

Researching Numeracy Teaching Approaches in Primary Schools

CASE STUDIES

Description

Six *Case Studies* were conducted during the second half of 2002. The purpose of these case studies was to explore teachers' communicative practices in depth, overtime. McDonough (2002) argued that "case studies that are qualitative in nature have four essential properties: they are particularistic, descriptive, heuristic, and inductive" (p.94). The case studies in this project focused on particular teachers exemplifying a range of teacher characteristics. They sought to describe details of the beliefs, constraints, intentions and especially actions. They were heuristic in that they illustrate what can occur, and they are inductive in that they allowed the team to make inferences about relationships between certain key variables and their influence on teaching.

The purposes of the case studies within this aspect of the project were to:

- clarify relationships and connections between the various elements of the model used to frame the data collection in a way that make sense to practitioners;
- elaborate the context of classroom interaction and communication;
- provide a source of stories, anecdotes, and contexts that enrich the other data;
- give insights into key variables informing teachers' communicative acts.

The six cases studies were chosen to represent teachers who were experienced and not experienced, rural and metropolitan, government and non government including one who was a Numeracy Coordinator. Each member of the research team observed one case-study teacher teach mathematics on at least 5 occasions in Term 4, 2002.

Teacher Intentions Survey

Prior to the observed lesson, case-study teachers were asked to complete the Intentions component of a *Teacher Intentions Survey Form* to provide a summary of the planned lesson from their perspective.

Case-Study Observation Schedule

A *Case-Study Observation Schedule*, based on Clarke & Clarke (2002), was completed by the research team member during the lesson to ensure that similar elements of classroom practice were observed across each case-study. After the lesson, the research team member spoke briefly with the case-study teacher to determine what, if anything, they would change or do differently next time and to give them an opportunity to comment on the lesson and/or their practice more generally.

Short History Questionnaire

Case-study teachers also completed a *Short History Questionnaire* to provide some background details on their pre-service education, teaching experience, professional development, why they became a teacher, and their levels of confidence in relation to teaching mathematics.

Analysis

Each member of the research team wrote a *Case-Study Report* on the basis of the *Case-Study Observation Schedules*, the extended interview and all other items of data available for the particular teacher concerned. That is, his/her responses to the initial *Concept Mapping* and *Student Work Samples Tasks, Opportunities and Constraints Interview, Collective Teacher Efficacy Scale* and the *Teacher Intentions Surveys*.

A reporting framework was developed to ensure some consistency in the Case-Study Reports. However, given the considerable variation in the experience of the Case-study teachers, a further analysis was completed involving all members of the research team and a ‘critical friend’ who read all the case-studies for clarity and consistency and to test the basis of the emergent patterns or themes identified. This involved two extended meetings, the preparation of a summary that documented key themes, and written responses to five questions that had emerged from the initial review of the Case-studies.

Contents

- Case-Study Observation Schedule
- Short History Questionnaire

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Case Study Observation Schedule

Observer:	Teacher's Name:	Year level:
Observation number (in overall sequence):	No. of children:	Date:
School:		

BEGINNING		MIDDLE		END	
TEACHER		TEACHER		TEACHER	
	Instructing students what to do		Explaining to students who need help		Correcting students work
	Showing students how to do something		Moving around asking questions		Summarizing what was learnt
	Making links and connections		Moving around answering questions		Commenting on explanations by students
	Reviewing previous work		Teaching a small group (High teacher involvement)		Using students responses to build understanding
	Answering questions		Teaching a small group (Low teacher involvement)		Helping students understand the maths
	Listening to students' suggestions		Working with a small group answering questions		Making links and connections
	Facilitating student to student interactions		Moving around giving instructions		Other:
	Posing a problem		Other:		
	Finding out what students know				
	Other:				
STUDENT		STUDENT		STUDENT	
	Listening to instructions		Working on practice examples		Listening to explanations by other students
	Listening to explanations		Working by themselves to solve the problem(s)		Listening to explanations by you
	Suggesting directions for investigation		Working in a group to solve the problem(s)		Talking to or showing others what they've done
	Asking questions		Making or showing something with materials		Indicating what they have learnt
	Letting the teacher know what they know		Discussing with students how to solve problem(s)		Evidencing the key outcomes of the lesson
	Sharing their ideas on what to do		Other:		Other:
	Showing the rest of the class something				
	Other:				

