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Teachers' conceptions of teaching, and the making of specific decisions in planning to teach

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Abstract. Teachers' conceptions of teaching, and broad approaches to teaching reported by teachers are both commonly found to range from teaching as information transmission, through to teaching as supporting students' own knowledge constructions. Further, conceptions and approaches have been found to correlate, suggesting that there might be some functional relationship between conceptions and actual teaching practices. But in teacher conception research, participants are commonly asked in interview to reflect on teaching generally, and not to report on particular teaching episodes. The conceptions reported might thus actually be *post hoc* reflections on past experience, and not indications of detailed functional decision steps. In work reported here, teachers described their reasoning when planning recent teaching episodes. Were higher level conceptions of teaching directly involved in these teachers' detailed planning, then some vestige of that might be expected to manifest. While student-centredness varied, teacher thinking during actual planning seemed more about contextually localised models of what students might do, than about evoking general conceptions of teaching. The constraints that this finding places on the interpretation of conceptions of teaching, and possible implications for teacher development, are discussed.

Keywords: conceptions of teaching, detailed teaching planning, teacher conceptions, teacher thinking, teaching planning decisions.

Introduction

The conceptions that teachers hold about their teaching have been the focus of much empirical study of recent years. In one of the first studies, Samuelowicz and Bain (1992) used semi-structured interviews to have 13 academics individually respond to a core set of 14 questions, starting with 'What is teaching?' and 'What is learning?', but including also more focused questions such as 'What is the teacher's role?', 'What is regarded as good teaching?', 'What are desired learning outcomes?', 'What are indicators of good learning?', and 'Does teaching influence student learning?' In similar work, Trigwell and Prosser (Trigwell et al. 1994; Trigwell and Prosser 1996a, b) interviewed 24 teachers of first year

physical sciences about their teaching in a specific course (subject, unit), but using quite open form questions that included 'Can you describe how you went about your teaching?', 'Can you say what teaching is?' and 'Can you say what learning is?'. Kember (1997) and Kember and Kwan (2000) interviewed 17 university teachers, and had them reflect on what they thought 'good teaching' to be, the motivational strategies that they used, the learning activities that they expected their students to pursue, and what were seen as effective teaching strategies. Finally, Murray and Macdonald (1997) used a combination of semi-structured interviews and open questions on a questionnaire to have university teachers respond on the role of a lecturer, the purposes of lectures, tutorials and assessment, and what defined 'good' and 'weak' students.

There has proved to be considerable commonality in the findings from these studies. Although different descriptive labels might be used, the analyses of the teachers' responses have consistently shown gradations from an emphasis on the teacher and the content, and notions of transmitting information from the teacher to the student, through to an emphasis on the student's need to construct some sort of representation of the content, and the notion that the teacher's role is to provide support and guidance to the student in that enterprise. When the questions asked were about general views on teaching, the responses have been interpreted as indicating the presence of conceptions of teaching ranging from teacher centred orientations on information transmission through to student centred orientations on conceptual development. When the questions asked were more about teaching practices, the responses have been interpreted as indicating broad approaches to teaching, but along similar gradations. We have findings of teachers holding student centred conceptions tending to favour student centred approaches, although sometimes quite mixed patterns have been found (see Murray and Macdonald 1997). We even have findings of teachers reporting student centred approaches tending to have students who report deeper approaches to study (Trigwell and Prosser 1997; Trigwell et al. 1999). None of this is particularly problematic, nor in substantial dispute.

However, there are yet questions that can be raised about conceptions of teaching. Perhaps foremost is the question of just what sort of construct a conception of teaching is. In one form or another, each of the reviewed studies has solicited responses to open questions on what teaching is seen to be, in some sort of general, or broad based fashion. The teacher subjects were not questioned on what they did in a particular concrete instance, on a particular given day, with a specified

group of students. So most directly, a conception of teaching is an entity induced from the responses to such broad, general questioning. At a minimum, a conception of teaching could simply be a summary term used by educational theorists to refer more efficiently to clusters of reported teaching approaches and intentions. But is it perhaps more than that?

Many of the subjects in the reviewed studies might never before have articulated a response to something like 'What is teaching?'. One could speculate that in constructing their responses, those subjects might have thought back over their teaching experiences, considered whether there seemed to be practices that they commonly employed, distilled from those practices core underlying ideas that they 'must therefore hold', and have expressed those. Such a speculative model would suggest that a conception of teaching might then be an outcome from reflective activity. It is something that teachers might develop from consciously thinking back over their teaching, and seeking to find some sort of coherent personal model for what they do. But again, might it be more than that?

The previously noted finding of a relationship between conceptions of teaching and broad approaches to teaching raises the possibility that there might be some sort of link between such conceptions and actual teaching practices. The reviewed studies do not in truth demonstrate such a link; what those studies have shown is more a relationship between *espoused* conceptions and *reported* approaches. It could well be that the experiences recalled to mind in generating an 'articulated conception of teaching' might substantially overlap with or duplicate those considered in reporting broad approaches; in which case the distinction between conceptions and approaches might be more semantic than substantive (see also Kember and Kwan 2000, on this point). But alternatively, it could be that a conception of teaching might actually exist in the mind of the teacher as some sort of generalised or abstracted entity. It could be that such a conception is evoked when teachers make decisions about particular teaching activities or events or classes, and thus has a direct functional role in the specifics of teaching.

