

## **Talking for Success:**

### **Widening Access to Educational Opportunities through Teaching Children how to Reason Together. (RG01-1222)**

**Final report to the Esmée Fairbairn Foundation, March 2004.**

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#### **Summary**

The project reported here has demonstrated that an innovative approach to teaching and learning (the Thinking Together approach) enabled children in primary schools to work together more inclusively and more effectively, improving their social skills and, at the same time, their use of language for reasoning and learning. It has also shown that the Thinking Together approach is not an ‘add on’ to the curriculum or something that is limited to a particular subject area such as ‘speaking and listening’, but can be applied to advantage across the whole curriculum. Activities generated by the project have been incorporated into a book of practical classroom materials for teachers at KS1 which will be published later this year (Dawes and Sams, in press) and other lesson plans will be made available to teachers on an OU website in May 2004. We have disseminated the findings to teachers through professional development workshops in many LEAs, and the value of the Thinking Together approach at KS1 has now been recognized by the QCA and DfES in the new Primary Strategy.

#### **1. Introduction**

Following the reporting guidelines provided by the Foundation, we begin by reviewing the rationale of the project and the aims expressed in the original proposal. We then describe briefly what actually happened during the project and how well these aims were fulfilled.

#### **Rationale for the project**

The project addressed the issue of the underperformance of some social groups in education through a focus on the quality of classroom talk. We began with the assumption, based on prior research and experience, that the ability to communicate and to reason with others is

important for success in education (and, in the longer term, for making a constructive contribution to society). Conversely, inadequate communicative competence will reduce children's opportunities for participation and so can lead to marginalisation and lower levels of achievement. Our earlier research had indicated that essential communication and reasoning skills were not taught effectively in many primary schools. Some children may acquire such skills in their home environments, but others do not have this opportunity. This seemed to be particularly true of those children from some social and ethnic minority backgrounds. The project aimed to improve access to education for these children by teaching them the basic talk skills that they require for success in school and for many aspects of their lives.

### **Project aims**

The main aims of the project given in the original proposal were as follows:

- 1) to develop a programme of lessons for teaching language and thinking skills across the curriculum in primary schools at Key Stage 1;
- 2) to use qualitative observation, video and interview data to evaluate intensively the implementation of this programme in order to assess which factors and teaching strategies are most effective in promoting speaking and listening skills and understanding;
- 3) to develop and test materials for a teacher training pack for national use;
- 4) to use an experimental control study to assess rigorously the impact of our teaching programme on reasoning and achievement, with a special focus on children from those social groups currently performing least well within education;
- 5) to disseminate the products and the findings of the project in a form that will have an impact on education policy and practice.

Before returning to these aims we will give a brief account of the staffing and the implementation of the project.

### **Staffing**

The central Open University research team were:

Dr Rupert Wegerif, Principal Investigator and Co-director

Professor Neil Mercer, Supporting Co-director

Denise Rowe, main Project Officer

Dr Karen Littleton, academic advisor

In addition we were supported by:

Dr Lyn Dawes, (De Montfort University) language teaching materials consultant

Don Rowe, (Citizenship Foundation and DfES) citizenship teaching materials consultant

Claire Sams, (Open University) general teaching materials advisor

Julia Underwood (Heronshaw First School) who commented on drafts of the lessons

Dr Jenny Houssart (Open University), maths materials advisor

Joan Swann (Open University), advisor on analysis of video data

The original bid named Claire Sams as the main Project Officer, but as she was unable to take up this post, with the agreement of Esmee Fairbairn, she was replaced by Denise Rowe who as a local primary teacher had similar background and experience. Claire Sams continued to work with us and helped with the development of lessons and continuing professional development materials.

Another change reported in the end of first year report was that Dr Karen Littleton became part of the project team. In addition to Don Rowe and Dr Lyn Dawes, the external consultants named on the proposal, we were greatly helped by Dr Jenny Houssart, an expert on teaching mathematics and inclusion issues and Joan Swann, an expert on the analysis of spoken language.

Two internal consultants named on the proposal, Fred Sutton (Statistics) and Manoj Mistry (Web-site) left The Open University. Dr Martin Le Voi of the Faculty of Social Sciences has therefore helped with the statistical analysis. Whilst the departure of Manoj Mistry led to a delay in the presentation of the project outcomes on the OU website, this should be achieved by the end of April 2004. External consultant Nigel Stephens has prepared the ground for this by editing selected episodes of video.

