a L2L philosophy are important. Themes which have emerged from interviews with the teachers include that a L2L pupil:

- has awareness of the processes of learning;
- is psychologically prepared for learning;
- is a good communicator (Hall, Leat, Wall, Higgins, & Edwards, 2006).

This growing appreciation appears to reflect a more general shift nationally and internationally in education discourse (c.f. Article 12 of the United Nations Conventions on the Rights of the Child, 1989), but also a changing understanding within the project of what L2L represents.

This paper will focus on and explore data collected using the method of pupil views templates (Wall, Higgins, & Packard, 2007). An example of a completed template can be seen in Fig. 1. This was a method used by many of the teachers to gather the pupils' perspective and in some contexts seemed to fit with teachers' beliefs about what is embodied by the philosophy of Learning to Learn. Teachers have described the tool:

The use of pupil views templates enables children to provide their own views on a variety of issues—some have to be pre-planned (the more specific templates) but others are good as a quick snapshot done at random (usually a blank template that can be adapted). (Teacher of Year 2)

These templates have been developed over a number of different research projects, fitting with ideas associated with psychological or semiotic tools (Vygotsky, 1978): the templates mediate pupils' thinking about cognition and metacognition and support them in expressing their learning. In addition, the templates fulfil a parallel purpose by acting as a pragmatic 'bridge' across the research-practice divide for teachers (Kuhn & Dean, 2004). The templates do this by acting as an empirical research tool for exploring pupils' beliefs about metacognition as well as a pedagogical tool for facilitating dialogue about learning in the classroom (examples of teachers using the templates for both purposes can be seen in Wall et al., 2007). The power of the templates within L2L lies in the fact that regardless of the research agenda of the project,

Pupil Response Record – Circle time

Name: Joshua
Age: 7

Circle time...



Fig. 1. An example of a completed L2L pupil views template. Moseley et al. (2005) model of frameworks for thinking (p. 314).

the templates have become a powerful feedback tool informing both teachers and pupils about metacognition in different learning contexts. This value for teaching and learning means teachers are more likely to truly engage with the outcomes, and therefore when also utilised as research evidence the richness of the data and its validity is likely to be increased (Wall & Higgins, 2006).

2. Method: pupil views templates

The Learning to LearnPhase 3 Evaluation can be perceived as a very disparate project, where teachers not only chose the innovation under investigation but also the data collection tools used to evaluate success (Wall & Hall, 2005). As such it was important to provide common tools which the teachers could easily use and adapt to their context and intent (Baumfield, Hall, Higgins, & Wall, 2007), as well as providing common data which could be analysed across the different contexts and approaches. Pupil views templates were one such data collection tool which was developed.

Most data collection methods within the field of pupil views tend towards the use of interviews, either one-to-one or focus groups (for example, Bullock & Muschamp, 2006; McCallum, Hargreaves, & Gipps, 2000), although some researchers have used questionnaires, with varying degrees of success (for example, Black, Swann, & Wiliam, 2006). In contrast and to support teachers in making their enquiry practical (Baumfield et al., 2008), pupil views templates were designed to transcend any division between teaching and learning in the classroom and empirical research. In other words, the templates aimed to be a tool which informed about pupils' development and understanding of metacognition in different learning contexts, provided insight for pedagogical development and provided data under a professional enquiry through action research approach. Arguably they provide a bridge between the cognitive domains and practice (Kuhn & Dean, 2004).

The method has its origins in educational action research, with the templates aiming to be a 'pragmatic tool' (Dewey, 1931; Leont'ev, 1981) which has meaning and value across both learning and research contexts. In other words, they aim to be a research tool that can be empirically influential and powerful, while also having an impact upon the pedagogical processes within classrooms. The theory behind the tool and its use is fully described in Wall and Higgins (2006), however a brief summary is included below.