A recent training study conducted by Ho et al. (2001) seems to claim such a strong functional role for conceptions of teaching, asserting that changing a teacher's conception to '... one of facilitating student learning is required before specific student-centred strategies could be eventually adopted' (p. 145). In four weekly sessions, 12 university teachers compared their own espoused conceptions of teaching to a

range of alternatives, examined teaching practices that reflected conceptions more student-oriented than their own, and finally redesigned the teaching practices that they had used in a particular teaching episode to realise a higher level conception of teaching. Of the nine participants espousing lower level conceptions of teaching before this training, six showed positive changes both in those conceptions, and in teaching practices as indicated by students' *Course Experience Questionnaire* responses (Ramsden 1990) a semester later. The authors concluded that '... a change in conceptions of teaching is a prerequisite to change in teaching practices' (p. 164), suggesting a directional influence from conceptions to practices. That is perhaps too strong a conclusion to draw, given the study's methodologies.

The interview questions used to determine changes in conception of teaching were of the same open general form as used in previous studies, and thus could have prompted general, reflective responses. However, responses derived from reflecting broadly on past experience cannot directly enable conclusions as to whether any indicated conceptions of teaching are involved or influential in later more specific teaching. Further, as a means of isolating any possible role that conceptual change might have in bringing about change in practice, the training applied was confounded. Logically, it could well have been that both the subsequent conception and practice changes were each, independently, outcomes from the highly contextualised training experiences used in which a teacher's own teaching actions and reasoning were subjected to close scrutiny. The methodology did not allow a conclusion that the training had influenced conceptual change alone, which in turn had then prompted change in practices.

To summarise the discussion so far, what we are left with is the relationship between conceptions of teaching and broad teaching approaches as established, but with the possibility that that relationship also indicates some sort of functional involvement or influence of conceptions of teaching on actual teaching practices as not proven. Stripped back to its essentials, what has actually been demonstrated to date is a relationship between verbal responses to two classes of general, open questions. It is not a relationship between conscious, articulated conceptions that might reside as cognitive tools in the minds of teachers, and detailed day-to-day teacher planning and actions. We presently do not have evidence that conceptions of teaching constitute a direct functional influence on specific teaching actions. It still remains that conceptions of teaching might be outcomes from *post hoc* reflections on experiences, and only that.

The intent of the present study then was to look for evidence of a functional role for conceptions of teaching in specific and individual teaching activities. The particular teaching activity chosen was that of planning for a single teaching event or episode (as opposed to broader curriculum or syllabus planning, see Stark 2002). Of the total time that teachers spend thinking about their teaching, a major proportion is likely to be in the context of planning how to present, practise, or demonstrate some quite specific point, or concept, or principle, or algorithm. Such planning thinking is embedded in the particular, in the moment. It is focused on deciding what to do in a 20 minute segment of an actual class, and probably relates quite directly to what actually happens in the subsequent teaching event. If there is indeed a real, functional influence that comes from a conception of teaching, then it might reasonably be expected to manifest in the detail of immediate teacher planning and decision making. If conceptions of teaching can be shown to be conscious parts of teachers' decision chains in planning, then such would constitute strong evidence in support of such conceptions being real entities in teacher thinking, and as having real functional influence on the detail of what teachers do when they interact with students. Should such conceptions not manifest in teachers' decision chains, then the possibility that those conceptions might yet exert influence is logically not disproved, but potential explanations for how that influence might play out would nonetheless be considerably constrained.

Methodologically, an ideal might be to observe teachers during the act of planning a particular teaching episode, and to have them think aloud during real time (Ericsson and Simon 1980, 1984). We could observe whether those teachers consciously recall and use any general principle or notion that could be labeled a conception of teaching, as a determinant of the specific teaching actions decided upon. We could directly observe whether those specific teaching actions are consciously planned as applications of such evoked conceptions of teaching.

However, such an 'over the shoulder' methodology is probably practically unrealisable. But it would be possible to ask teachers to recall instances of recent teaching and planning, and to have them relate their thinking and reasoning. If higher level conceptions of teaching are actual functional influences on the detail of teaching decisions, then one might expect observable vestiges of such influences in these teachers' recollections. On the other hand, if conceptions of teaching are instead outcomes in an independent class of activities, that being reflection on past experiences, such vestiges need not be observed at all.

There are of course potential weaknesses in a 'recall of recent thinking' approach. Although interviewed teachers would be recalling actual specific planning thinking, they would nonetheless be recalling, and not planning in real time. So their responses would still be proxies for the real objects of investigation. Further, there could be contamination of that recalled thinking. The approach requires that subjects distinguish between the recall of thinking that actually occurred at the prior planning time, and thinking about teaching that might occur in the real time present, but prompted by recalling that prior time, and that they report only the former. Subjects might vary in their ability to so distinguish. Some of that prompted real time thinking might even be of the reflective sort suggested to occur in the conceptions of teaching studies reviewed previously. So it is possible that explicit instances of conceptions of teaching might occur and appear to be part of a recalled decision chain, but actually be artefacts of real time present thinking about teaching. In the present context such would be spurious. What this means is that a 'recall of recent thinking' approach might constitute a conservative empirical test; it is biased towards showing conceptions to be part of explicit planning when they might not have been.