## **2. A brief account of the project**

### **Phase 1: Preparation. 1<sup>st</sup> February 2002 to 1<sup>st</sup> September 2002**

During this period we selected three ‘target’ schools (those who implemented the programme of lessons) and three matched ‘control’ schools (in which teachers and children pursued their

normal activities). Six teachers in the target schools and five in the control schools were involved. As described in the project proposal, the schools we selected had not reported high levels of academic achievement, and had a high proportion of children from social groups which are commonly described as underachieving. Thus one target school and one control school had a very high proportion of children from low-income families who had fairly recently arrived from the Indian sub-continent and for whom English was an additional language (EAL). In these schools, EAL support was provided for several children in each class by the LEA. In total, there were six teachers in the target schools and five in the control schools. As the project began, we organised training for the teachers involved, prepared teaching materials and prepared for initial teacher training sessions. We also briefed head teachers on the nature and purposes of the project.

In consultation with teachers, an initial set of five Thinking Together lessons were generated which focused on developing children's awareness and skills in using spoken language. A further set of nine lessons were then created which applied the approach to curriculum subjects such as history, geography and RE.

### **Phase 2: Implementation: 1st September 2002 to Mid July 2003**

We began this phase with an introductory twilight session to inform teachers about the background and aims of the project. All head teachers, advisory teachers, participating teachers and learning support staff in the target schools were invited. This was followed by a full day of professional development for all Year 2 teachers in target schools. A second full day of professional development had been planned but this was replaced with two twilight sessions at the request of head teachers who were concerned about lack of supply cover for staff. All learning support staff in the target schools also participated in a half-day of in-school professional development. Staff in control schools were informed of our interests in general terms, and asked if data about children's talk and learning could be gathered at appropriate times. Otherwise, no input was made to these schools.

We wanted to explore changes in the way that groups talk and reason together and the impact of collective reasoning on individual development. A short group test (for children working together in groups of three) was constructed from fifteen questions carefully selected from the Raven's Standard Progressive Matrices. In addition all children completed the Raven's Coloured Progressive Matrices Test individually. This test measures non-verbal reasoning and are standardised; performance on it correlates well with academic attainment. We have used

those tests extensively in our earlier, related research and they have proved effective for assessing the quality of group-based reasoning and the effects of Thinking Together activities on the development of individual children's reasoning abilities at Key Stage 2. All children were given both tests at the beginning of the year. Groups of three children were video-recorded talking together about the group test, which was given three days before the individual test. This sequence was repeated six months later (after the completion of the programme of lessons in the target schools). Recordings made during the group test provided us with rich qualitative data on changes in important aspects of children's talk over time.

The development of lessons for the programme continued during this phase. The team prepared twenty-five activities to fit in with QCA schemes of work in the main areas of the curriculum such as science, maths, English, ICT, citizenship, RE, geography and history. Lessons were devised to link in with the teachers' own schemes of work.

For the implementation of the programme, the teachers arranged their classes into mixed gender, mixed ability and mixed ethnicity groups of three (this type of grouping having proved effective in previous research projects). We then asked each teacher to select a 'focal group' that was as representative as possible of the ability range and ethnic mix of the class. In the project the focal groups were video-recorded more frequently than other groups to help us explore changes in their language use and behaviour over time. Towards the end of the project we asked teachers to reorganise the groups for one session. In this way we were able to assess if the children who had experienced the Thinking Together lessons were able to work well with children that they had not worked with before.

Researchers visited all the target schools regularly to observe and gather data, to support the project teachers and to collect feedback on activities. This informal support was strengthened by twilight sessions twice a term for the first two terms. In the third term, the pressure of SATs on teacher time made such meetings impossible to organise. All the teachers, heads, support assistants (where possible) and a group of children from each class were interviewed in the last month of the project. They were asked to discuss their involvement with the project and their impressions of its effectiveness or impact.

### **Phase 3: Analysis and dissemination: 16<sup>th</sup> July 2003 to 31st January 2004.**

The analysis of the data during this phase began to inform presentations and publications to academic and professional audiences. The outcomes of the analysis are reported in the next section.