The template provides an image of the learning situation on which the research is focused, the process becomes a three-way interaction between the researcher (or teacher), the pupils and the template (see Fig. 2). The template design has its

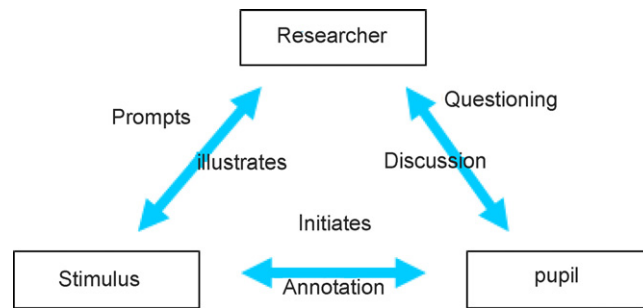


Fig. 2. Model of interaction using the template. An example of a completed L2L pupil views template.

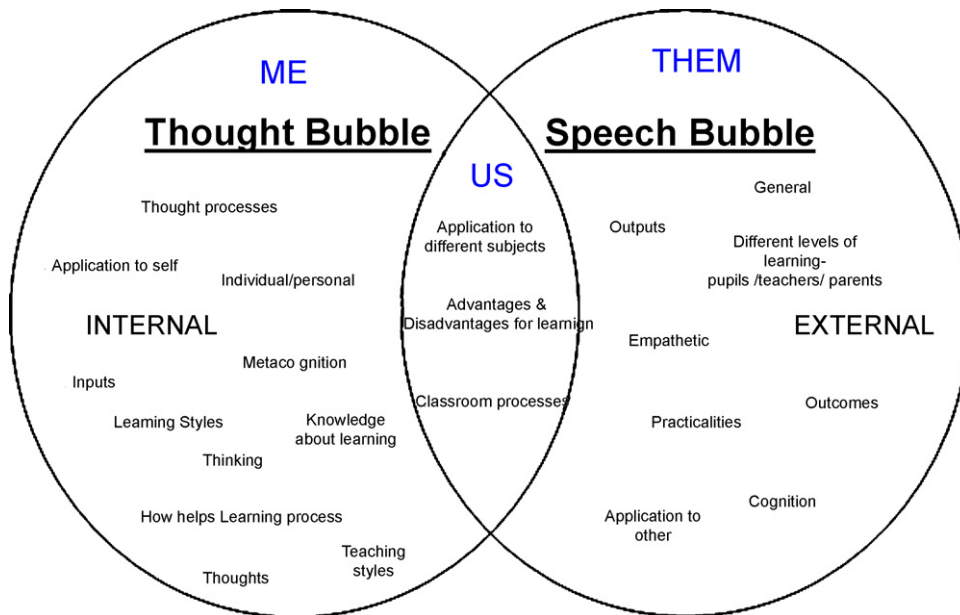


Fig. 3. Venn diagram of thought and speech bubble rationale on pupil views template. Model of interaction using the template.

inspiration in work completed by the Bubble Dialogue team¹; for example, McMahon and O'Neill (1992) and Jones and Price (2001) and also the research of Hanke (2000). The key idea in all these projects is that pupils can be asked, using a cartoon representation, to reflect on their thinking on different aspects of their experience.

The templates aim to gather information on pupils' attitudes and beliefs about teaching, curriculum content and school/classroom structures (the process of teaching), but also to go further into the realms of metacognition (thinking about the process of learning). This is done through a superimposed structure of speech and thought bubbles. The speech bubble looks at factors external to the individual: the learning of other pupils, teachers and parents and practicalities of learning in the specified context (cognition in general). In contrast, the thought bubble is intended to look at the 'internal' processes: the learning of the individual—'what is going on inside their head' (metacognition). An overlap between the two fields is expected with regard to advantages and disadvantages and subject differences: the impacts on the learning of themselves and others. A diagram of this rationale is included above (Fig. 3).