In the present study, such a recent recall approach was employed. In interview, teachers of undergraduate classes were asked to select a small teaching episode from within a recent class, and to describe the thinking and reasoning that went into its planning. Care was taken in structuring the interviews to focus the interviewed teachers on recalling their past thinking, and to lessen the possibility that those teachers might engage instead in present time reflection on that thinking.

Method

Subjects

A sample of 29 university teachers was recruited from those with a strong teaching responsibility at first and second year undergraduate level. They were told that they would be asked to describe how they prepared what they eventually did in a recent class, which they would select. The final sample comprised six females and 23 males, ranged from lecturer to associate professor rank, and came from the fields of biology, chemistry, civil engineering, mechanical engineering, physics,

mathematics, law, English literature, politics, and history. Of 30 academics initially contacted, only one declined.

Procedure

At the beginning of each interview, interviewees were reminded of the purpose, that being to recall and describe the thinking that went into the planning of some small component or teaching episode within a recent class. Partly to provide framing for later interpretation, partly to cue interviewee recall, but partly also to put interviewees at ease, interviewees next outlined the subject (course, unit) from which their chosen class was taken. Following that, they gave a simple descriptive overview of what happened in the chosen class. Next, they focused in on a particular part of the class, and gave a more detailed description of what happened, as a simple recollection of the events. Finally, they were asked to recall their thinking at the time when that chosen part was being planned, and to relate how they had decided to do what eventuated.

The interviews deliberately focused on the description of the chosen teaching episodes, and their planning antecedents. No questions, such as 'What do you think teaching is?' or 'Are there any general approaches that you use in your teaching?', that might prompt a broader reflective discussion were asked. If any interviewed teachers offered such reflective comments, it was thus at their own initiative, and not directly prompted by the interview process. The intent was that the teachers' responses should be simple recollections of thinking that had occurred in the recent past, and should not include thinking initiated or prompted during the interview itself. Admittedly this was an ideal. However, the hope was that by deliberately requiring sequenced descriptions of the course or unit, the class, the chosen class segment, and only finally allowing the recollection of thinking that occurred during planning, there would be a priming effect for such recollection of thinking, and the intrusion of extraneous aspects would be constrained.

The main role of the interviewer was to guide the interviewee through the stages of overview, class description, and episode planning description. The only supplementary questioning that occurred was to solicit elaboration or extension when a response seemed artificially abbreviated, or clarification when a response's meaning was unclear. Such questioning would typically take the form of 'Could you extend on

that, or say more about your thinking there?' Interviews were tape recorded, and typically lasted about 30–40 minutes.

Developing the scoring categories

As a preliminary to analysis, interview transcripts were first read to detect a range of teaching and learning issues that were explicitly considered by at least some of the interviewed teachers. These issues were then used to construct a set of scoring categories. One category necessarily constructed, given the purpose of the present study, was whether there was any indication that general conceptions of teaching had been explicitly present in making more specific teaching decisions. The six categories eventually developed are not claimed to be definitive of all issues that are considered during planning, either in the present study or more generally. Rather, they are intended to comprise a representative sampling, and a vehicle for describing the variations in the manner in which such issues are considered during planning. The six categories and their definitional descriptions were as follows.

Sensitivity to existing student knowledge
Were any references made to student backgrounds, in terms of providing ideational anchorages? This could be selecting specific presentational items because they are expected to connect to background and experience, prompting recall of things expected to be prior learnings or experiences, or referring explicitly to particular related items known to be current, like things from previous classes.

> Take Newton's second law and apply it to the atmosphere .. I remind them about Newton's second law ... we talk about hydrostatic balance ... they already know a little about this so it is really revision ... we've been going along systematically ticking off these ideas ... I'm aiming for clear links, clear steps ... I come back and relate this to an idea that we'd talked about earlier in the course ... the thing that the students react most strongly to is the strong links between the different components, the strong logical structure. [Mathematics]

> I started off by asking them what alternative dispute resolution procedures were ... getting them to remember what we'd discussed about ADRs [alternative dispute resolution procedures] ... did

> enable me to link topics ... previously we'd discussed the role of tribunals in mediation ... so I brought negotiation and conciliation in as extras additional to mediation ... I reminded them of the similarities with the tribunal. [Law]

Prompting student engagement

In the described teaching episode, did the teacher deliberately or consciously prompt student active engagement in some manner? Were there questions, challenges, sections of interaction, which seemed to have the express purpose of prompting the students to connect with the material content?

