

# **It's CAME; We saw; Did it Conquer? – A review of the Cognitive Acceleration in Mathematics Education Pilot Study in Northern Ireland**

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## **Abstract**

This paper presents the findings of a pilot evaluation funded by the Belfast Education and Library Board of the Cognitive Acceleration in Mathematics Education Programme in a number of post-primary schools in Northern Ireland. It looks at the impact of the programme on teachers' classroom practice and teaching methods and its use as a professional development tool. It also examines the impact on the pupils in terms of performance and attitude to mathematics.

## **Background**

The Cognitive Acceleration in Mathematics Education Project (CAME) project is funded at King's College, University of London by the Esmee Fairburn Charitable trust and the Economic and Social Research Council. *Thinking Maths* (Adhami, Johnson, & Shayer, 1998) gives a full account of the project.

The aim of the CAME project is to enhance the cognitive development of students through approaching their mathematics learning in a reflective way. It builds on the work of earlier projects in science, for example the Cognitive Acceleration through Science Project, and the successful outcomes of such programmes (Adey and Shayer, 1994) provided the motivation for developing CAME. It is theoretically grounded in the dimension of social constructivism and draws on the work of Piaget and Vygotsky, seeking to integrate the cognitive and social agenda in the classroom. In order to develop a culture of thinking and reasoning it suggests that attention needs to be paid to both the subject being taught and to how the learning is managed. It aims to contribute particularly to the teaching of mathematics in early adolescence where it is suggested that there is a 'window of opportunity' for rapid intellectual development, given appropriate specialist teaching and suitable cognitive stimulation. It suggests that this approach can significantly raise the thinking capacity of the students and gives weight to cognitive development as well as topic specific learning.

The CAME project has developed a technique of teaching mathematics designed to promote general thinking and recommends a two year programme with CAME lessons being taught approximately every two weeks. The project has produced

comprehensive guidance notes for each lesson, each of which has the following four-part structure:

Phase 1	Phase 2	Phase 3	Phase 4
<ul style="list-style-type: none"> <li>• Concrete preparation</li> </ul>	<ul style="list-style-type: none"> <li>• Cognitive challenge</li> <li>• Social Challenge</li> </ul>	<ul style="list-style-type: none"> <li>• Whole class construction</li> <li>• Metacognition</li> </ul>	<ul style="list-style-type: none"> <li>• Bridging</li> </ul>

The lessons are characterised by group interactions and the emphasis is on individual or group formulations of solutions to problems rather than just on the end result. The outcome of the lesson is the thinking process and the sharing of ideas rather than the specific knowledge or skills themselves.

### **Current Climate**

*It seems that in order to learn, young people need opportunities to explore real problems and to think through their responses, making meaningful connections and, ideally, making their own meaning, rather than being “taught” solutions or having meaning created for them. The challenge is therefore to make learning developmentally appropriate to the age and maturity of the learner; socially relevant; emotionally engaging; motivational, in the sense of being explicitly relevant to real-life contexts; cognitively challenging; and connected.*

*(Pathways, Proposals for Curriculum and Assessment at Key Stage 3, CEA 2003 Page 2 of Rationale)*

This extract from the proposal for the new curriculum in Northern Ireland summarises a move within the education community as a whole towards a more constructivist view of education. Whilst stimulating pupils with challenging problems and encouraging them to think has been a cornerstone of mathematics teaching for many years (Polya, 1945) there is still often a tension between the demands of preparing pupils for examinations or “covering the curriculum” and allowing pupils opportunities to make their own learning connections. The

Activating Children's Thinking Skills Report (McGuinness et al, 1996 page 62) states that mathematics teachers experience a problem with:

*a recognition of the conflict between 'rote' learning deemed to be necessary for the 'basics' and getting through the curriculum and examination work, and on the other hand, investigative learning to encourage thinking and problem solving.*

Schoenfeld (1994) argues that learning to think mathematically means both developing competence with the tools of the trade and developing a mathematical point of view or as he puts the latter "*valuing the process of mathematisation*". It is seen as crucial in mathematics education to find a bridge between these two competing demands in the classroom and teachers are being encouraged to champion the cause of thinking skills in the mathematics classroom (Ball, 2002; Pratt, 2002).