The speech bubble and the thought bubble on the template means that there is an automatic prompt for the pupil to talk about what they are thinking. This could very simply be what they think about a specific activity, for example independent reading, or it could be more sophisticated with regard to the more abstract thinking processes which they associate with or utilise during a specific activity. The latter abstraction into metacognitive process can be seen to link with Veenman and Spaans' (2005) concepts of metacognitive awareness and metacognitive skilfulness: ideas which will be used in the cross case study analysis of pupil views.

¹ <http://www.dialogbox.org.uk/BubbleDialogue.htm>.

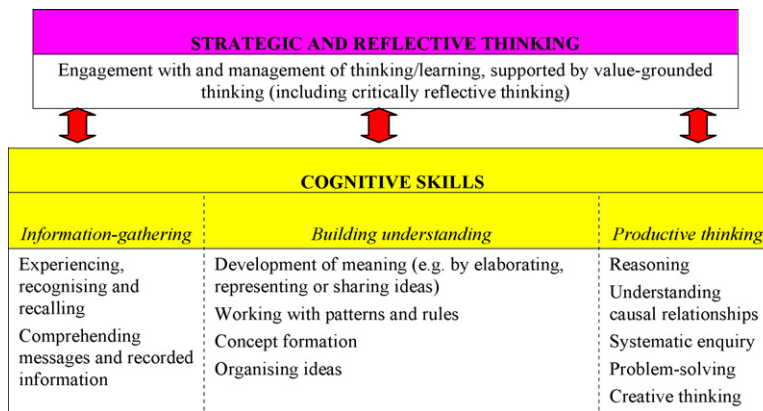


Fig. 4. Moseley et al.'s (2005) model of frameworks for thinking (p. 314). Venn diagram of thought and speech bubble rationale on pupil views template.

3. Exploring pupil views of learning

Since Article 12 of the [United Nations Convention on the Rights of the Child \(1989\)](#), the rationale for consulting pupils is diversifying and the potential significance of the pupils' perspective has become established in the educational research rhetoric. There are many studies now available that investigate primary pupils' perspective of education and school (for example, [Flutter & Ruddock, 2004](#); [Pollard, 1996](#); [Thomas, Smees, & Boyd, 1998](#); [Tunstall & Gipps, 1996](#)). However, within this literature there are few studies that have explicitly looked at learning process, and fewer still that have explored pupil views of metacognition.

The literature exploring pupil views of the learning process and their knowledge and understanding of it is increasing. One of the influential studies which began to examine the issues surrounding pupils' perceptions of the learning process is by [McCallum et al. \(2000\)](#). They interviewed pupils as young as seven years old and asked them to describe "learner conditions and classroom conditions that they [pupils] believed were conducive to learning" (p. 279). [Bullock and Muschamp \(2006\)](#) researched pupils' understandings of their own learning needs and strategies in maths, English and science. They found that pupils in Year 6 (ten and eleven years old) saw learning as their responsibility and had a good understanding of the relationships between the content of their learning and the strategies that they used to learn. In addition, as part of the Teaching and Learning Research Programme (TLRP) [Black et al. \(2006\)](#) explored pupils' beliefs about learning, finding "... that primary pupils see little connection between their involvement in learning and particular school practices, so that the pattern of change between these two can be quite different" (p. 168). However, it is the author's belief that while these studies go some way to considering the complexities of learning, not one of them extends into asking pupils about the metacognitive realm. There are studies that investigate young pupils' metacognition (for example, [Larkin, 2006](#); [Whitebread et al., 2005](#)), but a paper which explore *pupils' beliefs* about their metacognition is absent.

There is no doubt that an important part of learning is metacognitive thinking. The term metacognition was introduced in the 1970s by [Flavell \(1979\)](#) to encompass learners' knowledge of their own cognition. [Veenman and Elshout \(1999, p. 510\)](#) state, "Metacognitive skills ... concern the procedural knowledge that is required for the actual regulation of control over one's learning activities". Metacognition has been subsequently given high status as a feature ([Georghiades, 2004](#)), with characteristics of transferable learning skills, awareness of the process of learning and sustained benefit of metacognitive knowledge. This means that it can be argued to be a powerful and important aspect of teaching and learning, and therefore, worthy of research.