> Einstein said let's assume that these little patches in which the special theory works are connected by 'tortuous paths' where light tries to take the shortest path between two points ... I started with an example of a bead sliding down a wire ... what's the shape of that wire that would give the quickest route down ... there was a fair bit of interaction between the students and myself ... then I said what do you know about earthquakes ... you get a curved path ... we spent 3 minutes discussing what would happen if the refractive index increased in a certain way [Physics]

> If you're going to mount a gear on a shaft, and that shaft is going to be carried by bearings, and it will transmit rotational torque to the gear, what happens at the gear? I'm trying to get them to tell me that there are going to be some sort of forces generated between the teeth. What direction will the forces act? Most will eventually say 'tangentially'. If the two teeth are together where is the force? They eventually come up with the mutual norm to the surfaces. [Mechanical Engineering]

Awareness of student thinking during teaching

In reporting the teaching episode, does it seem that *during* that episode the teacher intentionally considered the cognitive reactions that the students might be experiencing in response to the teaching episode?

> Connecting with students ... thinking the same thing at the same time ... when I'm drawing this, then I'm thinking what they might be thinking ... if I'm not thinking what they might be thinking, then I might not mention things that I need to. [Civil Engineering]

> They don't really enjoy the puzzle of trying to find the notes ... at first pass they find it really quite overwhelming .. you can't analyse this work without sight [of the score]. I don't know that this form is evident to the ear .. they have to find those visual patterns in this score ... they will get a picture of form. [Music history]

Student thinking as a basis for planning

In the *planning* of the teaching episode, is reference made to expected student thinking or mental processing peculiar to the teaching topic? Is the teacher imagining that quite particular, contextually localised or situated student thinking would or might be evoked, when deciding how to teach the topic, or in selecting the detailed materials and presentations to be used?

> Things that were in resolution in the student needed to be made unresolved ... to unravel things that on the surface look to be true and real and unquestionable ... the students' versions of human history are coming down more and more to very simplistic general propositions [History]

> Divided them into small groups of three ... posed a short hypothetical ... their question was 'what things they would think about in making up their minds as to what they would do?' ... intent was to facilitate discussion ... to get them to start thinking, because when somebody's talking to you, you start to think ... I wanted them actually to start committing themselves to thought and decisions as to what they thought was relevant. [Law]

Introspection as source of models of student thinking

Does the teacher explicitly introspect on his or her *own* thinking, specifically in relation to the material, as a basis for intuiting likely student thinking? This could be introspection on how they presently think through the material, or it could be recollection of how they might in the past have learned or understood the material.

> To think about things from the students' point of view ... if I can't follow the sequence of steps, then how in hell can I expect them to … could present the theory and then do an exercise ... in the past I've found that I just get lost with all the theory ... so I try to take the theory through a step and then apply that ... take the theory another step and apply that ... try to keep them with me a bit more [Civil Engineering]

> This is a new subject for me ... so I'm fairly insecure ... I think it's my insecurity that recognises the level of insecurity that the students might be feeling too. So I think that I've nutted it out [succeeded in understanding it], but I want to share with them what I've nutted out, to show them that this is the way that I've done it. [Law]

Explicit use of teaching conceptions in decision making

Was there any mention that would indicate that general, 'theory-like' conceptions of learning or teaching were consciously and deliberately evoked as a preliminary to, and as part of the planning that went into preparing for the teaching episode? Did the teacher report doing anything like *explicitly* using higher-order constructs or generalisations as functional, *intermediary* components of the chain of thinking, in planning the teaching episode?

> My general philosophy is that it is more effective to concentrate on a small area and explain it well, and show the logic behind that area, in depth ... if I want to illustrate a certain point ... what's the effect of this group in this reaction? ... I show one, not 50 because that just blows them away ... so I pick an example that I think is quite instructive, concentrate on it, and really focus in on what's going on. [Chemistry]

> It's easier to take students from something relatively simple to something more complicated .. rather than give them something complicated and pull it apart ... it's the way that I learned it, and understood it ... it was easy for me to develop the complexity in a way that was clear to me .. it should be clear to the students. [Biology]

The scoring scales used for each of the six categories comprised three rating levels. First, if the described event or action was directly indicated by at least one explicit statement in the protocol, a rating of *clearly present* was entered. Second, if there were no explicit direct indications, yet at least one statement clearly alluded to the described event or action indirectly, a rating of *apparently present* was entered. Finally, if there was no statement indicating the event or action, directly or indirectly, a rating of *not evident* was entered. For the sixth, 'use of teaching conceptions' category a fourth rating level was added. If statements referring to 'theory-like' conceptions of teaching were present, but their context within the protocol clearly indicated that they were more

reflections prompted by the experience of the interview, than direct descriptions of a step in planning decisions, then a rating of *present as* post hoc *reflection* was entered. The few occurrences of such 'reflective statements' were typically in the concluding stages of an interview, well past the point where the interviewee had described the specific thinking used in planning the teaching episode. Against each category, scoring was essentially a simple binary 'yes' versus 'no' decision against scale points, with no account taken of variation in frequency of mention.

A final point about the present scoring approach is worth emphasising, that being how it differs from the approaches typically used in the reviewed studies on conceptions of teaching. In the reviewed literature the categorisations represented variations in conceptions of teaching purported to be held by the interviewed teachers. Those categories would be defined by descriptions of how a teacher holding a related conception might operate or think. The scoring approaches in those reviewed studies would be to use the responses to open questions to allocate a teacher to a conception. It was the teacher who was categorised. In the present study, the teachers' responses are taken to be reasonably direct indicators of the thinking steps evoked as part of a quite specific and purposeful teaching activity. It is those particular thinking steps themselves that are categorised, and not the teachers exhibiting them.