### **Education System in Northern Ireland**

While the research supporting this paper may have broader implications, it was carried out in Northern Ireland and a short overview of the education system is provided here to illustrate the context. Northern Ireland has a population of approximately one and a half million with two hundred and thirty five post-primary schools and a post-primary pupil population of approximately one hundred and fifty six thousand students (DE, 2004).

Responsibility for education lies with the Department of Education (NI) with five Education and Library Boards (ELBs) playing a broadly similar role to LEAs in England in that they offer support and curriculum advice to teachers. Northern Ireland mostly retains a selective post-primary system with children sitting a transfer test at the end of primary school with approximately forty per cent attending selective Grammar schools.

### **Implementation of CAME in Northern Ireland**

The Belfast Education and Library Board (BELB) wanted to introduce a programme that encouraged the move from a didactic to a constructivist approach in the mathematics classroom, and to encourage the development of thinking skills through the delivery of the mathematics curriculum. It aimed to find a research-based programme that would facilitate this. In addition, the board wanted a programme that

was practical, suitable for a wide range of abilities, and which could be easily implemented by practising teachers but did not compromise mathematical rigour. It was also hoped to find a programme that included a professional development aspect for teachers. With these aims in mind the decision was taken to introduce the CAME project, which was already operating in a number of schools in England, into a number of pilot schools in the Belfast area.

The programme was launched in June 2002 with a conference in Belfast that was attended by heads of mathematics departments in post-primary schools, officers from the BELB, representatives from three other Education and Library Boards and members of the Education and Training Inspectorate Mathematics Team. The conference was presented by Alan Edmiston, an accredited CAME tutor, and Mundher Adhami, one of the founders of the CAME programme in King's College, London, and co-author of the accompanying teachers' materials.

Four post-primary schools were invited by BELB to take part in the first year of the professional development programme. Each participating school was asked to nominate two contact teachers who each undertook to deliver a series of CAME lessons with a Year 8 class. Each teacher was given a copy of *Thinking Maths*, the teachers' guide to the CAME programme. It contains an overview of the methodology and twenty CAME lessons with lesson notes and resources. The teachers were also expected to take part in training sessions. These training sessions took place three times during the academic year and were conducted by a CAME tutor. The teachers were released from teaching for two days and given the opportunity to discuss the CAME lessons that they had been delivering in school. The CAME tutor taught demonstration lessons in each of the participating schools and these were observed and evaluated by the group of eight teachers. The tutor also made use of video clips to highlight key elements of the CAME approach. Later in the year, each of the teachers delivered a lesson during the training days, which was peer reviewed by the other teachers and by the CAME representative. Between the training sessions, teachers were expected to continue delivering a number of CAME lessons in their own schools.

At the end of the first academic year, a further four schools were invited to take part while the existing teachers carried on to the second and final year of the programme. This research involved the first cohort of teachers and the Year 9 pupils who had experienced two years of the CAME lessons.

### **Focus of the Study**

This survey focussed on post-primary schools and collected data from two schools implementing the CAME project and two control schools outside the project. The research aimed to examine a number of key issues:

The impact of the CAME project on pupils':

- group working skills (to include discussion and teacher/pupil, pupil/pupil interactions);
- ability to approach unfamiliar problems (to include both attitude and technique);
- motivation and confidence in mathematics;
- awareness of applicability of skills outside mathematics.

The impact of the CAME project on teachers':

- teaching methods.

Teachers' perceptions of the CAME project with particular reference to:

- its suitability for a full range of abilities;
- the transferability of teaching approaches;
- the structure of the support programme.

### **Methodology**

The Belfast Education and Library Board commissioned this report to review the first two years of the CAME project. In addition to this review the BELB were particularly interested in examining the academic self-perception of those pupils who had participated in the project compared to a control sample who had not.

At the end of the academic year 2003/2004 four schools had completed the two year pilot project. A sample, to participate in the pilot study, of one grammar school and one non-grammar school was made by the BELB from the initial group of four schools. A control sample of two non-CAME schools, one grammar and one non-grammar, was chosen by the BELB.

Within each of the four schools participating in the pilot study, two year 9 classes were administered the 'Myself as a Learner Standardised Scale' (MAL) (2002). Burden (2000) perceives this as an information gathering instrument and comments that adolescents have responded positively to the nature and purpose of it. The results were initially analysed using the MAL scale suggested by Burden. Further analysis using the Mann-Whitney U-test was then carried out. This is an inferential non-parametric test for significance and it was deemed appropriate for this data because of its suitability for data with a small sample size and where there may not be a normal distribution.

