Declaration of Authorship

I, Andrew Neil, declare that this thesis entitled 'Developing the theory of the regulation of learning: how teachers regulate student learning during whole class discussion' and the work presented in the thesis are both my own, and have been generated by me as a result of my own original research. I confirm that:

- this work was done wholly or mainly while in candidature for a research degree at this University;
- where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
- where I have consulted the published work of others, this is always clearly attributed;
- where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
- I have acknowledged all main sources of help;
- where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself.

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UNIVERSITY OF SOUTHAMPTON

ABSTRACT

FACULTY OF SOCIAL AND HUMAN SCIENCES

SCHOOL OF EDUCATION

<u>**Doctor of Philosophy**</u>

DEVELOPING THE THEORY OF INTERACTIVE REGULATION: HOW TEACHERS REGULATE STUDENT LEARNING DURING WHOLE CLASS DISCUSSION

by Andrew James Neil

Background: the aim of this study is to bring a better understanding of the theory of interactive regulation. This is done by examining how learning is regulated by the teacher at a fine-grained micro level during whole class discussion. The study investigates the processes involved with the construct of 'micro regulation'. The decision to focus on micro regulation arose from an initial interest in formative assessment which, in its broadest sense, is concerned with how teachers elicit, interpret and use evidence of student understanding to better meet the needs of learners. The literature identifies a number of weaknesses in both the conceptualisation of formative assessment and in its provision. For example, despite an investment of £150 million pounds over three years to promote formative assessment (DCSF, 2008) it has been recognised that there remains a 'comparative weakness in provision' (OFSTED, 2009) whilst in the words of Professor Paul Black, formative assessment is 'not happening' (TES, 2010). Regarding how formative assessment is conceptualised, Wiliam (2011) notes the way in which formative assessment has begun to be seen (wrongly in his view) as an assessment tool rather than a continuous process. Further reading in the field led the author to begin to view the more immediate and responsive process of micro regulation as being of primary importance, especially given his perspective as a classroom teacher. The review of the literature therefore led to a shift in focus from formative assessment to micro regulation.

The construct of micro regulation is conceptualised as preceding formative assessment which is more concerned with making decisions about the next steps in instruction. The view was taken that it makes sense to examine the regulation that occurs prior to formative assessment as it is this initial regulation that may serve to inform decisions regarding whether or not subsequent instruction needs to be adjusted. Whilst some studies have been carried out into this more immediate form of regulation, there remains limited understanding surrounding this level of regulation as a continuous process, hence the need for this research. The literature review comprises two chapters. The first chapter attempts to make sense of formative assessment by examining the way in which it has evolved conceptually in the literature and the second chapter examines how regulation is conceptualised and highlights the main issues that this study addresses.

Research questions: the main research question asks 'What is the nature of the teacher-led regulation that takes place during whole class discussion?' Subsidiary research questions are asked about (i) the mechanisms that teachers use to regulate learning (ii) the way in which these mechanisms interact with other elements of the instructional activity (iii) the extent to which regulation is a continuous feature of the instructional activity and (iv) the perceived strengths and weaknesses of the regulation that takes place during the instructional activity.

Results and analysis: a qualitative methodology was developed in order to comprehensively describe the structure of both the whole class discussion activity and the regulation that exists within this activity. Teacher – student discourse that took place across 20 lessons (involving five teachers and three different curriculum subjects) was audio recorded and transcribed in full resulting in over 100,000 words of transcribed text. A qualitative content analysis was carried out using 'analytic induction', an approach to data analysis that involves the initial development of an analytic scheme (i.e. coding) followed by its subsequent modification (Znaniecki, 1934). A number of 'analysis-guiding' secondary research questions emerged inductively as the data analysis unfolded. During data analysis, the research literature was also been drawn upon with the result that the findings that emerged are both grounded in the data and validated by the literature. There were two distinct stages to the data analysis: descriptive and interpretive. Descriptive coding was used to describe the structure of whole class discussion activities and interpretive coding was carried out in order to identify the nature of the regulation that was evident within this structure.