#### **3. Results**

In the course of the project we gathered a range of different kinds of information in the target schools, as follows:

- (i) pre- and post-intervention video recordings of a ‘focal group’ in each target and control class carrying out a reasoning test activity;
- (ii) video recordings of other groups of children in target schools engaged in joint activities during Thinking Together lessons;
- (iii) video recordings of teacher-led whole class sessions during Thinking Together lessons;
- (iv) observations and ethnographic notes from visits to the schools during the programme;
- (v) audio-recordings of interviews with teachers and children;
- (vi) children’s scores on the Raven’s Coloured Progressive Matrices test of non-verbal reasoning;
- (vii) children’s scores on base-line tests at school entry and on the SATs test at the end of year 2. [This proved impossible to use due to the different nature of the baseline data in different schools]

The same information was also gathered in the three matching control schools, apart from items (ii), (iii) and (iv) in the list above. Talk from interviews, group activities and some whole class sessions were transcribed. This range of different types of data provided complementary perspectives on the relevant processes and outcomes.

#### **Interviews with teachers and heads**

Semi-structured interviews with the classroom teachers and head teachers in the target schools were very useful in revealing problems and issues with the implementation of the programme, some of which we discussed above. At the same time they revealed an overwhelmingly positive evaluation of the impact of the project, even in the one school in which the

implementation had, due to staffing problems, been rather unsatisfactory. All the heads and teachers expressed a desire to continue with the Thinking Together approach in their schools and classes. We have continued to support them to make this possible. The interviews revealed a heightened awareness of the nature and functions of talk amongst participating teachers, and of the importance of improving children's communication skills as a means for ensuring their successful participation in education. We found the positive responses of the head teachers particularly valuable because, although they had agreed to the project being carried out in their school, they were more detached from its implementation than the classroom teachers. One head teacher commented:

*Now, I've done that lesson (on Florence Nightingale) with Y2 last year and it was very difficult getting questions from them; questions that you'd get information from. I did it with (a class in Y2) this year and it's incredible, the questioning – and I think it's really developed that skill of questioning. Because that's quite a difficult and mature skill to have, quite complex. In fact it was really interesting, because once we had watched the video and the children had asked the questions, when we came to learn about Florence Nightingale, because they had asked the right questions they were able to get so much more information.*

This was echoed by another head teacher, who commented:

*I was quite impressed with the way that they are working together ... they are listening to each other, taking turns and asking. They are working things out together where before they I have not noticed that. In those particular sessions ( i.e. lessons observed) I have noticed that they have all been engaged in what they are doing.*

She contrasted this with the previous state of affairs

*Based on previous knowledge of these classes at this school I wouldn't have expected children to have the skills to enrol other members of the group who weren't engaged initially bringing in other children into what's happening not just ignoring them..... I wouldn't have expected to see so many children listening to each other involving each other actually even noticing that somebody else hasn't given any input and I think that I certainly haven't witnessed that any where else before.*

This same head teacher reported that changes had also been reported by outside professionals who were experienced school visitors:

*When we had our assessment, (part of the Healthy Schools initiative) the assessor actually commented on their ability as groups of Year 2 children to sit and listen to the conversation round the table as a group that they hadn't noticed in other schools. They were quite impressed with that.*

Issues of social inclusion also figured prominently for the teachers and head teachers. One head teacher from a target school with a high proportion of children with English as an additional language (EAL) made this observation of a group of children:

*They didn't assume that what one child said was the answer. They were very keen to know what each individual child knew, and that was really good. In another group, within the same lesson, there was a child who has a statement, and again, the inclusion there was excellent. So I think it seems to work across, for all children, I suppose – special needs children, EAL children, the more able children,.....There's one little girl who's both EAL and special needs and to see her animated in a lesson is just wonderful.*

A case study of activities of this group is included below.

**A case study: Nuresha, Vijay and Kyle** *(all names have been changed)*

Nuresha was a child from a Bengali-speaking family in one of the target schools. Vijay had a similar background, though he was more fluent in English. Kyle was a native English speaker of local origin. When we made our initial video-recordings of the group working together on reasoning test problems, it was noticeable that Nuresha did not speak at all. On the recording she can be seen sitting well back from the table, while the other group members, Vijay and Kyle, work on the task. Sometimes she looks round the room, sometimes she plays with her ruler but she is completely disengaged from the group. The teacher introduces the group task and asks questions to check for understanding. She asks Nuresha several questions, such as:

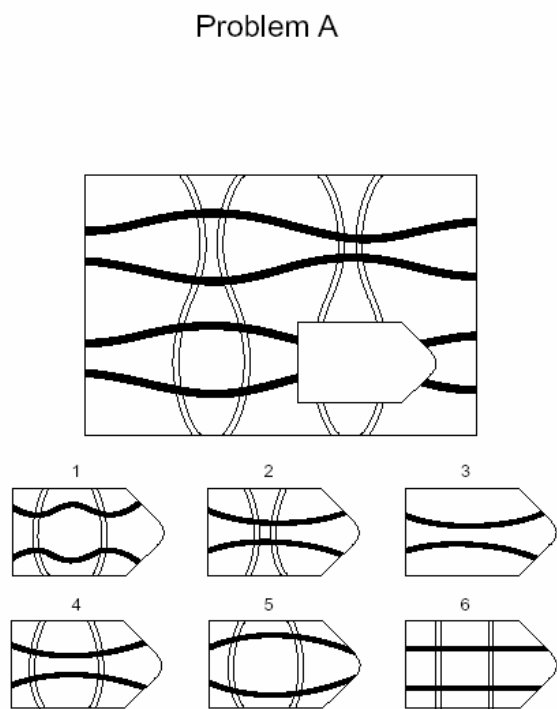
*Do you agree, Nuresha? What do you think? Can you see why it's not number 3?*

In response Nuresha nods. When the teacher leaves the group Vijay takes over the pencil and answer sheet. Kyle says it is his 'go' and a little later asks Nuresha if she wants a go. Nuresha shakes her head. Neither of the other children speak directly to her again during the rest of the



sequence. The subsequent exchange between Kyle and Vijay involves disagreement over who should answer each question. There is no explanation of opinions or collaboration to work out the patterns in the puzzles. This is a kind of interaction that we have found quite frequently in pairs and groups in classrooms which can be described as ‘disputational’ talk. **Extract 1: It’s four not five** is a sample of the children’s talk before the implementation of the programme. The group are working on the Ravens’ Test puzzles.

**Figure 1: An example of a Raven’s Reasoning Test Puzzle**



**Extract 1: It’s four not five**

Kyle : It’s four not five (*referring to the number of the puzzle*)

Vijay: We’re on number five now, bogey. Look, we done number four, dumb brain. It’s this one, isn’t it?.

Kyle : No.

Vijay: It’s this one isn’t it?

Kyle : No,

Vijay: Yes

Kyle : No

Vijay: It’s number 1.

Kyle : No, It's my turn to cross it off (*Attempts to take the pencil from Vijay who keeps it and marks number 1 on the answer sheet*)

(*Kyle raises a fist to Vijay and Vijay runs away from the table saying 'don't hit me'.*)

In this extract, the boys disagree without attempting to explain, provide reasons for opinions or seek each others' views. The competition between them is quite playful but is not productive from an educational point of view. Their main aim seems to be to assert or defend their individual ideas and there is no attempt to pursue the task collaboratively.

Soon after this extract was recorded, the implementation of the Thinking Together lessons began. The approach encourages children to listen with respect and ask one another relevant questions. The class creates and agrees to use a set of shared ground rules for talk when working in groups. The next recording we made of Nuresha was about half-way through the project in a whole class setting. In this session Nuresha is better engaged with the task and appears much more comfortable in the group. She speaks appropriately and confidently in response to a question from the teacher and takes part in class activities such as miming happiness to a partner.

In June 2004 we video-recorded Nuresha, Vijay and Kyle undertaking exactly the same problem-solving activity they had been engaged in the initial recording. This time the way that they worked together was quite different. The video shows all members of the group leaning forward to the table and frequently looking at each other as they pursue the task. Nuresha is involved throughout. They decide as a group that each should take turns at handling the task materials and ticking the answer sheet. The children remind one another of some the ground rules for talking that have been agreed in their class. **Extract 2: Which one...** is a sample of the group talk. The children are working on the same Raven's Test puzzle as in Extract 1.

### **Extract 2: Which one...**

Kyle : Which one ... (*to Nuresha*) You have to ask us which one we think. OK. You have to say "Kyle and Vijay, whose name, which one?"

Vijay: You have to say 'I don't want to do this' or 'Kyle, what do you think?' ....say...  
(*And a little later*)

Vijay: Next. Nuresha's getting the best ones, isn't she? You have to say 'what do you think, Vijay or Kyle' ?

Nuresha: I think that (*number 2*)

Kyle : I think that (*number 4*)

Vijay: Nuresha, look.