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Case Study Observation Schedule

PART A:

<p>Lesson focus:</p> <p>Artefacts collected (work samples etc.):</p>	<p>Classroom layout:</p> <p>Classroom features:</p>
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Lesson Summary (in point form) include aims:

Time	Description (i.e., write all you can of what happens and what is said etc.)	Comments / Questions: (subjective view)

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PART B: LESSON ELEMENTS

	Illustrative examples
<p>1. Features of the task selected for lesson or lessons, especially the degree of openness / challenge (Comment as appropriate)</p>	<ul style="list-style-type: none"> • Locus of control - Student choice/control • Open/Closed • Student product(s) (e.g., written record, models, observations, generalisations) • Sequencing of activities explicit • Teacher response to student needs • Match of task selection to apparent learning needs • Clarity of Task
<p>2. Level of Teacher Support / Level of Student Independence (Choose one /comment as appropriate)</p>	<ul style="list-style-type: none"> • Teacher Support: (High, Medium, Low) • Student Independence: (High, Medium, Low)

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Case Study Observation Schedule

<p>3. Pattern of Interaction (Comment, indicate proportion of time as appropriate)</p>	<ul style="list-style-type: none"> • Press for Understanding (<i>deep</i>) (eg: Convince Me, Probing, Excavating, Focussing, Modelled Confusion, Seeking Explanation, Revoicing, Drawing Attention To, Noticing...) • Prompt activity/response (<i>surface</i>) (eg: Cueing, Prompting, Funnelling, Rehearsing...) • Directing/endorsing activity (eg: Demonstrating, Giving / Reiterating Instructions, Managing Behaviour, Organising, Encouraging...) • Peer interaction (on/off task, quality)
<p>4. Lesson Structure</p>	<ul style="list-style-type: none"> • Distribution of Teacher Attention • Whole / Part / Whole • Other
<p>5. Materials, tools and representations</p>	<ul style="list-style-type: none"> • Materials and tools (what, by whom, purpose, relationship to the concept, relationship to the aim) • Single/Multiple representations
<p>6. Nature of the learning community and classroom interaction</p>	<ul style="list-style-type: none"> • Valuing students' ideas, solutions and methods • Building upon students' ideas, solutions and methods (e.g, drawing out a teaching point) • Off and On task communication / focus (including classroom management)

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	<ul style="list-style-type: none">• Engagement (High, Medium, Low)• Extent of risk taking• Procedural / Conceptual Mathematics Communication (eg; process/procedure vs. higher order reflection thinking)
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PART C: INTERVIEW/REVIEW QUESTIONS

What did you have in mind for the lesson (what was your aim)?

What (if anything) would you do differently?

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NAME :
AGE RANGE: 18-25 26-35 36-45 46-55 55+
QUALIFICATIONS:
What qualifications do you hold?
Where did you obtain your qualifications?
TEACHING EXPERIENCE:
How many years have you been teaching?
How many years have you taught at the level you are teaching this year?
What other year levels have you taught?
How many schools have you taught in (do not include teaching rounds)?
What Professional Development experiences have had the greatest impact on your teaching?
a) PD generally
b) Math's specific PD
PERSONAL PERSPECTIVE:
Why did you choose teaching as a career?

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Case Study Teacher - Short History

What aspects of teaching do you enjoy most?

What things about teaching do you find most difficult or frustrating?

How confident are you in your ability to scaffold students' learning of mathematics?

How do you rate your own understanding of key mathematical concepts?
Low Medium High. Why?

What do YOU think *Modelled, Shared, Guided* means in relation to teaching mathematics?

Thank you for your participation in the project at this level. Your commitment and generosity with your time has been much appreciated.

Numeracy Project Team