In addition, each school provided the researchers with a small group of approximately six pupils who participated in a taped group interview. As the interviewees were children it was hoped that the group interview would be less intimidating and would encourage a variety of ideas and responses. The interview questions were presented in a standardised semi-structured format.

In the two CAME schools and the two control schools the class teachers participated in a standardised semi-structured taped interview. Prior to recording, the teachers were invited to review the questions and where the researchers felt it appropriate, they explored further comments and issues raised by the teachers' responses. In addition, the Head of Mathematics in each of the schools was invited to respond to issues relating to whole school policy matters.

## **Results**

### **Teaching Methods**

The teaching staff in the schools participating in the CAME project felt that their teaching methods had been affected positively by involvement. The use of group

work was discussed with the teachers and the view was expressed that initially their own concept of what constituted group work had to be examined in order to accommodate the CAME lessons. One teacher explained that he had reached the opinion that since the children *'spend more time during the day speaking to their friends and value the opinions of their peers, then the use of discussion within the groups was just a logical step forward'*. Concerns that allowing children to participate in this format of learning was a form of *'cheating'*, that the group would be dominated by strong personalities or that the weaker students would become isolated proved to be unfounded once the CAME approach had been introduced. The CAME teachers discussed how the use of group work allowed peer tutoring to come into play, with the less able children *'picking up quite quickly what the other children are talking about'* and the children *'enjoying the chance to help each other'*.

The area of student confidence and anxiety was introduced by the CAME teachers in discussing their use of group work. The teachers discussed how children understood that all of the responses from a group would be accepted by the teacher and treated equally. In establishing which responses were correct, the teachers had the opportunity to use incorrect responses to further stretch the thinking of the children and allow them to argue the case for the correct answer. The teachers felt this was a positive aspect of this teaching strategy. All of the teachers involved in the CAME project felt that allowing the children to take more ownership increased the pupils' confidence. The improvement in the pupils' mathematical confidence materialised not only in their enjoyment and willingness to participate in the lessons but also in their style of questioning. The opinion was voiced that the phrase *'I can't do that'* was being frequently replaced with *'I have got as far as ...and now I am stuck'*. The CAME teachers interpreted this as children having sufficient confidence in their mathematical ability to be able to break down a question into its component elements and thus be able to isolate the areas that were causing them difficulty.

Associated with the use of group work, the areas of classroom management, discipline and time allocation were discussed by both the CAME and non-CAME teachers. In terms of classroom management both sets of teachers had concerns about the manageability of group work. The teachers identified the following external factors: class duration and size, arranging furniture to accommodate the style of teaching and

curricula demands. However, the view was expressed by some of the CAME teachers that the CAME approach put a structure onto group work and therefore once that approach had been established, the discipline issues did not arise. They did contrast the theoretical classroom management situations portrayed on the training videos against the everyday reality and felt that in this aspect some of the classroom scenarios were not realistic. Within both the CAME and non-CAME schools the formation of groups occurred in different ways; the structure of groups that appeared to be favoured was that of mixed ability. This not only allowed peer-tutoring to occur but also permitted the less enthusiastic pupils to witness the pleasure with which other members of the class worked. CAME teachers did express concern that the approach was time consuming and that *'it can be frustrating if you have certain areas in the curriculum to be covered and the discussion has led in a different direction'*. None of the CAME teachers interviewed found sufficient time to teach all the lessons recommended in the CAME teachers' guide or at the training sessions. The teachers expressed the view that preparing children for either internal or external examinations was an influencing factor in not achieving the desired number of lessons.

### **The suitability of the CAME material for different ability ranges**

In discussing the suitability of the CAME material for all ability ranges, the teachers felt that the *'middle ability mathematicians would understand a lot of it'* and that the material was *'pitched round about their level'*. The teachers in the grammar school expressed the opinion that their *'bright'* children would be able to work through the material quickly although they felt that this group of children would be able to transfer the skills and knowledge they had learnt into other subject areas. The teachers in the non-CAME schools, both grammar and non-grammar, did not feel that even their brighter pupils would be able to do this. One teacher also articulated the view that sometimes his best mathematicians were also his quieter children in class and that the CAME approach had given them an opportunity to articulate their mathematics and gain confidence in expressing their views in class. Another teacher felt that although the CAME material was useable for the weaker student, it became very time consuming because the pupils' weak mathematical knowledge meant that establishing accurate knowledge took a long time. This teacher felt that the teacher guidance needed by these pupils contradicted the ethos of the CAME ideal.