Nuresha: I think, that, that, that.

Kyle : No, because, look, because that goes round. It goes out. It goes out.

Vijay: Or that one.

Kyle : No, because it hasn't got squiggly lines.

Vijay: It has to be that.

Vijay: OK num' 4.

Nuresha: Num' 4

In this extract Nuresha is much more involved in the group's shared reasoning. She is encouraged by the other two children, who are listening to one another and accepting alternative view points better. Nuresha suggests an alternative which challenges Kyle and Vijay, prompting Kyle to provide reasons why her suggestion may not be the correct answer to the puzzle. When the group converge on an answer, Nuresha affirms her participation by repeating the answer aloud, echoing Vijay.

Nuresha speaks in total 26 times in this second recording. This is less than the others (Kyle 72 and Vijay 76) but is obviously significantly more than the pre-intervention session. She is involved in all the decisions that are made. She is asked one question in the pre-intervention test, but twenty-one in the corresponding post-intervention session. "What do you think?" is the commonest form of question, several times taking the form 'What do you think, Nuresha?'. All three children display a readiness to work together and an understanding of the importance of each individual contribution to the group's answer.

We have additional evidence that this group were thinking together more effectively in the post-test than in the pre-test. The Raven's Test puzzles (see Figure 1) have right or wrong answers. The group complete 15 puzzles and scored 11 in the pre-test. Most of these answers were decided and recorded by Vijay who controlled the pencil. In the post-test we see alternatives being suggested and reasons being given for rejecting or accepting an answer. In the post-test the group scored 13 out of 15. The final two questions were rather more difficult and few groups worked out the correct solution.

### **Key Words in Context Analysis**

To provide a more general assessment of the effects of the intervention programme across all the classes, we used a computer-based method for analysing changes in language use (Wegerif and Mercer, 1997) called Key Word in Context (KWIC). Using a concordancer (software for analysis of language) it is possible to identify and measure rate of occurrence of items such as

questions, pronouns, names and other key words. We looked at key words such as ‘because’, ‘why’, ‘I think’ which can indicate reasoning across all the transcripts. The changes in language use and in the way that children interact, illustrated by the case study of Nuresha’s group, were confirmed by this type of analysis. The results are summarised in **Table 1**.

**Table 1: Key Word in Context (KWIC) analysis for six target groups.**

<b>Key Words</b>	<b>September 2002</b>	<b>June 2003</b>
Because and cos ( <i>used in explicit reasoning</i> )	9	36
I think ( <i>used to introduce hypothesis</i> )	23	31
If ( <i>used to reason about problems</i> )	2	13
Why ( <i>task related questions</i> )	3	12
Which ( <i>task related questions</i> )	9	21
What ( <i>task related questions</i> )	15	21
You ( <i>used in questions</i> )	31	144

**Comment**

It can be seen that the use of logical connectors (‘because/cos’) and the use of ‘What’ and ‘Why’ task-related questions increased over the period of the intervention in the target classes.

The same analysis for the talks of the three groups recorded in the control classes in the post-intervention period showed no similar pattern of change. For access reasons, only three groups in control classes could be recorded pre/post intervention. The results are summarised in

**Table 2.**

**Table 2: Key Word in Context (KWIC) analysis for three control groups**

	<b>September 2002</b>	<b>June 2003</b>
Because and cos ( <i>used in explicit reasoning</i> )	15	21
I think ( <i>used to introduce hypothesis</i> )	35	17
If ( <i>used to reason about problems</i> )	0	7
Why ( <i>task related questions</i> )	0	1
Which ( <i>task related questions</i> )	12	2
What ( <i>task related questions</i> )	8	7
You ( <i>used in questions</i> )	5	11

## **Comment**

In the control groups video-recorded there is no overall change in the use of those key terms found to be important indicators of language both being used to reason together and to encourage the inclusion of other's perspectives.

## **Use of test scores and statistics**

We used the Raven's reasoning tests to examine the impact of the project intervention on all children in the target classes, not only those in the selected groups that we were able to video-record working together. In previous studies we have shown that the Thinking Together approach can lead to increased group performance on reasoning activities, and can also show better subsequent test scores for individuals (Wegerif, Mercer and Dawes, 1999; Mercer, Dawes, Wegerif and Sams, 2004). The non-standard construction of the test we developed as a focus for the talk of the groups meant that it was not suitable for statistical analysis. However the individual test enabled us to measure change in reasoning ability in all the children in the study. Gains on reasoning tests sometimes indicate that children have successfully engaged in Thinking Together activities and have internalised some of the strategies that they have used in their group discussions.