In [Moseley et al.'s book \(2005\)](#) which provides a comprehensive synthesis of current thinking and theory relating to thinking and learning, a model for mapping frameworks for thinking is outlined (see Fig. 4). The three cognitive components, arising from [Bloom's taxonomy \(1956\)](#), plus a self-regulatory/metacognitive system is useful in beginning to think of knowledge about thinking and learning. Although the authors do not imply a hierarchy of thinking within this model, they do distinguish between what can be an automated cognitive process within the cognitive skills section, and reflective and strategic thinking which is seen as conscious and 'harder work'. This latter facet is where metacognition is apparent.

If the reflective and strategic thinking category within Moseley et al.'s model is where metacognition lies, then within this category it is useful to use the duality of [Veenman, Elshout, & Meijer's \(1997\)](#) concepts of metacognitive knowledge and metacognitive skilfulness. This splitting of metacognition is based on [Flavell's \(1979\)](#) definition of metacognitive knowledge: "... declarative knowledge one has about the interplay between personal characteristics, task characteristics and the available strategies in a learning situation ([Veenman, Kok, & Blöte, 2005](#)); and metacognitive skilfulness: "reflecting on the nature of the problem, predicting consequences of an action or event, planning and monitoring the ongoing activity, comprehension monitoring, checking the results of one's actions, testing for plausibility and reflecting on one's learning performances" ([Veenman et al., 1997](#)). The author would argue that in L2L this distinction is useful in that it is arguably not enough for pupils to be aware of the processes of learning and thinking going on 'inside their

head' (metacognitive knowledge), but to be truly effective there needs to be greater understanding of how this awareness is used (metacognitive skilfulness). In other words, an L2L pupil needs to be critical and rational about Learning to Learn, indeed returning to Moseley et al.'s framework, they need to apply these cognitive skills to their metacognition.

Metacognition, because of its inwardness, is difficult to observe. Within Moseley et al.'s model it could be argued that evidence of cognitive skills might be more observable and recognisable across individuals, whereas strategic and reflective thinking are more hidden and private. Even with adults it is difficult to identify and reflect on what metacognition is to them and with pupils this is increased. Indeed, it has been argued that metacognitive skills do not develop until the age of ten to twelve years old (for example, Kuhn, 1999), although metacognitive knowledge can be present at a much younger age. In contrast, Bartsch, Horvarth, & Estes (2003) found that young pupils have knowledge of what they have learnt, but not of how and when they learnt it. However, in the author's experience (Wall & Higgins, 2006; Wall, Higgins, Miller, & Packard, 2006; Wall, Higgins, & Smith, 2005) and as others have documented (Leat & Higgins, 2002), including L2L project teachers (Higgins et al., 2007, 2006, 2005), this is not always the case. The data collected using pupil views templates aims to engage with these debates.

4. Cross case study analysis

The data within this paper was collected as part of the L2L Phase 3 Evaluation. It comes from seven schools, all based in the primary age phase (catering for pupils aged four to eleven), representing all three LAs. The schools all chose to use the templates as useful in providing data for their enquiry. Individual teachers used the templates as they saw fit and so there is likely to be little parity in the type of approach used as this will have depended on the age of the children, their language competency and therefore the support needed. This point should not be forgotten, but it is felt that for the purposes of this paper and the number of templates being analysed, the impact will be minimal. For further information about how the templates can be used please see Wall et al. (2007).

In total 210 pupil views templates were analysed. This meant 674 units of text: each text unit was isolated on the basis of sense and therefore could be anything from one word to a sentence. The templates included in the sample were completed by pupils ranging from Reception (four years old) through to Year 6 (eleven years old). Analysis of the data from the templates was conducted using a predetermined structure outlined below using N7 qualitative software (Richards & Richards, 1993).