## **Transferability of Teaching Skills**

In general the CAME teachers felt that as a result of participating in the project they had the opportunity to develop certain professional aspects of their work that otherwise would not have taken place. In particular the teachers discussed the questioning techniques that had played such a major role in this work. Some expressed the view that initially, having asked a question, they found the silence which occurred while waiting for a pupil response difficult to handle. The tendency to '*give the answer*' or rephrase the question was almost natural and they had to learn to hold back and let the pupils initiate the reply. However, this was a learning experience for both pupil and teacher. All of the teachers expressed the view that they had brought this new style of questioning and classroom management into other classes throughout the school that were not involved in the project. Teachers felt that the CAME approach could be useful in preparing older pupils to approach coursework for GCSE.

All of the CAME teachers felt that the material used in the project as well as the suggested approach, encouraged children to develop their thinking skills. In general, thinking skills were not taught '*in their own right*'. Neither CAME, nor non-CAME teachers felt that there was much support for the opinion that children could transfer their thinking skills into other areas of the curriculum. In general, the teachers thought that pupils viewed mathematics as a separate entity. Examples that contradicted this would include the obvious use of calculation or graphical work within Science, Geography or Technology.

One of the schools participating in the CAME project organised an in-house training day for their teachers from all subject areas. The purpose of this was to demonstrate the CAME style of teaching and to suggest ways in which other subjects could use this. They expressed the view that there was a '*generally positive attitude*' and '*group inclusiveness*' about the approach that they felt would be good practice within the school.

## **The Structure of the Support Programme**

The teachers involved in the CAME project felt that on its own, the resource folder was '*very intimidating*' and that the folder gave '*hints*' on how to approach a lesson. The CAME teachers felt that without training, the material in the folder would probably be interpreted as just another investigation. The training videos were described as '*crucial*' in indicating the style of a CAME lesson and watching another colleague present some of these lessons was also cited as being very beneficial. However, it was commented upon that the classroom management of the videoed lessons was slightly artificial and the view was expressed that more time could have been spent discussing the realities involved in implementing these lessons. There were differences of opinion about the training days. These ranged from being described as '*very good*', with particular enthusiasm for the collegiality and support from other participating teachers, to '*less beneficial*' and repetitive.

## **Pupils' Motivation and Confidence in Mathematics**

Pupils in both CAME and non-CAME schools were asked about their feelings towards mathematics and most expressed the view that it is a hard subject, is boring and consists of too much work. One pupil in a CAME school described mathematics as fun while a few other pupils at the same school talked about the enjoyment to be had solving problems and discussing mathematics in a group. This view point was not exclusive to the CAME pupils. Areas of mathematics that emerged as being most enjoyable were calculator work, formulas, symmetry, circles, probability and pie charts.

## **Pupils' ability to approach unfamiliar problems**

When asked about how they would approach an unfamiliar mathematics problem the CAME pupils responded that they would try to work it out for themselves before asking the teacher, with several pupils suggesting that they would try to find an example of a similar type in their books or try a question with easier numbers. Most of the non-CAME pupils said that asking the teacher would be their first recourse.

### **Pupils' group working skills**

There was no difference in responses from CAME and non-CAME pupils to questions relating to this area. Most pupils indicated that they preferred working in groups rather than working on their own with only one or two dissenting voices. Reasons for preferring collaborative working included understanding friends' explanations better than a teachers' explanations, having less work to do in a group and having people to talk to about the work. Some also suggested that it provided useful feedback in that '*your friends could let you know quickly if you had made a mistake*' rather than waiting until the teacher was correcting the work. Those who preferred working on their own said that it was faster and that occasionally disagreements arose in a group situation.

### **Pupils' awareness of applicability of skills outside mathematics**

All pupils were aware that some mathematics was useful outside the mathematics classroom. The sciences were highlighted as subjects in which mathematics had a major role to play and several students drew attention to the importance of handling money and dealing with percentages in everyday life. Others suggested that topics like Pythagoras' Theorem were a waste of time as they would not be used elsewhere.