On reading the present category definitions it might seem that observations similar to the *clearly present* ends could well be used to infer the presence of a student centred conception of teaching. But that is not the purpose here. The subjects were instructed to recall their thinking during planning for specific teaching events, so it is assumed that that is indeed what they did. Their responses are thus interpreted only to represent directly the thinking that occurred, and not to indicate something else. To repeat, the concern here is not about whether a conception might exist for a given teacher, but whether such conceptions are functional components in teachers' specific decision chains.

Results

Each interview protocol was scored by two independent raters. Following initial scoring, the raters compared their ratings, and discussed disagreements, which led to greater but not full agreement. In summary there remained disagreement on 22 (12.6%) of the 174 rating decisions. However, all disagreements were over the extent to which a category

event was seen as present, and not over whether it was present or not. When the *clearly present* and *apparently present* rating levels were pooled, and for the sixth category the *not evident* and *present as* post hoc *reflection* levels also, the raters were in 100% agreement. Given the often judgmental nature of deciding whether statements within a protocol constituted direct or indirect indications, these agreement levels demonstrate a very acceptable level of rating reliability.

Table 1 shows the numbers of teachers indicating each of the six category events. The first things to be noted are the frequencies for the first four categories. If the events described in those four can be taken as characterising what it might mean to operate in a student-focused manner, then the majority of the 29 teachers interviewed reported at

Table 1. Numbers of teachers indicating each of the category events

	Clearly present	Apparently present	Not evident	Present as *post hoc* reflection
Sensitivity to existing student knowledge				
	13 (18)	12 (7)	4 (4)	
Summary totals	25		4	
Prompting student engagement				
	12 (14)	10 (8)	7 (7)	
Summary totals	22		7	
Awareness of student thinking during teaching				
	12 (12)	10 (10)	7 (7)	
Summary totals	22		7	
Student thinking as a basis for planning				
	12 (12)	11 (11)	6 (6)	
Summary totals	23		6	
Introspection as source of models of student thinking				
	7 (13)	8 (2)	14 (14)	
Summary totals	15		14	
Explicit use of conceptions of teaching in decision making				
	2 (3)	3 (2)	19 (19)	5 (5)
Summary totals	5			24

The first figure in each cell is the count as per the first scorer, the figure in parentheses is that from the second.

least some specific, student-focused teaching and planning practices. Counting teachers whom both raters scored at either *clearly* or *apparently present*, 25 indicated taking some account of prior student learning or background, 22 indicated prompting student engagement, 22 indicated some awareness of student reactions and thinking during the teaching episode, and 23 indicated that expected student thinking was a basis for planning; indeed cross-tabulations showed that 19 of the teachers gave some indication of all four of these events, with only one giving no indication of any. Although perhaps not necessarily part of the definition of student focus, some 15 seem to have reflected on their own thinking as a source of ideas on how their students might react to the planned teaching episode and its material. In their descriptions of how they planned and taught a single, specific teaching episode, a clear majority of these teachers seem to recall thinking chains that might be consistent with holding student-focused conceptions of teaching.

However, when the sixth 'use of teaching conceptions' category is considered, it is not evident that this apparent student-focused teacher thinking was explicitly and necessarily guided by more superordinate generalisations. Both raters agreed that 18 of the teachers gave no indication at all that anything interpretable as a conception of teaching had been consciously used in the planning thinking. A further six teachers were identified as possibly indicating such conceptions, but both raters agreed that none had described these conceptions as being part of their planning processes. Only five of the 29 teachers in the sample indicated that some sort of articulated conception of teaching might have been an explicit component in planning decisions. In summary, while many of the teachers interviewed might well possess developed conceptions of teaching, the findings here do not support such conceptions being consciously evoked as a necessary reference point or guide in making detailed planning decisions related to any specific teaching episode.

A final analysis of the present observations considered whether some form of relationship between conceptions of teaching and detailed teacher thinking might yet be indicated. Even accepting that such conceptions seem not to be necessary components of that thinking, it might still be that teachers who explicitly evoke such conceptions are more likely to exhibit student-focused planning. Cross-tabulations compared the five 'conception evokers' against the 24 'non-evokers' on ratings for each of categories one through five, for each rater separately. While the small cell numbers involved suggest that interpretations should be cautious, none of the ten observed χ^2 values came close to the

critical values needed for a 0.05 significance level, with only two values being greater than one. The present data then seem to offer no suggestion that even the small minority of teachers who apparently explicitly evoked something akin to a conception of teaching during planning were at all different in their other specific teaching and planning thinking, let alone more student-focused. Indeed one of the 'conception evokers' whom both raters had rated at '*clearly present*' would seem to have been somewhat teacher-focused; 'I try to make lectures as if I am writing a formal paper'.

Supplementary analyses

During their interviews, the present teachers were given no intentionally prompted opportunity to express higher level conceptions of teaching. This was a deliberate aspect of the methodology. However, it meant that the present data allow no interpretations as to whether any such articulated conceptions might exist with these teachers, independently of whether such conceptions might be involved directly in detailed planning thinking. The simple presence of conceptions *per se* was not tested. So the possibility of relationships, albeit of types other than direct functional involvement, between conceptions and detailed planning could not be tested.