Firstly, the text units on the templates were coded according to school type, age of pupil, and in that some pupils had completed more than one template, they were marked with the sequence in which the template was completed. The text units were also tagged at this stage with whether they were written in the speech bubble or thought bubble. The second stage of the analysis saw the statements categorised using Moseley et al.'s (2005) model (Fig. 4). The statements were categorised as to whether they were predominantly evidence of cognitive skills: information gathering, building understanding, or productive thinking; and/or whether they were evidence of strategic and reflective thinking. The following definitions based on the model were used:

- *Information gathering*: Comments in this category tended to be characterised by recall of ideas and processes, comprehension of information they have been told or have read.
- *Building understanding*: This needed the concepts of information gathering, but also required some organisation to be given to these ideas and recollections, some idea of relationships were looked for, plus some development of meaning about implications and patterns that could be applied.
- *Productive thinking*: These comments tended to show reasoning, problem solving and some movement of understanding beyond the concrete and towards the abstract. Ideas that were generalisable and creative were placed in this category.
- *Strategic and reflective thinking*: This category looked at whether the comments represented an awareness of the process of learning. It needed a reflective or strategic element to the statement; that this comment represented thinking about learning.

An additional category was introduced at this stage for affective comments to learning.

Thirdly, the statements which were labelled as strategic and reflective, and therefore indicative of metacognition, were then reanalysed for evidence of metacognitive knowledge and metacognitive skilfulness (Veenman et al., 2005). These categories were characterised in the following ways:

- *Metacognitive knowledge*: Comments in this category demonstrated an understanding that the child could think about learning, and that the individual understood some of the processes which supported their own learning.
- *Metacognitive skilfulness*: Comments within this category represented a movement beyond knowledge towards the application and translation of thinking and learning skills across different contexts or for different purposes.

The coding system was checked for inter-rater reliability. A colleague not associated with the project or the templates was asked to code comments from 20 templates, this included 75 text units. The inter-rater agreement was 82% which was felt to be very good for qualitative analysis. It should be noted in all the graphs that the categories used were not necessarily

Table 1
Number of templates and number of text units for analysis across the year groups

Year	Number of templates	Number of text units
Reception	6	46
Year 1	36	135
Year 2	81	236
Year 4	10	47
Year 5	57	206
Year 6	20	4
Total	210	674

mutually exclusive and a single text unit could be classified as fitting under more than one category and therefore percentages in the following graphs do not add up to 100%.

5. Metacognition and its relationship with pupil age

The first element of the analysis looked at the age of the pupils that had completed the templates (given by year group) and explored the relationship that this had with the identification of pupil responses relating to dispositions to learning, cognitive skills, metacognition and metacognitive knowledge and skilfulness. It should be noted in this analysis that no templates were completed by Year 3 pupils within the project and therefore this year group is not mentioned in the graphs and analysis that follows. The number of text units per year group can be seen in Table 1.

Trends related to the comments categorised as affective were explored. Pupils were found to be mostly positive (see Fig. 5). However, there did seem to be an interesting general trend within the templates for these types of dispositional comments to tail off as the pupils got older: pupils in Key Stage 1 were more likely than those in Key Stage 2 to comment on feelings they associated with learning. For example,

It's good because we help each other to get more ideas. (Year 1 pupil)

Little bit hard, little bit easy, little scary. (Year 2 pupil)

It should be recognised that there could be some kind of teacher effect acting on any of these results. The teacher acts as facilitator when pupils complete the templates and therefore their expectations and talk could be impacting on the way in which the templates were completed. This rationale could be backed up by the anomaly of the templates from Reception aged pupils in the graph below, which do not appear to follow the identified trend, with less dispositional comments than Year 1 and 2. However, the number of completed templates from this youngest year group was low and therefore the proportions being shown could be seen as unrepresentative. Despite these potential influences the findings related to affective comments have been included as it is felt they add to debates surrounding attitude to school, it is likely that as attitudes to school decrease, then so will attitudes to learning (Black et al., 2006). This is important in deciphering pupil views of anything, including metacognition.

