Facilitating and supporting talk with pupils about metacognition: a research and learning tool

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Abstract
The Centre for Learning and Teaching at Newcastle University has a clear belief that research and learning in classrooms are closely related. This paper will look at a method developed by researchers at the Centre which aims to gather data about pupils’ views of learning and teaching, with a particular focus on thinking about learning (metacognition). This methodology has proved to be an adaptable and effective research tool to examine different learning contexts from the pupils’ perspective, but also an aid to reflective dialogue between pupils and teachers as part of the teaching and learning process. A range of templates have been created as psychological or semiotic tools. They form the basis of a mediated interview by providing an image of the learning environment or activity on which the research is focused, and becomes the stimulus for a three-way interaction between the researcher (or the teacher), the pupils and the template. This paper provides examples from a number of research projects where the approach has been used to gather data.
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Introduction
The method described within this paper has its origins in education action research; where researchers have supported teachers in examining their own practice. Action research has a history dating back to the 1930s and the work of Lewin (Adelman 1993). Influenced by Dewey and the American Pragmatists (Ryan 1995; Shook 2000) the approach has developed with different underpinning epistemologies, from pragmatism, through positivism to post-modernism (Hammersley 2004). Throughout, the overall approach as a spiral process of progressively formulating and testing solutions to practical problems is recognisable in its various forms. In education it has become an approach to apply a scientific or evidence-based approach to classroom enquiry and has been strongly influenced in the U.K. by the work of researchers such as Stenhouse (1981) and Elliott (1991). Within this approach, learning about teaching and learning and research of classroom and learning process are closely linked and if a data collection tool used within the context of action research can be of benefit to both then there is untapped potential.

Some commentators argue action research is in danger of being a “contradiction in terms” due to the competing demands of ‘action’ and ‘research’ (Hammersley 2004) and that there is a potential tension between theory and practice. Although, if the position that Hustler et al. (1986), Whitehead (1989) and Carr and Kemmis (1986) take is correct, action research has the prospect of being empowering teachers, can be
seen as meaningful professional development and as a vehicle for changes, thus the link between research and learning is paramount. In this context, a research tool which can transcend the barrier has inherent advantages.

The method described here aims to be a tool which has meaning and value in learning and in research. In other words, it aims to be a research tool that can be empirically influential and powerful, while also impacting the pedagogical processes within classrooms.

This paper will use examples from research where the approach has been used to gather information on a variety of different learning contexts and activities, including how ICT can be used to facilitate talk about learning (Wall et al. 2004), the process of compiling digital portfolios in primary schools (Higgins et al. 2004) and pupils’ views as part of the Learning to Learn (L2L) Phase 3 evaluation¹. In all cases templates have been used to investigate the learning processes pupils perceive are associated with these different activities or contexts. Results from these projects will be used to illustrate use of the templates and the extent to which they are effective at investigating metacognition.

**Background**

In 1989, Article 12 of the UN conventions on the Rights of the Child increased the emphasis on the entitlement of pupils to have their voice heard regarding situations and contexts which impacted on them. It states that: “children and young people have a right to be involved in the decisions that affect them. This right extends from

decisions affecting them as individuals, to decisions that affect them as a collectivity.” Since this legislation there has been increased educational research investigating and consulting pupils about different aspects of school; however few have explicitly looked at learning and the associated metacognitive processes.

The rationale for consulting pupils is diversifying and the potential significance of the pupils’ perspective is being established. Relevant to this study are those studies that investigate the pupils’ perspective with younger pupils, within the primary age phase. For example,

- Pollard has asked pupils about their experiences of curriculum, assessment and pedagogy (Pollard 1996);
- Tunstall and Gipps (1996) focused on how pupils viewed different aspects of formative assessment;
- Batchford (1996) looked at attitudes to school and the work children were given;
- pupils’ perceptions of their primary teacher were investigated by Wragg and Woo (1984);
- children’s views on the more general school experience have also been examined (Thomas et al. 1998); and
- Flutter and Ruddock (2004) explored how research into the pupils’ perspective and how pupils as researchers can be used in school improvement.