### **The NFER Survey**

The NFER *Myself as a Learner Scale* (MALS) (Burden, 2000) was used to determine the academic self-perceptions of the Year 9 pupils. The scale was constructed to focus on students' perceptions of themselves as learners and active problem-solvers within educational settings and thus seemed to be appropriate to measure the impact that the CAME project had on student participants.

A sample of students from each school was asked to respond to the list of twenty statements, shown in Table 3.1, by circling one of five possible responses ranging from (a) *Yes, definitely*, to (e) *No, definitely not*. Scores were allocated to each item on a basis of 1 (most negative) to 5 (most positive) and a total calculated for each student, thereby producing a score for each pupil in the range 20 to 100. The mean

score for pupils in CAME schools was 67.18 while for those students in non-CAME schools it was slightly lower at 66.72.

The percentage responses were then calculated for each question and this is shown in Table 3.1.

The results were subjected to further analysis using the Mann-Whitney U-test. It can be observed from the table that 28.3% of CAME pupils and 17.3% of the non-CAME pupils replied *Yes, definitely* or *Yes, a bit* to the statement “I like having problems to solve” and Mann-Whitney suggests that this is a significant difference ( $U = 903$ ,  $p = 0.033$ ).

While no other statements produced a statistically significant difference between CAME and non-CAME respondents it is interesting nonetheless to examine the results further. It can be observed from the table that, for example, 37.7% of CAME pupils replied *Yes, definitely* or *Yes, a bit* to the statement “I think that problem solving is fun” as opposed to 28.2% of the non-CAME pupils. In response to the statement “I like having difficult work to do”, 15% of CAME pupils responded positively, that is, responded either *Yes, definitely*, or *Yes, a bit* while 8.7% of non-CAME pupils responded positively. In the same question, 45.3% of CAME pupils responded negatively i.e. replied either *Not very true* or *No, definitely not* while the corresponding figure for non-CAME pupils was 63%.

The statement “I get anxious when I have to do new work” prompted 18.8% of CAME pupils and 8.7% of non-CAME pupils to respond *Yes, definitely* or *Yes, a bit*, and 60.4% of CAME pupils and 47.9% of non-CAME pupils to respond either *Not very true* or *No, definitely not*.

Considering the emphasis in the CAME project on collaborative problem solving one might have expected there to be a difference between CAME and non-CAME pupils in their responses to the statements “I’m good at discussing things”, “I’m not very good at solving problems” and “I know how to solve the problems I meet”, however little difference between the two categories was noted. Among possible explanations

for this is the fact that most teachers did not have the opportunity to carry out the recommended number of CAME lessons.

In terms of encouraging independent learning, it is interesting to note that 58.5% of CAME pupils responded positively to the statement “When I get stuck with my work, I can usually work out what to do next” while the figure for non- CAME pupils responding positively was 41.3%. Likewise only 11.3% of CAME pupils agreed to some degree with the statement “I find a lot of schoolwork difficult” while 21.7% of non-CAME pupils agreed and in response to the statement “Learning is difficult” 64.1% of CAME pupils and 47.8% of non –CAME pupils replied either *Not very true* or *No, definitely not*.

Table 1.1 Percentages responses for each question by CAME (N = 53) and Non-CAME (N = 46) respondents.

<b>CAME vs Non-CAME</b>										
	<b>Yes, definitely</b>		<b>Yes, a bit</b>		<b>Not sure</b>		<b>Not very true</b>		<b>No, definitely not</b>	
	C	NC	C	NC	C	NC	C	NC	C	NC
1. I'm good at doing tests	11.3	4.3	34.0	39.1	43.4	34.8	9.4	6.5	1.9	15.2
2. I like having problems to solve.*	9.4	4.3	18.9	13.0	41.5	26.1	15.1	32.6	15.1	21.7
3. When I'm given work to do, I usually feel confident I can do it	11.3	13.0	37.7	34.8	32.1	34.8	13.2	10.9	3.8	4.3
4. Thinking carefully about your work helps you to do it better	49.1	39.1	41.5	52.2	9.4	6.5	0.0	0.0	0.0	2.2
5. I'm good at discussing things	22.6	26.1	35.8	32.6	24.5	21.7	11.3	13.0	5.7	6.5
6. I need lots of help with my work	3.8	4.3	9.4	6.5	17.0	21.7	52.8	32.6	17.0	34.8
7. I like having difficult work to do	7.5	2.2	7.5	6.5	35.8	28.3	20.8	30.4	24.5	32.6
8. I get anxious when I have to do new work	7.5	0.0	11.3	8.7	20.8	43.5	34.0	28.3	26.4	19.6
9. I think that problem solving is fun	11.3	6.5	26.4	21.7	24.5	17.4	26.4	30.4	9.4	21.7
10. When I get stuck with my work, I can usually work out what to do next.	11.3	6.5	47.2	34.8	28.3	34.8	9.4	21.7	3.8	2.2
11. Learning is easy	11.3	6.5	30.2	32.6	24.0	43.5	13.2	6.5	11.3	10.9
12. I'm not very good at solving problems.	5.7	8.7	9.4	8.7	24.5	32.6	41.5	39.1	11.3	10.9
13. I know the meaning of a lot of words	17.0	21.7	41.5	45.7	26.4	19.6	7.5	13.0	5.7	0.0