When comments categorised as the different cognitive skills according to Moseley et al.'s (2005) framework were explored there was a general increase in this type of comment as the pupils got older (see Fig. 6). However, Year 5 pupils provide an exception to this rule. This could be due to teacher affect, although the numbers of analysed templates within this particular year group should have produced representative statistics.

It is interesting that comments related to 'information gathering' are seen to remain relatively positive across the different year groups, from Reception through to Year 6. These comments remain very similar in content with the pupils showing

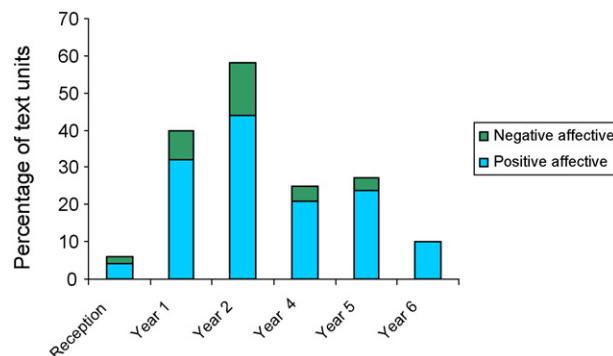


Fig. 5. Graph showing affective comments across the year group.

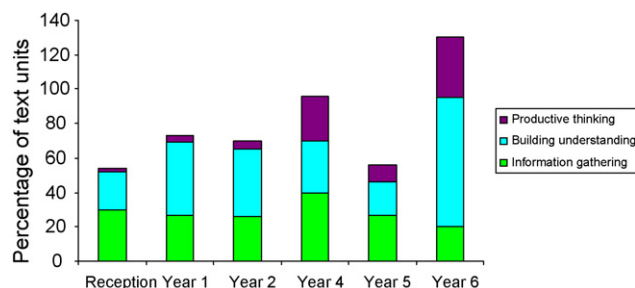


Fig. 6. Graph showing percentages of comments categorised as Moseley et al.'s (2005) cognitive skills.

comprehension of lesson and curriculum content, recalling activities they have been involved in and giving detail of the learning strategies they have used. For example,

James is doing well and I think he'll get to a high standard. Although I get different types of books as him. (Year 5 pupil)

If I put my hand up Miss Lewis will ask me. (Year 2 pupil)

'Building understanding' also does not appear to follow any consistent trend across the age groups, although there appears to be evidence of an increase in these types of comments in templates from Year 6. However, this one jump is not enough, particularly considering the numbers involved, to be confident in this finding.

In contrast, trends relating to 'productive thinking' appear to show an increase as pupils get older: pupils in Key Stage 2 were more likely to include comments under this category than pupils from Key Stage 1. This would arguably seem to suggest some kind of Piagetian progression, with older pupils with experience and competence in cognitive skills related to gathering information and building understanding being more likely to progress and show evidence of productive thinking. Having said this it is worth noting that some pupils in the younger age groups were making comments which were classified under this heading and so there is no exclusivity to this type of cognition and it could be presumed that maybe with appropriate instruction or experiences it might be developed in younger children.

With regard to the different elements of metacognition that were explored, Fig. 7 shows that comments categorised as metacognitive knowledge and skilfulness were apparent across the year groups. This goes in contradiction to the findings of Bartsch et al. (2003) and Kuhn (1999): pupils within the L2L project as young as four and five years old showed that they not only have metacognitive knowledge, but also could demonstrate metacognitive skilfulness, something that these researchers found did not emerge until secondary school. For example,

When I read in my head when I come to a long word I skip it. (Year 5 pupil)

I like working in a group because it is easier to work things out. (Year 2 pupil)

We held the coins. I learnt about coins by myself—none of my friends helped me. I have got better at knowing coins. (Reception pupil)

At the current stage of the research it is not possible to say whether this metacognitive skilfulness in these younger pupils is apparent because of the L2L interventions or something else. However, it could be argued that the interventions included under the L2L umbrella give the pupils knowledge and vocabulary with which to talk about learning (Higgins et al., 2007, 2006, 2005). This is not metacognitive enrichment per se. L2L is about so much more, it is embedded in actual tasks and much more short term goals as well.