The statistical data in Appendix B shows that we cannot make a strong claim that the project improved reasoning ability. This disappointing finding can be attributed to several important contextual factors such as:

- there were problems with the implementation of the programme in one target school;
- in one of the control schools a teacher was found to be using an approach which included several of the key features of Thinking Together.

These issues are discussed in Section 4 below. However, we are able to show that in the two target schools where evidence indicates that the intervention had been wholeheartedly pursued by the teachers, the children's pre/post-intervention scores increased significantly more than the national average for increases in Raven's test scores over eight months for this age group. To this extent, then, we have evidence of the positive impact of the programme on the development of children's oral competence, and through this their ability to think and reason more effectively.

#### **4. Problems and issues that emerged in the course of the project**

Several factors adversely influenced the success of the teaching programme in schools, as explained below.

##### **Teacher commitment to the programme**

Within the first few months of the implementation phase we found that one target school was experiencing difficulties with implementing the programme and was soon on the verge of abandoning it. The teacher had several new children in her class who arrived with very little competence in English, and another new child whose disturbed behaviour was very disruptive. The language support assistant left on long-term sick leave. As a consequence his teacher felt that managing group work became very difficult. Interviews with teachers in this school also revealed that some of the pedagogic traditions of the school conflicted with the principles of the Thinking Together approach. Research staff continued to work with the teacher, and very recent observations suggest that she is now successfully implementing the approach and using it with confidence. However, this development was too late to impact on the project's data and hence its results.

##### **SATS tests**

While we were aware from the start that there were SATs tests in May of Year 2 we had not realised how much impact this would have on teaching throughout the year. In all the schools, the Spring term was dominated by preparation for the SATs tests. This did not matter greatly in the two schools where teachers had confidence in organising group activity - and indeed they used the Thinking Together approach as the basis for preparing SATs revision activities for their classes. However, in the school where the implementation was already faltering, the external pressure of SATs had a highly negative impact.

##### **Unexpected events in a 'control class'**

As mentioned above, we used individual and group reasoning tests to assess the impact of the Thinking Together programme, matching our target classes with control classes from similar catchment areas and with similar characteristics. Our hypothesis was that the target classes would improve their scores on these reasoning tests more than the control classes, demonstrating a link between the intervention and scores on the Raven's tests (which correlate well with academic achievement). We were therefore surprised when one control class out-

performed all other classes in the post-intervention testing. We interviewed the teacher of this class and found she had become an enthusiast for promoting talk in groups and the development of thinking skills. Supported by a full-time classroom assistant, her teaching style involved much use of group work and whole-class activities including frequent circle time, mixed ability talking partners in maths and literacy lessons and board games which promoted turn-taking, reasoning and social skills. She had some experience of the CORT (Edward de Bono) thinking skills approach and always emphasised the importance of giving reasons. She also set up activities requiring independent problem solving. The overall impression we formed was that this teacher was exceptionally innovative and effective, and she was already using many of the methods and techniques we were promoting through our intervention. For these reasons, her class did not provide appropriate control data - but paradoxically provided some additional evidence for the value of the kind of talk-focused approach we are promoting.

## **5. Dissemination and impact**

The outcomes of the project can be summarised as follows:

- a) evidence of the value of the Thinking Together approach for promoting effective group work, for developing communication and thinking skills, and for enabling the inclusion of potentially marginalised children in mainstream classrooms;
- b) advice and guidance to teachers on strategies which they can use to help children develop an improved use of spoken language as tool for reasoning and learning;
- c) a set of Thinking Together at Key Stage 1 lessons which will, in conjunction with the guidance mentioned in (b), enable other teachers to implement the approach in their classrooms.

The following list records our initial dissemination of the project findings and materials.

- Findings will be reported in journals for researchers, teachers and policy makers
- Findings will be discussed during conferences and professional development workshops such as Thinking Together conferences provided by the project team for teachers in a range of LEAs.
- A book for teachers and teacher educators, (Wegerif, R. and Dawes, L, 2004, *Thinking and Learning with ICT: Raising achievement in primary classrooms*. London: Routledge) draws on the project work and findings.