Some one to two months after the collection of the present interview data, each participating teacher was approached again and asked to complete the *Approaches to Teaching Inventory*, developed by Prosser and Trigwell (1999). Twenty-five of the total 29 completed the inventory. Those completing were asked to do so in relation to their teaching of the subject about which they had been interviewed. Completions occurred individually and independently, and inventory responses were returned by mail. The *ATI* had been developed to allow the reporting of general intentions and strategies related to the teaching of a single subject or unit, and was used here as a readily scorable surrogate for asking a general, reflective question. The intent in collecting the present teachers' *ATI* responses was to test for relationships between such generally focused measures and the detailed teaching actions that might be applied in the planning of a single teaching episode.

The *ATI* comprises 16 items, each describing some generally phrased intent or teaching approach, combined with a five-point response scale ranging from 'only rarely true of me in this subject' through to 'almost always true of me in this subject'. The inventory is structured as two

eight-item scales, namely a *Conceptual Change/Student-focused approach* and an *Information Transmission/Teacher-focused approach*. Each scale is further divided into two four-item *Intention* and *Strategy* sub-scales, with possible sub-scale scores ranging from 4 to 20, and with higher values indicating greater reported frequencies. The *ATI* has been deliberately designed to reflect the two-dimensional model of conceptions of teaching that its authors derived from their interview based research (Prosser and Trigwell 1999).

The numbers of teachers in lower, middle, and higher score intervals for each sub-scale are shown in Table 2. In global terms, the present sample reported mid-range to higher frequencies of student-focused intent coupled with mid-range to lower frequencies of student-focused strategies, and mid-range frequencies of teacher-focused intent coupled with mid-range to lower frequencies of teacher-focused strategies. That is, for both approaches, reports of intention seemed more frequent than those of strategy. However, for the present purposes the teachers here would seem to have been neither an extraordinary nor peculiar sample. Although the *ATI* did not directly ask it of them, it is not unreasonable to expect that were these teachers asked 'what they considered teaching to be' they would likely have been able to articulate a 'conception of teaching', and those expressed conceptions might well have varied.

Possible relationships between the present *ATI* responses and the teachers' recalled thinking when planning their described specific teaching episodes were considered next. For each of the six categories of teacher thinking during planning, the ratings from the two independent raters were combined. When both raters agreed that a given category event was clearly present, a point score of 3 (*Agreed present*) was assigned. When one or both raters rated an event as apparently present, a point score of 2 (*Partly agreed*) was assigned. When both raters agreed that an event was not evident in the planning thinking of the teacher, a point score of 1 (*Not evident*) was assigned. Recall that there were no instances of one rater scoring an event as present and the other rater scoring that same event as not evident.

The analyses performed were simple cross-tabulations of the six teacher thinking categories against the *ATI* sub-scale intervals shown in Table 2. Of the 24 χ^2 values calculated, none approached significance at $p < 0.05$; only two attained $p < 0.2$. There seemed no reliable indication that *ATI* sub-scale scores were related to the presence of any of the teacher thinking events as reported in the interviews. When asked to reflect on their teaching over the span of an entire subject or unit, the

Table 2. Numbers of teachers within score intervals for each ATI sub-scale

	Lower score values (4–10)	Middle score values (11–13)	Higher score values (14–20)
Conceptual change/student-focused			
Intention (ranged 4–20)	7 (28)	6 (24)	12 (48)
Strategy (ranged 5–16)	14 (56)	6 (24)	5 (20)
Transmission/teacher-focused			
Intention (ranged 7–15)	6 (24)	14 (56)	5 (20)
Strategy (ranged 8–15)	12 (48)	9 (36)	4 (16)

First figure in each cell is a simple count of teachers scoring in the interval; second figure in parantheses is percentage of group of 25.

intentions reported as being held, and the strategies reported as being used seemed to relate in no consistent fashion to the specific thinking events recalled as having occurred in the planning of a recent single teaching episode from that subject or unit. One interpretation might be that what the *ATI* measures is essentially not about what teachers do in the day-to-day detail of planning for teaching. If we can assume that responding to the *ATI* is akin to articulating a conception of teaching in response to general reflective questions like 'What do you consider teaching to be?', then the finding here perhaps reinforces the contention that such conceptions of teaching might not be directly and functionally involved in the day-to-day detail of planning for teaching.

Discussion and conclusions

The purpose of the present study was to investigate teacher thinking during the detailed planning of specific, single teaching episodes. In particular, the intent was to test whether any higher level conceptions of teaching that teachers might hold have any direct functional role in deciding the teaching actions planned for such specific episodes. The argument here is that previous research on teachers' conceptions of teaching seems consistently to have used quite open, general questions to elicit teachers' reports of their teaching conceptions and approaches. The findings from that previous research are thus sensibly interpretable as having shown only relationships between what teachers *report* when asked about their general conceptions, and what they *report* when asked about their general approaches. Findings of a relationship between such

reported conceptions and reported approaches need not indicate any functional, determining role for conceptions in the detailed planning and execution of day-to-day teaching; this latter role has not been demonstrated.