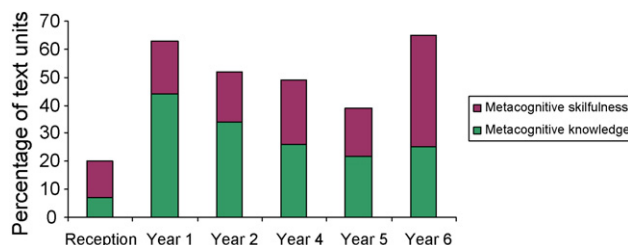


Fig. 7. Graph showing percentages of comments categorised as Veenman et al.'s (2005) metacognitive knowledge and skilfulness.

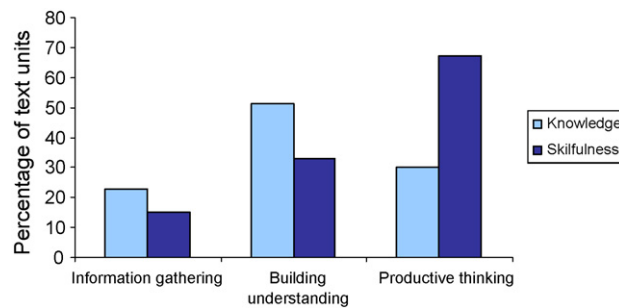


Fig. 8. Graph showing the overlap between cognition skills and metacognition.

6. Learning to Learn: being cognitive about metacognition

The Learning to Learn Phase 3 Evaluation has always had a focus on the outcomes for learners and pupils are an obvious part of this group. However, as the name of the project suggests one of the areas these outcomes cluster around is learning about learning itself. Therefore, within this evaluation it was not only important to investigate pupils' knowledge about their own learning, but also how they were using Moseley et al.'s (2005) cognitive skills and applying them to the learning and thinking processes, metacognition. How the pupils were being cognitive about the metacognition. It was believed this would develop understanding about the difference between metacognitive knowledge and skilfulness.

It was within the analysis of comments categorised as different cognitive skills that it became apparent that the pupils were not only demonstrating cognition about lesson content and different elements of classroom process, but they were also being cognitive about their thinking and learning.

Fig. 8 shows the overlap between the different cognitive skills and metacognitive knowledge and skilfulness. It can be seen that there is a definite progression, with the least amount of overlap in comments categorised as gathering information through to most being related to productive thinking. Moseley et al. (2005) say that no hierarchy is inferred by the different cognitive skills they present, however these findings do seem to suggest that metacognition and in particular metacognitive skilfulness becomes more likely when certain cognitive skills are apparent.

Comments categorised as metacognitive knowledge are seen to be most commonly when associated with the building understanding skill, for example

Sometimes when I read by myself if it is funny I laugh. (Year 5 pupil)

I think its good working on your own because no one is here to distract you. (Year 1 pupil)

Using Moseley et al.'s (2005) definition, this skill is all about development of meaning and working with patterns and rules, concept formation and organising ideas. If pupils were thinking strategically and reflectively about their learning, then this skill would be a baseline in beginning to develop that knowledge about learning and thinking. You can gather information about learning, but understanding only comes when you start cognitively being aware of the relationships and interactions between the different elements which would correspond to the skill 'building understanding'.