- An article was prepared and published in *Teaching Thinking*, a professional journal reaching perhaps 2,500 staff rooms.
- An article was prepared and has been provisionally accepted for publication in *Early Years: An International Journal of Research and Development*. (A copy of this is enclosed with the report).
- Further articles are in the process of being prepared for appropriate publications including *The International Journal of Bi-lingual Education*, *The Curriculum Journal* and the *British Educational Research Journal*.
- The book *Talk Box: activities for Speaking, Listening and Literacy at KSI* (Dawes and Sams, in press) will be published by David Fulton Publishers later this year.
- Thirty-five lessons designed to enable teachers to apply the Thinking Together approach to different areas of the curriculum will be available on the project web-site which will be advertised in *Talk Box*.
- Professional development sessions on Thinking Together at Key Stage 1 have been given to large audiences of teachers and head teachers in London, Birmingham, Milton Keynes, Cornwall, Wiltshire, Gloucestershire and several other boroughs.
- On-line materials have been prepared, based on the project, for the OU-BBC Teach-and-Learn project which is chaired by Tim Brighouse. This will offer short web –based professional development courses for teachers. It was launched in January 2004 and our courses will be online in April 2004 (see <http://www.teachandlearn.net/about.htm> for more details)

## **Conclusion**

As an interventional research project based in school settings, this project has encountered some implementation difficulties described above. Nevertheless, we are pleased to report that a great deal has been accomplished in terms of achievement for individual children and teachers, and the project's goals have generally been realised. The overall evidence is clear that the quality of interactions in classrooms can be improved by a method of teaching and learning that focuses on enabling children to participate effectively in dialogues with their teachers and with each other. In earlier projects we have shown that this approach can improve learning outcomes and individual reasoning ability. This project has provided some similar evidence. However, its most original contribution is to show how the Thinking Together



approach can significantly improve the inclusion of potentially marginalised children into the mainstream of classroom activity, and so enable education for all. This project has shown that even these very young (Year 2) children benefit from the direct teaching of specific talk skills. The awareness of the importance of speaking and listening has been shown to give individuals a 'voice' in their classroom community, enabling all children to understand better what is going on in one another's minds. It allowed those who might otherwise have been ignored or even rejected to be invited into learning conversations. It encouraged children to hear and consider a range of points of view, comparing them with their own and recognising that differences can be resolved without conflict. In these ways this project has provided the researchers and teachers involved with invaluable data and with insights which can inform our writing and discussion with others working to help each child reach their potential through education. There is no doubt in our minds of the direct benefit gained by the project's target children such as Nuresha, Kyle and Vijay.

We expect the impact of the project, through multiple forms of dissemination, to be substantial and so justify the support given to us by the Esmee Fairbairn Foundation.

Findings from the project will be made publicly available of the following website:

[www.ThinkingTogether.org.uk](http://www.ThinkingTogether.org.uk)

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**Appendix: Statistical analysis.**

Pre/post comparisons of individual children in the target and control classes doing Raven’s Coloured Progressive Matrices (CPM) non-verbal reasoning test were made using an analysis of covariance with pre-test results as covariate, post-test results as dependent variable and condition as fixed. The mean scores are shown in Table A1 below. The results of this analysis showed no significant difference between target and control conditions.

**Table A1: individual performances of children in Target and Control classes on the Raven’s Coloured Progressive Matrices test**

	Pre-intervention: mean scores	Post-intervention: mean scores
Target classes	20.83	25.58
SD	7.447	7.356
Control classes	20.35	25.41
SD	6.012	6.456

$F(1,164)=0.808$ ; two-tailed  $p = 0.370$

We also compared the improvements in Raven’s CPM scores in the two schools where we believed the approach to have been well implemented with the norms for Great Britain (Raven, J. C., Court, J., H. and Raven, J. 1995 Raven Manual: Section 2: Coloured Progressive Matrices. Oxford: Oxford Psychologists Press).

The mean increase in scores in these target schools over eight months was 5.06 points (out of 36) whereas the predicted increase in scores over 12 months for children aged 6 to 7 derived from national norms is 2 points. A One-Sample T-Test showed this difference to be significant (see Table A2)

Table A2: Mean increase in scores of two target schools compared to national norms.

N	Mean	Std. Deviation	t	df	Sig. (2-tailed)	Mean Difference
54	5.06	5.156	4.355	53	.000	3.056