In the present study, teachers were asked to recall how they had thought through and planned some specific teaching episode that had occurred in a recent class. Importantly, these teachers were not asked general reflective questions about teaching. The expectation was that if higher level conceptions, or something akin to them, were functionally involved as conscious steps in planning, there would be some reference to them when these teachers recalled their preparations. In brief, the explicit use of higher level conceptions as a preliminary in the planning of specific teaching episodes was found not to have occurred at all consistently, or even frequently. Indeed the clear majority of respondents made no mention at all of any general, conception-like entities. In all cases the teachers were focused on their immediate local contexts. When describing teaching and learning, it was in the context of particular teaching actions related to the topic at hand, or particular student reactions or behaviours that might result.

The supplementary analyses of these teachers' *ATI* responses reinforced this view of planning processes. No consistent relationships were found between teachers' categorisations by the *ATI* as student-focused or teacher-focused, and the specific thinking that they employed in their planning decisions; the general approaches supposedly indicated by the *ATI* seem entities independent of the specific thinking steps evoked in detailed planning. For any model that might argue a strong functional role for conceptions, the present findings are at least difficult to handle. The present findings do not support the notion that conceptions of teaching play any sort of necessary, functional role in more specific, context embedded decision making by teachers.

These present findings align with those of a number of recent studies on higher education teaching that were outside a direct focus on teachers' conceptions of teaching. Kane et al. (2002) reviewed some 50 papers on academics' espoused beliefs about teaching, and concluded that there was simply insufficient support for a relationship between such espoused beliefs and specific teaching practices. Hativa et al. (2001) interviewed a sample of exemplary teachers, and likewise found no clear relationship between those teachers' espoused beliefs and principled knowledge, and their actual teaching practices; the teachers evidenced no conscious awareness of about half the specific practices that they actually used, and several practices that they mentioned were not

observed in their actual teaching. Mason (2001) interviewed a small sample of mathematics teachers on their teaching of specific topic material, and found that principled perspectives on what mathematics is, or on how mathematics might be most effectively learned, were singularly absent or only tangentially mentioned at most. Finally, McAlpine and Weston (2000) and McAlpine et al. (1999) studied teachers' decisions within very short time-frame teaching instances during a class, and found that the vast bulk of those decisions related to goals that were immediate and specific to those teaching instances, and concerned judgements about the detail of teaching methods and content within those instances. In research contexts broader than teachers' conceptions of teaching, the present suggestion that higher level conceptions might not be functionally involved in the detail of teacher thinking seems not extraordinary.

If conceptions of teaching are not a necessary part of detailed teacher thinking, then we return to the question of what role such constructs might play. What is not in dispute from previous research is that such conceptions of teaching, sometimes very sophisticated as well as clearly articulated (Entwistle and Walker 2002), can exist in teachers. As foreshadowed earlier, one possible interpretation that would fit with the present findings is that conceptions of teaching might essentially be outcomes from teachers' reflective activities. From time to time teachers might simply think back over recent and specific teaching experiences, consider how effective the practices might have been, or what outcomes might have been observed, and maybe speculate on how things might be varied in some future context. Such reflection might be irregular, loose, and unplanned, or very deliberate and strategic (see for instance Kane et al. 2004, analysis of expert teachers' behaviours). Occasionally teachers might recognise 'customary patterns' in their teaching. Sometimes, perhaps in response to collegial conversations, such recognised patterns might be articulated in the form of an internally consistent general view.

But no matter how well crystallised or articulated a conception of teaching might be, there need be no necessity that teachers might yet evoke such conceptions during subsequent detailed planning. Those later planning activities might still rely on enacting specific teaching practices used in previous teaching contexts seen to be similar. There need be no mediatory step in the planning process that involves the conscious recall and use of any previously articulated reflection. Within the interpretation suggested here, conceptions of teaching are seen as entities that can exist independently of detailed planning and teaching

activities. Relationships previously found between espoused conceptions and reported general approaches can be interpreted in terms of both essentially resulting from reflections on the same recalled concrete experiences, but with slightly different focusses.

The idea that how people might think about and describe their own behaviours need not relate to how those same people actually behave in real and particular situations is definitely not new. Some three decades ago Argyris and Schön (1974) made the distinction between an 'espoused theory of action' and a 'theory in use' to explain how the observed practices in many professions can be at variance with how the practitioners describe those practices. Also some three decades ago, findings that cross-situational consistency was perhaps more a rarity than the norm led to personality theories based on traits or generalised dispositions being challenged by interpretations that recognised the need to study individuals' behaviours in specific interaction with particular conditions (see Mischel 1973). For more than 40 years social psychologists have well understood that expressions of general attitudes are rarely predictive of behaviours in specific situations. Moreover, when there is a connection between attitudes and behaviours, the direction of influence is typically understood to be from behaviours to expressed attitudes; attitudinal positions are generated in response to behaviours, to fit with those behaviours (e.g., Myers 2002).