14. I usually think carefully about what I've got to do.	17.0	17.4	39.6	45.7	26.4	26.1	13.2	8.7	1.9	2.2
15. I know how to solve the problems that I meet.	5.7	2.2	41.5	47.8	30.2	45.7	18.9	4.3	3.8	0.0
16. I find a lot of schoolwork difficult.	3.8	6.5	7.5	15.2	26.4	30.4	34.0	37.0	24.5	10.9
17. I'm clever.	18.9	19.6	45.3	34.8	20.8	30.4	11.3	8.7	3.8	6.5
18. I know how to be a good learner.	15.1	21.7	45.3	43.5	26.4	26.1	9.4	4.3	3.8	4.3
19. I like using my brain	20.8	21.7	37.7	21.7	26.4	30.4	9.4	13.0	5.7	13.0
20. Learning is difficult	3.8	6.5	9.4	6.5	22.6	39.1	35.8	34.8	28.3	13.0

**\*Items where a statistically significant difference exists between the two independent variables using Mann Whitney U.**

## **Conclusion**

All of the staff participating in the CAME pilot project felt that their willingness and ability to include group work in their teaching had been positively influenced by their participation and training in the project. The CAME teachers paid particular attention to the classroom management of this style of teaching and had the opportunity to reflect on their questioning techniques. The CAME teachers found that their new teaching skills were transferable into other year groups. All of the CAME teachers expressed the view that the CAME approach and material would help develop the thinking skills of the pupils, and there is some limited evidence of this in the pupil interview responses.

Among the teachers there seemed to be agreement that the CAME material was most suitable for pupils broadly in the middle ground with regards to ability. While teachers felt that the material could be used for the weaker pupils the difficulty arose in the length of time it took to cover one lesson. The view was also expressed by teachers that the mathematically able children in the grammar sector would find this material less challenging.

Nevertheless, teachers recognised the positive aspects of peer-tutoring that took place within a mixed ability group of pupils and felt that this was a constructive element of

this teaching style. This positive view of peer-tutoring was also reflected in the pupil evidence and both the survey and the pupil interviews suggested that the CAME project may have a positive influence in encouraging independent working. There was a statistically significant difference in the responses of pupils to the statement concerning the enjoyment of solving problems, with CAME pupils responding more positively.

In the view of the CAME teachers, the support programme was crucial to this project as on its own the resource folder was intimidating. The demonstration lessons, while interesting and informative, were at times artificial. However, the mutual support given by the participating staff and the forum that the training days supplied to discuss difficulties, proved to be very beneficial and appreciated by all who attended.

### **Broader Application**

While this research has highlighted a number of very specific issues associated with this particular programme it also raises a number of issues that are more general. In particular, it raises questions about the level and nature of integration of thinking skills and cognitive development into the curriculum and gives a glimpse of how this might successfully be accomplished. Certainly the ideas underpinning CAME can be heard resonating through the new curriculum in Northern Ireland and elsewhere. The change in attitude experienced by the pupils with particular regard to enjoyment of problem solving, indicates the need for this type of work to become more widespread. In addition, this research brings to light some concerns about the nature of continuing development (CPD) for practising teachers and the fact that the teachers gained so much from the opportunity to watch each other teach and discuss their experiences suggests that this type of CPD has some benefit regardless of the particular aim of the teaching programme.

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