Few studies have explicitly looked at the learning process. In particular, this catalogue of research has not looked at metacognition.
The term metacognition was introduced in the 1970s by the researcher John Flavell (1979) to encompass learners’ knowledge of their own cognition. Veenham and Elshout (1999: 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.

One of the studies which began to examine the issues surrounding pupils’ perceptions of the learning process is by McCallum et al. (2000). As with much of the research in the field, an interview was the main data collection tool, with physical stimuli used to scaffold the talk. This method was used with pupils as young as 7 years old to describe “learner conditions and classroom conditions that they [pupils] believed were conducive to learning” (p.279). But, even this study does not go as far as to examine pupils’ thinking about learning: the metacognitive process.

Therefore, in order to transcend a division between teaching and learning in the classroom and empirical research, this research tool must offer something new to both researchers and teachers. A tool which will inform about pupils’ development and understanding of metacognition in different learning contexts emerges as a principal consideration.
**Theoretical basis**

We will now describe the theory behind the tool and its implementation. In keeping with much of the research within the field and also to cater for pupils across as wide an age range as possible, an interview format is used as the basis for this method. Talk is seen as important for comprehension and knowledge (for example, Doddington 2001); however, within this method a carefully designed paper template is important in supporting and scaffolding this talk in the interview scenario.

The template we have designed is a ‘semiotic tool’ (Vygotsky 1978) and forms the basis of a mediated interview on the teaching activity. By providing an image of the learning situation on which the research is focusing, the process becomes a three-way interaction between the researcher (or teacher), the pupils and the template (see figure 1). The researcher/teacher has an important role within the process of the interview, they initiate the discussion around the chosen learning context and to a certain extent will steer the dialogue. The template operates as a reminder of the learning context under discussion and thus acts as a stimulus; however as part of the technique it is annotated by the child and therefore becomes a record of the discussion and a stimulus for further talk and ideas.

![Figure 1. Model of interaction using the template](image-url)
**Format**

The templates have been developed in a cartoon format to help learners to discuss and then record their thinking about learning based on a recent teaching activity. The template design has its inspiration in work completed by the Bubble Dialogue team\(^2\); for example, McMahon and O’Neill (1992) and Jones and Price (2001). In this research speech and thought bubbles are used to support discussion and role play in citizenship and values education. The research of Hanke (2001) was also influential in the design; here thought bubbles were used to gather pupil views of the different sections of the Literacy Hour. 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. This led us to design templates which can help to stimulate reflection on *the processes of thinking* in different learning contexts.

This method aims 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 (the process of learning). This is done through a superimposed structure of speech and thought bubbles. The thought bubble is intended to look at the ‘internal’ processes: the learning of the individual - ‘what is going on inside their head’ (metacognition). In contrast, 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). An overlap between the two fields is expected with regard to advantages and disadvantages and subject differences: the impacts on the

\(^2\) [http://www.dialogbox.org.uk/BubbleDialogue.htm](http://www.dialogbox.org.uk/BubbleDialogue.htm)
learning of themselves and others. A diagram of this rationale is included below in figure 2. Therefore, the template appears to have the potential to bridge the world between the concrete and the more abstract; in this sense it is a mediating tool.

![Venn diagram of thought and speech bubble rationale on pupil views template](image)

**Figure 2. Venn diagram of thought and speech bubble rationale on pupil views template**

**Procedure**

Specific pictures used within our current research projects have included situations such as circle time, using different types of ICT, working as a group or independently and using interactive whiteboards (IWB). The templates can be designed to fit with any learning context, including situations outside school (such as homework or more informal learning). Templates have been designed for particular research projects and different focuses (examples can be seen in figure 3 and further completed templates are used to support arguments later in the paper). Although the templates have proved to be very versatile, we have found it is essential that they
keep the basic elements of thought and speech bubbles as this seems to help learners focus on their thinking. The common form also helps researchers and teachers use them effectively and consistently.

The templates have usually been used with groups of 4-6 pupils, much like a focus group interview (Greig and Taylor 1999). The discussion starts around the template, but the flexibility of the image also means that the learner can add to the picture, for example, by adding in faces to the teacher and pupils or by drawing representations of their favourite lesson. This approach helps to lessen the tension between interviewer and young person being interviewed by providing them with a familiar task (completing a ‘worksheet’) that they can get on with as they talk (Greig and Taylor 1999).