Findings and discussion: it was found that the structure of whole class discussion may be described in terms of a series of three-part and extended question-response-feedback (QRF) cycles. Validation for these QRF cycles was found in the literature. From a comprehensive description of the whole class discussion activity, it has been possible to identify the nature of the regulation that takes place. Micro regulation was found to comprise both regulatory questioning and regulatory feedback. In answer to the first subsidiary research question, it was found that regulatory questioning involves the use of modifiers and probes, whilst regulatory feedback involves teachers in confirming, rejecting, reformulating, providing answers to their own questions and finally by prompting students to help one another to solve a problem. In answer to the second subsidiary research question, it was found that regulation is a significant part of what a teacher does: an enlarged concept of regulation has developed in which regulation takes place both at the point at which evidence of student understanding is elicited (through teacher questioning) and also at the point at which this evidence is used to move learning forward (through feedback); regulation is both fully embedded in, and at the same time is an identifiable part of, the instructional activity. In answer to the third subsidiary research question, it was been found that regulation is a continuous feature of the whole class discussion activity. Finally, in answer to the fourth subsidiary research question, it was found that the strength of the regulation that takes place during whole class discussion activities varies greatly. Regulation remains weak if it takes place only during the three-part QRF cycle in which it is restricted to regulatory feedback alone. There is a stronger regulatory influence in the extended QRF cycle where teachers modify their questioning, however there is also evidence of a number of weaknesses in teacher questioning including the 'guessing game', the 'poorly worded question' and the 'premature modifier'. Strongest of all is the regulatory influence exerted in extended cycles through the use of probing questions. The outcome of this study is a conceptual model that shows how experienced teachers regulate learning during whole class discussion as well as a definition of the construct micro regulation.

Conclusion: after summarising the main findings to come out of this study, this chapter discusses how teachers adjust the cognitive complexity of their questioning. Two further constructs emerge as a result of this discussion: regulatory questioning that has a 'constructive' function and regulatory questioning that has a 'deconstructive' function. A call is made for future research to focus less on regulatory feedback (which is often evaluative) and more on regulatory questioning which may be conceptualised in terms of these two functions. Such research would likely focus on emerging patterns of the adjustment of the cognitive complexity of questioning. In furtherance to this notion, a practical tool is proposed – the Regulatory Questioning Matrix – with which teachers might examine their own regulatory practice. Finally, this study draws to a close by taking a step back in order to consider the relationship micro regulation may have to other dimensions of interactive regulation. Together with formative assessment and self-regulated learning, micro regulation is considered a dimension of interactive regulation and an attempt is made to bridge the conceptual gap between these three dimensions by considering how they may interact with, and impact upon, one another throughout the process of teaching and learning.

Foreword

The origins of this research can be traced to two memorable conversations that have taken place during the 14 years that I have been a teacher of French. The first of these conversations was with a personal friend of mine who is Head of History in a secondary school. Formative assessment (also known as assessment for learning) had for some time been a popular topic of conversation between us. Prior to this particular conversation, we had both been working on developing peer- and self-assessment in our teaching, with variable degrees of success. On this occasion, however, my friend openly announced to me that he was no longer *doing* formative assessment. At that time, the notion of doing formative assessment (or rather *not* doing it in my friend's case) was one that struck a chord with me for in a sense and if the truth were told, I had also stopped doing formative assessment. After a relatively successful trial in which I had been working on peer-assessment strategies with a Year 7 class, I had been planning to develop further this idea by uploading audio feedback onto my school's Virtual Learning Environment. I had even begun to put together a research proposal for this very PhD, as is evident in the following quote from an email addressed to my supervisor Dr John Woollard:

> What I'm hoping to do is record digitally my feedback, post it to a VLE forum (set up as individual groups so feedback is private) and then have students annotate my comments by replying to the forum. The forums will then facilitate two-way communication between teacher and student. I'm interested in establishing whether this form of feedback is more effective than traditional feedback and also to what extent getting students to annotate my feedback assists the learning process…

Perhaps unsurprisingly the idea was soon dropped both in my teaching practice and also as a possible PhD research focus; other more important things had started to take priority, in particular the planning of lessons and the marking of students' work. Even if this innovative approach was now unlikely to come to fruition, was it really possible, I asked myself, to no longer *do* formative assessment? Was it something that could be switched on and off as easily as one does a light bulb? These were questions that I began to ponder, but in the absence of any immediate answers, was forced to leave hanging, albeit with a nascent desire to dig just that little bit deeper.

The second conversation took place during a French department meeting in the first few weeks of moving to a new school. I had been happily expounding the virtues of formative assessment (making criteria explicit, feedback in the form of two stars and a wish, peer- and self-assessment etc.) when a colleague came in with the rejoinder: 'oh, we already *do* all of that here'. Later, I found myself asking how it could be that they were already *doing* formative assessment. It is important to remember that at the time (September 2009) formative assessment was being promoted as an innovative, cutting edge practice almost certainly guaranteed to deliver impressive learning gains.

