

## PLANNING FOR MATHEMATICS TEACHING: PERCEPTIONS OF EXPERIENCED AND TRAINEE TEACHERS

Cherry Edwards.School of Education, University of Southampton

*This paper is concerned with planning as an activity at the core of mathematics educators' work. Through analyses of reflective writings and course tasks, the dimensions of planning are considered in relation to discrete groups of mathematics teachers: trainees, mentors and MA students. The paper explores links between theory about and practice of planning and how we can understand the planning activities of practising teachers.*

" Planning is one of those things that student teachers do a lot, but experienced teachers don't do at all!", so said one Head of Mathematics. It is therefore not surprising that trainee teachers, searching for role models in the behaviour of their subject mentors, protest that they just don't see anything they recognise as planning.

What and where is planning?

It might be argued that teachers do not plan. A SCAA evaluation found that "Where teachers were using a scheme in an individualised way, there was sometimes little planning involved" (Askew & Brown et al. 1993: 27). Or perhaps, the planning of experienced teachers is just not observable; for example, " some aspects of teachers' planning seem to be commonly accomplished while having a bath, eating breakfast or driving to work in the morning!" (Calderhead 1984: 71). If the suggestion that " ... the more experience you have the more idiosyncratic will be the form of your planning." (Perks and Prestage 1994 : 65) is a valid one, then student teachers may well have difficulty in seeing or recognising teachers planning activities.

Theoretical conceptions of planning range from cognitive models, e.g. 'planning nets' of Leinhardt & Greeno (1986), to planning as a process, e.g. arranging manipulable materials (Hill et al. 1981). Calderhead (1984) claims that "Planning is aimed principally at the selection or construction of activities" (page 72). Yinger found that planning "could be characterized as decision making about selection, organisation and sequencing routines" (Yinger 1979: 165). In short, teacher planning research has yet to reach any consensus but themes such as teachers' use of routines, planning as selection and control of classroom activities do re-occur.

Aims and Objectives

A major feature of 'the planning landscape' is the 'rational' or 'aims and objectives' model. First

developed in the fifties, this model suggests that planning consists of a number of sequential decisions about aims and objectives, content, organisation and evaluation. Variations on this model still abound, particularly in advice to student teachers or mentors, (c.f. Kyriacou (1991) and Perks and Prestage (op. cit.)). 'Aims and objectives' are familiar to most teachers and trainee teachers as accepted, even 'recommended', ways of planning. Teachers seldom reject this approach completely; but they are often aware of significant practical limitations to sequential lesson planning (C.F. Brown 1993: 108). Consequently, every student teacher meets a bewildering variety of thinking based on these 'rational, sequential' models and a diversity of views about their usefulness.

### Writing about planning

It is against this background that I collected data about teachers' and students' thinking about planning. I wished to investigate what teachers said about their planning and what characterised 'planning' for them. The written material used in this study has three distinct sources:

1. Students' Reflective Writing-. PGCE students wrote about their experiences of planning as part of personal reflective writing exercise. The students' writing was diverse and often muddled, revealing their good intentions but only partly formed practices. Many wrote about what they think they should be doing with few references to actual practice, their own or that of their mentors.

2. Student tasks-. The same students undertook a topic planning exercise working in groups of three. The task was offered as a simulation of what might happen to them in school, aimed at 'your Year 9 group'. Although the students worked co-operatively, their written assignments were individual and idiosyncratic, differing from one another in both style and content. Despite frequent 'plugs' on the course, only seven of the students made reference to the National Curriculum. Several students wrote about the on-going nature of planning a topic and the necessity of flexibility in planning, but most adopted some form of 'aims and objectives' format.

3. Mathematics Teachers' Reflective Writing-. A group of mathematics teachers undertook reflective writing focused on planning, as a part of their Masters course, writing and responding to each other's thinking over a period of a few months.

All of this written data was categorised in two ways: firstly by identifying extended descriptions of planning activities, secondly, through emergent themes e.g. aims and objectives, materials usage, problem solving, mentoring. For the sake of brevity, only data from the teachers' writing is presented here.

### Descriptions and themes

The descriptions offered by teachers are diverse; each demonstrates an idiosyncratic view of

planning, as Perks & Prestage (op. cit.) suggested. One teacher writes mainly about planning for her department, not her own preparation; other teachers refer to their own topic planning. Only one teacher describes planning a lesson:

- The first thing I do is to write down what I am aiming for with that particular lesson and what I expect my pupils to know by the end of it ...  
My next step is to review what I have to teach and I try to come up with as many sources as I can ...  
I choose the method I am going to use (group work, individual work, visits out of the school area, videotapes, etc) ...  
I try to think how I am going to give extra work to the very good students and extra help to the weak ones ...  
I always write down a few notes about the lesson concerning the way of teaching the particular lesson ...  
I spend some time thinking on the activities I am going to plan and I try to come up with interesting ways ( an interesting start is very important) of implementing them ...  
I choose the materials I need for the particular lesson ...  
I am always doing this having in mind how much time I have for completing the lesson ...  
I have in mind their learning styles and I do not expect to get the same responsiveness from all of them ...  
The next step is to prepare handouts if needed ( having in mind the top/bottom ability groups) ...  
The last thing I do is deciding what kind of evaluation I am going to implement.