Figure 3. Examples of the different response templates currently in use
Ideas from the discussion are recorded on the template. Throughout the interview pupils are reminded and encouraged to write down their thoughts and ideas in the appropriate bubble. However, we usually emphasise that they do not need worry about writing conventions (for example spelling or grammar) but should complete the template in their own way: some pupils have independently used one speech bubble for positive and one for negative impacts on learning; others added their own bubbles for extra space; and a few used drawings to illustrate their meaning. An example of a completed template can be seen in figure 4.

![Template used to collect pupil views on the use of IWBs](image)

**Figure 4.** Example of a template used to collect pupil views on the use of IWBs

**Exemplification**

1. Investigating metacognition
   
   As part of the IWB evaluation the responses written on the pupil views templates by pupils in six primary schools using interactive whiteboards were analysed using
Nud*ist (Richards and Richards 1995). The resulting themes and trends revealed a lot of information about the impact pupils perceived IWBs had on their learning: on the way that learning is initiated, facilitated and the way different learning approaches were managed (see figure 5, 6 and 7). Firstly it is important to note the wide variety of different aspects of learning process which were incorporated in pupils’ comments on the templates. There appears to be little doubt the templates had instigated a diverse and productive discussion on the use of IWBs and learning.

![Figure 5. Pupils’ perceptions of different approaches to learning accommodated by the IWB](image1)

![Figure 6. Pupils perceptions of how IWBs supported the learning process](image2)
When these graphs are looked at with regard to the structure of the template, it is possible to see that the speech bubble and the thought bubble have complementary functions and act together to encompass different aspects of learning. However the thought bubble, shown in the graphs in a darker shade, has gathered more information about understanding and thinking processes in the facilitation of learning category, more about motivation, attention and interest in the initiation of learning category and consistently more information about approaches to learning. The thought bubble and speech bubble combination does seem to elicit responses that reveal issues of metacognition.

![Graph](image)

**Figure 7. Pupils perceptions of how IWBs initiated the learning process**

In addition to the analysis above, within the Interactive Whiteboard Evaluation the templates were used as complimentary evidence on the pupils’ perspective to a more traditional interview format; therefore comparisons were possible across the two methods. The templates captured data about pupils’ motivation to learn and the social
aspects of learning which was not apparent in the more traditional interviews. In contrast, the traditional interview gathered information about gender differences and behaviour issues within the class which was not found on the templates. This comparison of methods needs to be investigated further.

Therefore, there seems to be evidence that they are successful in making available insight into pupils’ perceptions of the learning process; however with regard to our second aim of providing evidence for the teacher, to what extent do they provide evidence to aid the teaching and learning process, particularly for practising teachers.

2. The templates as a research tool
In addition to the templates being used by researchers, within the interactive whiteboard evaluation, they have been used for research purposes by teachers completing action research projects. For example one school, within the Learning to Learn Phase 3 Evaluation, wanted to investigate the use of paired learning for literacy in Year 6. Within this experimental design there was a control class and a Learning to Learn class; therefore a comparison of the pupils’ responses could be made. The teacher gave out the templates to both classes in the afternoon after they had been taught a lesson with the same learning objectives: one taught using paired learning and one without. The pupils were then asked simply to complete the templates to show what the pictured pupils, if they had been part of their morning lesson, were saying and thinking. The results (examples are shown in figure 8) show the pupils in the class where paired learning was not used were more outcome-
orientated and were more likely to include comments which were off-task, whereas the pupils in the Learning to Learn class made more process-orientated annotations.

In another Learning to Learn school, the target pupils were from the Foundation Stage and therefore the teachers increased the amount of support provided to complete the templates. A scribe was used to collect the pupils’ perspectives, while the pupils drew a picture to represent their learning. The prompts given to the pupils in order to complete the template were also formalised and became questions to be answered. An example of a template completed by a child from this sample is included below, it is possible to see that even very young pupils can talk about their learning, although the extent to which the template was an aid to the individual child, or to the teacher in designing the research method is debateable.