Metacognitive skilfulness, however, is more likely to interact with productive reasoning and again it would appear logical that if you are learning about and building understanding about learning, you will be able to recall the use of strategies which aid learning and thinking and be able to make links between the different of metacognitive skills and knowledge, but to truly have metacognitive skilfulness than there needs to be some understanding of 'causal relationships' and also some 'systematic enquiry' (Moseley et al., 2005, p. 314) into what works best for an individual. Quotes from the templates which exemplify this type of comment, where children are reflecting or being strategic about their learning, include,

I made some chicken—I thought about how mummy did it. (Reception pupil)

Its okay if you just try and I just ignore people if they laugh cos I've got it wrong (Year 2 pupil)

We was thinking of describing words and thinking of some information and some ideas and I like James being my Literacy partner. (Year 4 pupil)

It certainly seems logical that information gathering (recall) and building understanding (developing associations and patterns) would be more likely to be related to developing knowledge about thinking and learning process, whereas when children start to think about how they apply this knowledge, to be metacognitively skilful, then there is a need for them to use cognitive skills that are more related to productive thinking (reasoning, problem solving and movement towards the abstract). It therefore appears to make sense that there is this association between comments categorised as metacognitive skilfulness and productive thinking which is less likely with building understanding and information gathering.

7. Concluding thoughts

Pupil views templates have been shown to enable teachers within the Learning to Learn Phase 3 Evaluation to gain knowledge and understanding regarding pupils learning and thinking. The structure of the thought and speech bubble with the picture of the learning context has complemented the L2L agenda of facilitating pupil talk and thinking about the process of metacognition. The comments written down by the pupils give evidence of both metacognitive understanding and skilfulness. With this latter facet of metacognition it could be argued that because these templates rely on pupils declaring and expressing their knowledge about metacognition, skilfulness could not be truly evidenced. However, the counter argument would be that evidence from a template where an individual has declared knowledge of metacognitive process, while also expressing that they are consciously using them in their learning would surpass any subjective evidence from observation completed by a third person. These pupils not only have the knowledge about metacognitive skills and process, but they also know *how* they are using them in different learning contexts. This, the author believes, fits with understandings of Veenman et al.'s (1997) definition.

Learning to Learn pupils within this project have been shown to have declarative metacognitive knowledge and metacognitive skilfulness at a much younger age than previously thought. This paper has given evidence of pupils as young as four and five year old (Reception) displaying not only metacognitive knowledge, but also metacognitive skilfulness. This is in direct contrast to the research of Kuhn (1999) and Bartsch et al. (2003). However, there does seem to be some support for the fact that metacognition develops and increases as pupils get older or become more experienced learners, particularly in relation to the debated area of skilfulness. It is important to ask to what extent the explicit focus on Learning to Learn in the project classrooms or the different Learning to Learn innovations implemented by the teachers have enabled this transfer of metacognitive knowledge and skills to younger pupils in these schools. This would be an important area for further investigation.

The analysis frame used, combining the cognitive skills of Moseley et al.'s (2005) model and Veenman et al.'s (1997) two types of metacognition, has been useful. Insight has been gained into the overlap between cognition and metacognition and some understanding into how cognitive skills can be used to reflect on thinking and learning processes (metacognitive knowledge and skilfulness) has started to be developed. The emergence of different associations between the cognitive skills and metacognition knowledge and skilfulness furthers the debate regarding the development of metacognition. The next stage is to ask whether teachers can explicitly support pupils in applying the cognitive skills to their thinking and learning (for example under an approach like Learning to Learn) and how this can facilitate and support pupils' declarative knowledge about their metacognition.

Acknowledgements

Schools, teachers and pupils involved in the Learning to Learn Phase 3 Evaluation should be acknowledged for their hard work in trialling and using the templates within their classrooms and as part of their own research work. In particular, I would like to thank Fleecefield Primary School, Oakthorpe Primary School and Wilbury Primary School in Enfield, Leaf Lane Infants and Winsford High Street Primary School in Cheshire and St. Meriadoc's Infant School in Cornwall who have given me copies of their templates to be used as part of this research.

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