There is also an important methodological point here. Does the possibility that behaviours might be at variance with how they are described render verbal reports unreliable as a data source in making inferences about the reported behaviours? Ericsson and Simon (1980, 1984) investigated the use of verbal reports to infer something of a person's thinking or conceptual processes. They demonstrated that the validity and reliability that can be attached to those reports as data is a function of the empirical procedures used to elicit the reports, and how the person generates the reported information. The forms of verbal report in which we might have most confidence are those in which subjects verbalise the thinking of interest, as they are engaged in that thinking. Provided that the thinking processes are such that they are not substantially altered by the act of verbalising, we can be confident that the verbalisations are a valid sampling of the thinking. This can also be true for recent thinking acts, for which the subjects have some direct recollection of the thinking. However, when subjects have no direct memory of the target thinking, or have difficulty accessing such memory, making inferences from subjects' verbal reports is questionable. If in making a verbal report, '...subjects fail to recover from [memory]

information that has been requested of them, they may reason about the situation and report the results of their inferences instead of memories' (1984, p. 168).

Ericsson and Simon's methodological caution can be related to interview studies in the conceptions of teaching literature. In their own discipline fields, academics are usually well schooled in the need to develop internally consistent, coherent arguments on any topic about which they wish to expound. It would not be surprising were they asked something like 'What is teaching?', that they might bring to mind whatever relevant information they could, and then construct some sort of reasoned, integrated position in response. So long as such responses are used only as indicators of conceptions of teaching, or of capabilities to articulate such, then no particular methodological issues arise. But if such responses are used to argue something about the detail of teacher thinking then we could be venturing into dubious inferential territory. In line with Ericsson and Simon's (1984) caution, responses to 'What is teaching?' might not be direct recollections of teacher thinking processes, but rather the outcomes of reasoning about teaching.

In conclusion, what implications for teacher development might derive from an interpretation that there is no necessary functional role for conceptions of teaching in the detail of teacher thinking and planning? The prime implication would seem to be to focus on developing particular practices within specific teaching situations or contexts. The teachers in the present study were observed to evoke practices that were very closely embedded in the immediate teaching context. This observation seems to fit with what would be expected from our understanding of cognitive skills (see for example, Anderson 1982, 1987, 1990, 1993). Those skills that have been most recently and frequently executed in a given context, and proven effective in that context, will be the particular skills that tend to be evoked by the identification of that context. If we want a teacher to behave in specific, more 'student oriented' ways in a particular context, then we need to arrange for that teacher to practise those specific ways in that particular context. Should teachers show an inclination to articulate some sort of generalised conception, then well and good. But the primary development effects would be expected to come as generalised transfer effects, as experience with a range of specific 'student orientated' practices increased. The present findings suggest that focussing on developing a conception of teaching, albeit a desirable one, and hoping for some sort of broad ripple effect provides no guarantee that such conceptions would in any sense be evoked, and thus have influence, during detailed teaching activities.

A recent study by Hativa (2002) can perhaps serve as an illustration. A combination of student and teacher interviews, student and teacher questionnaires, and direct observations of teaching was used to select two teachers exhibiting demonstrably poor teaching effectiveness. From this same information, problem teaching behaviours were identified, which included things like presenting no framework overviews at lesson starts, or summaries at lesson ends, providing no transition signals during lessons, skipping steps in logical progressions, and presenting material at too abstract a level with minimal examples. Some problem behaviours seemed to align with more general beliefs expressed by the two teachers; lectures crowded with detailed information seemed to align with a belief in the necessity of 'covering the syllabus', and teacher only presentations seemed to align with a belief in strict lecturing as the only feasible method for teaching large classes.

Customised interventions were devised in which each teacher practised specific and highly targeted modifications to their problem teaching behaviours, under intensive and individualised supervision from an educational developer. These interventions focused on only a few modifications at a time, examples of which included writing out key lines of argument during preparation, as a counter to omitting logical steps in class; prioritising content sections that had been rated for importance, as a counter to 'presenting everything'; setting deliberate time limits of five minutes for teacher talk before using more Socratic questioning, as a counter to strict teacher only presentations. This intensive program ran over a four month period. The results showed clear improvement on all of the pre-treatment problem behaviours targeted by the interventions. But interestingly, the results also showed sympathetic shifts in expressed beliefs and attitudes that aligned with those treated behaviours, even though the strong emphasis in the interventions had clearly been on practising modifications to specific teaching behaviours.

The suggestion here is that teaching expertise should be seen as based on the existence of a rich repertoire of highly context-specific teaching practices, which enable proficient, rapid and adaptive responses to a wide variety of teaching situations (see for instance Calderhead 1996). That expertise is not defined by the presence of well developed and articulated higher level conceptions of teaching, nor in particular by the consistent and conscious evoking of higher level conceptions as component steps in the making of detailed and specific teaching decisions. Of course, well formed conceptions of teaching might well exist in some individuals. However, the suggestion here is that, in essence, such

conceptions might be better interpreted as being the results from reflections on one's teaching experiences, and thus more likely to pre-require such experiences than to determine them. If we concentrate on developing rich repertoires of teaching practices, maybe conceptions of teaching are entities that then follow, and thus more sensibly serve as possible indicators of the existence of those repertoires.

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