Figure 8. Examples of templates used in the L2L Phase 3 Evaluation (template of child from L2L class on right)
Figure 9. Pupil views template used with pupils in the Foundation Stage

A further teacher completing action research within the Learning to Learn Phase 3 Evaluation designed templates of their own to fit with the school’s research aims and learning focus (see figure 10). The structure of the thought and speech bubbles was kept constant, while the teacher adapted the image to reflect the school’s research and learning focus.
With regards to researching teaching and learning the templates have proved adaptable to a variety of contexts and age ranges. They have been successfully used by researchers to gather insightful and powerful information, investigating and evaluating a variety of education innovations and teaching and learning scenarios.

3. The templates as a pedagogical tool
As part of the Learning to Learn Phase 3 Evaluation teachers completing action research using the templates have remarked on how they helped give an insight into the pupils’ understanding of their own learning and the subject matter, combining effectively the twin aims of research and teaching and learning tool:

“In retrospect, the use of the pupil response templates could have been started earlier; as they proved to be very indicative of the development of the pupils’ metacognition.” (Teacher at Wilbury Primary School, Enfield, 2004)
“Our clearest picture of the pupils’ abilities, in working in partnership with others and expressing the skills that they have learnt, are from the Pupil View Templates.” (Teacher at Fleecefield Primary School, Enfield, 2004)

Thus, the evidence transfers from the context of research to teaching and learning and, as such, this research tool appears to have the potential to become embedded in teachers’ professional development through action research. However, as a structure for talk about metacognition, it is important to ask to what extent it is practical to use the templates and associated structure: do they provide a practical solution for encouraging talk about metacognition in classrooms?

**Practicalities**

There are a few practicalities which need to be described for those who wish to use the templates for themselves.

Firstly, the data collected from the mediated interviews has the advantage of being in a written form which removes the need for transcription, a common concern with more traditional interviewing techniques. However, this does mean that the data collected is only that which is written down by the pupils, topics covered as part of the discussion might not end up on the templates, as a reaction some researchers have chosen to tape the discussion using a recorder. More positively, we have found that the written element tends to limit the pupils’ responses making them more succinct. The form in which the data is produced - short one word answers, phrases and sentences - allows for qualitative and quantitative analysis: a considerable advantage.
Secondly, the templates were thought to be self sufficient; however, through their use in the Digital Portfolio Project it was found that pupils in schools where explicit talk about learning was not the norm found the templates harder to use and lists of outcome-related statements often resulted. In contrast, pupils used to talking about metacognition and the learning process were much more likely to make process-orientated comments. In other words, access to relevant vocabulary about learning appeared to be an important variable in using the templates. This is not to suggest that the outcomes of learning are not perceived as important, but the process by which the pupils achieve these outcomes is critical and therefore metacognition needs to be addressed. It is intentional that the templates encourage engagement with both aspects.

Through working on the IWB evaluation in schools where many children were not familiar with vocabulary about learning, it was found that by starting with the speech bubble, the more generally attributable aspects of the learning process, and then moving on to the thought bubble, a ‘scaffold’ was provided for the children in moving from the concrete to the more abstract aspects of learning. Thus even children unaccustomed to talking about their learning could be supported by the structure of the template to begin to engage with ‘what was going on inside their heads’ when they were learning.

Thirdly, to increase the support for pupils completing the templates and through the need for different researchers and teachers to administer them, guidelines and prompts were provided. Guidelines were adapted as the templates were trialled, for
example, as part of the IWB evaluation it was found to be more effective if the
discussion started with the speech bubble, the more generally attributable aspects of
learning, before moving on to the thought bubble and the individual learning
processes: thus a progression was formulated from the more concrete to the abstract.

Fourthly, we found that prompts increase reliability across interviews, which also
means in the larger projects that cross-school themes can be ascertained. An example
of a set of these prompts is given in the table below. However it should be pointed
out that these questions were meant as a guide, rather than as a definitive list to be
kept to during each interview: the intention was more of a discussion around the
stimulus than an interview.