This teacher offers a thumb nail sketch (lines 1 - 5 & 16) of a sequential ' aims and objectives' model for a lesson ( the only teacher who claims to use this approach). Pupils appear in terms of their responsiveness (line 13 ), their learning styles (line 13 ) and their abilities (lines 6-7). Mathematics is only indirectly referred to as 'what I have to teach' (line 3). The teacher's choices are centred on materials (lines 3, 11 & 15) and activities (lines 4 & 10-11).

A contrasting view of planning is offered in this teacher's writing:

Planning work for pupils involves reviewing their previous experiences and focusing on their subsequent, current and future needs and capabilities. The more thorough and accurate this review process the more appropriate the planning can become. Planning lessons for a group of students one already knows, is easier than for a group which one has no prior knowledge. This review is often subconscious and ongoing. It probably occurs all the time and is an essential part of day to day classroom activity.

Here pupils, their experiences and needs are foregrounded (lines 1,2 & 4). Planning is achieved through reviewing, focused not on the teacher or the mathematics involved, but on the pupils and their capabilities. Planning for this teacher is a process which points in two directions at once, backwards to previous experiences (line 1) and forward in time to future needs (line 2).

In the teachers' writing, only one reference is made to the National Curriculum. No-one wrote directly about mathematics; instead generic words like "topic", "syllabus" or "what I have to do" were used. Nonetheless, several themes occurred: 'Or~anisin~ materials' played a significant role in the planning activities of these teachers. e.g. "In Years 7 and 8, we have a whole year plan of which classes are doing a particular topic at any particular time and when we finish a topic the box of materials for that topic is passed onto the next teacher." Planning is viewed as a problem solving activity by several of the teachers e.g. "Planning is a series of 'problems solved'. You establish the problems and the constraints

and you then solve them."

Several teachers wrote about their experiences of working with ITT students on planning issues. One teacher wrote about planning exclusively in the context of working with an ITT student. An extract from his writing follows:

"We tend to intuitively solve the so-called problems but to forget to formalise them because they are the choices that one has to make. This is particularly true when experienced teachers plan their lessons and it is only in helping ITT students plan their lessons that the reflection on your own practice helps to realise the many and various details that are taken for granted."

This association of planning, mentoring and reflection, i.e. noticing the "taken for granted" was also commented on by other teachers. One writes that "having to support ITT students is a necessity of reflection." These teachers claim benefit for themselves in articulating their views of planning, as encouraging reflection and as a way of knowing more about their own practices.

## Conclusions

The teachers in this study do plan. However, the practices described are diverse and idiosyncratic, making little reference to either 'aims and objectives' models of planning or to the National Curriculum. In their planning tasks, the students' work was also surprisingly individual, but often included references to National Curriculum and generally, used a sequential 'aims and objectives' planning model. For some ITT mentors, 'planning' has become inextricably linked to their work with students and is seen as a positive stimulus to reflection on their own classroom practices.

In the data collected, idiosyncratic style in planning is not the prerogative of experienced teachers but was found in the writing of these students during their training courses. It may well be that the dissimilarities between individuals, whether students or teachers, are greater than the differentials which accrue from classroom experiences.

## Bibliography

~ Ilf BROWN Il et al. (1993), Evaluation of the implementation of National curriculum Mathematics at Key Stages 1, 2 and 3, School Curriculum and Assessment Authority

BROWN S (1990), 'Scottish Teachers' Perception of Time in Classroom Teaching and the 'Simple Management Model', Chapter 5 in BEN-PERETZ Il & BROTHIER R (Eds) (1990), *The Nature of Time in Schools*, London: Teachers College Press, pp 102 -115

CALDERHEAD J (1984) *Teachers' Classroom Decision Making*, London: Holt, Rinehart and Winston

HILL J, YINGER R & ROBBINS D (1981) Instructional planning in a developmental pre-school. Paper presented at the annual meeting of the American Educational Research Association, Los Angeles, L.A., quoted in CLARK ell & YINGER R J (1-87), 'Teacher Planning', Chapter 3 in CALDERHEAD J (Ed) (1987), *Exploring Teachers Thinking*, London: Cassell Educational, pp 84 - 103

KYRIACOU C (1991) *Essential Teaching Skills*, Sillon Schuster

LEINHARDT G & GREENO J G (1986), 'The Cognitive Skill of Teaching', in *Journal of Educational Psychology*, Volume 78, No 2, pp 75 - 95 PERKS P & PRESTAGE S, (1994) 'Planning for Learning', Chapter 6 in JAWORSKI B & WATSON A (Eds) (1994), *Mentoring in Mathematics Teaching*, London: Falmer Press

YINGER R (1979) Routines in Teacher Planning, *Theory into Practice*, Vol. XVIII, No.3, pp 163 - 169