Table 1: Examples of prompt questions used in the Interactive Whiteboard Evaluation
by the researcher with the template

<table>
<thead>
<tr>
<th>Thought Bubble (Internal)</th>
<th>Speech Bubble (External)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• What did you learn when using the IWB?</td>
<td>• Why would you tell another school/teacher/child to use the IWB?</td>
</tr>
<tr>
<td>• What new skills did you achieve when using the IWB?</td>
<td>• What do other pupils/teachers/parents learn with the IWB?</td>
</tr>
<tr>
<td>• What did you learn about how you learn?</td>
<td>• What was good about using the IWB?</td>
</tr>
<tr>
<td>• What about working with other people, did you learn anything new?</td>
<td>• What was not so good about using the IWB?</td>
</tr>
<tr>
<td>• How did the IWB change the way you think about the subject? How?</td>
<td>• What would you tell people that you felt about using the IWB?</td>
</tr>
<tr>
<td>• How will IWB change how you do things in the future?</td>
<td>• Who would you want to show this work on the IWB to? Why?</td>
</tr>
<tr>
<td>• How did the IWB help you?</td>
<td>• Has any of your own work been put on the IWB? How did this make you feel?</td>
</tr>
<tr>
<td></td>
<td>• Who do you think would benefit most from learning using the IWB?</td>
</tr>
</tbody>
</table>

Fifthly, the templates are meant to be adaptable, to the needs of a project (i.e. the
research focus), to the needs of target pupils (their age and metacognitive
competence), and to the needs of the teacher or researcher (their research questions and learning objectives). Two of the national research projects where the templates have been used encompassed the full primary age range, from Foundation Stage to Year 6, and the teachers who have been using them have had many different research and learning objectives. Although prompts and guidelines are provided, some teachers - particularly within the Learning to Learn Phase 3 Evaluation - have chosen to use the templates in alternative ways (as described above).

In response to these matters of practicality further adaptations to the templates are planned. As an extension to the Digital Portfolio Project it is anticipated that the speech and thought bubble format can be included in a learning portfolio where the child can use a piece of work, rather than a pre-prepared picture and then use the structure to reflect on what they have learnt and achieved. In combination with this development, it is hoped that by moving the templates into an electronic format pupils who find writing difficult will be able to digitally record their thoughts into the format, therefore increasing potential independence for the learner. An electronic version also has the advantage that it can be changed into web format with parents and other relevant adults being able to log on and view a child’s learning and possibly give a response which can be collected as a basis for further research.

**Final thoughts**
These templates were initially designed and used as a research tool. Nevertheless, through their use in the classroom it has become apparent that the support they provide for talk about learning is seen as invaluable by the teachers who have trialled them. The structure of the thought and speech bubble alongside the picture which
provides a reminder of the learning context under scrutiny appears to facilitate talk about the process of learning. In addition to having potential for researchers, teachers with whom the team has worked have begun to use the templates as an aid to incorporating reflection into their lessons on a more informal basis. The template has benefits away from its initial empirical role and has become embedded in the feedback loop between teachers and pupils in the classroom. Thus, for teachers involved in the process of action research, systematic enquiry into their own practice (Stenhouse 1981), and such a tool has the potential to be powerful in bridging the gap between ‘action’ and ‘research’ (Hammersley 2004).

With regard to potential weaknesses, doubt has been expressed by some researchers as to whether relying on pupils writing down their ideas is adequately capturing the comprehensive picture. It has been suggested it may be appropriate for the discussion surrounding the templates to be recorded. In addition to the probable need for transcription which would result, it has to be considered whether what appears on the template is more or less pertinent to the pupils than what is commented on as part of the discussion. This therefore leads us to the fundamental issue, that further investigation of these templates is necessary, in particular, comparing data from more traditional interviews and the templates and regarding their reliability and validity.

We believe these templates begin to fulfil two important functions which are complimentary and are consistent with the Centre for Learning and Teaching’s philosophy about research. The template is both an empirical research tool for exploring pupils’ beliefs about metacognition and a pedagogical tool for facilitating
dialogue about learning in the classroom. Regardless of the research element, 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 used as research evidence the richness of the data and its validity is likely to be increased. In consequence, the evidence from these sources passed on through the University team to policy makers as a result of national research projects can be seen as more convincing and noteworthy.

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Bibliography