Additionally, the very nature of my new school (private, preparatory) made it highly unlikely that they would be involved in any of the latest Government initiatives to implement formative assessment. All the same, the French department at this school was already *doing* formative assessment, of this my colleague was most adamant.

This research, then, has brought me to a point where I can now see that both of my colleagues were quite justified in speaking of their approach to formative assessment in the way they did. What my first colleague had stopped doing, it has now become clear, was the innovative application of a formative assessment practice, whilst what my second colleague was involved in was more akin to the continuous regulation of learning. The purpose of this study, then, is to take a fine-grained look at this process of regulation, whilst at the same time not forgetting that the information elicited during this process may be used to plan subsequent episodes of teaching and learning. In this way, the two concepts – formative assessment and the regulation of learning – may be able to co-exist quite peacefully. What follows is an account of how the construct of 'micro regulation' has developed through empirical research.

Introduction

The American psychologist David Ausubel once remarked: 'the most important single factor influencing learning is what the learner already knows. Ascertain this and teach him accordingly' (Ausubel, 1968, p. vi). Of course, as educators will know from experience, teaching and learning is rarely a smooth and trouble-free process. As Perrenoud (1991, p. 9) points out, error and approximation on the part of the student are the rule and not the exception. Wiliam (2011, p. 47) being perhaps even more candid, suggests that at times 'children do not learn what we teach'. This view and how these difficulties may be overcome is expressed clearly by Sanmarti and Jorba:

> In all meaningful teaching, the teacher plans, more or less explicitly, how to teach certain content and the student body tries to adapt, with more or less resistance, to the teacher's demands. For this confrontation to be successful there must be a continuous regulation of both the teaching and the learning process.
>
> (Sanmarti and Jorba, 1993)

In broad terms, regulation takes place by identifying obstacles to effective learning, making decisions about the most effective means of overcoming these obstacles and then taking appropriate action. Wiliam (2007, p. 32) views this process as one of keeping learning 'on track', and this is a notion that remains throughout this study. From a review of the literature, it would appear that regulation takes a number of different forms and is generated by different agents (either the teacher or the students themselves). First, there is the theory of regulation in its broadest sense, second there is the comprehensive body of literature that has developed around the concept of formative assessment (which may be considered a dimension of regulation) and third there is the literature that focuses on the self-regulation of learning. In addition, there exists much research into scaffolding which may also be considered a form of regulation. The following sections of this introduction examine briefly each of these areas in an attempt to show both how they fit together conceptually and how they will form the basis of the research that is to be carried out.

The broad theoretical framework of the regulation of learning: first, much has been written about the general theory of regulation with noteworthy contributions from Allal (1988a) and from Perrenoud (1988; 1991a; 1991b; 1991c; 1998). Allal (1988a) identifies three types of regulation – proactive, interactive and retroactive – with each type referring to the moment at which the regulation takes place during the teaching and learning process. Perrenoud (1991c, p. 81), drawing on the work of Allal, explains that proactive regulation is more closely related to differentiation, whilst retroactive regulation involves what could be called 'micro-summative evaluation' (1991c, p. 81). Perrenoud notes how interactive regulation involves the 'visual navigation through these activities … to the initiatives taken to thoroughly engage pupils to help them to understand the purpose of the activity and find their own place in relation to it in order to prevent them from abandoning it at an early stage'

(1998, p. 88). Perrenoud (1991b) concedes that it is possible to consider interactive regulation as either a form of proactive or retroactive regulation and there is some truth in this in as far the teacher is continually engaged in either anticipating or remediating the responses of the students. However, as Perrenoud points out, there is good reason to develop the concept of interactive regulation: 'teaching situations should be made more interactive in terms of spontaneous feedback' (1991c, p. 84) before teachers resort to other methods of regulation, in particular retroactive regulation. As a useful starting place, Allal and Lopez (2005) define interactive regulation as follows:

> [Interactive] regulation contributes to the progression of student learning by providing feedback and guidance that stimulate student involvement at each step of instruction.
>
> (Allal & Lopez, 2005, p. 245)

It is clear from the above definition that the concept of regulation is wide ranging taking place 'at each step' of instruction[1]. At this point, it is possible to offer a visualisation of the developing conceptual framework (see Figure 1).
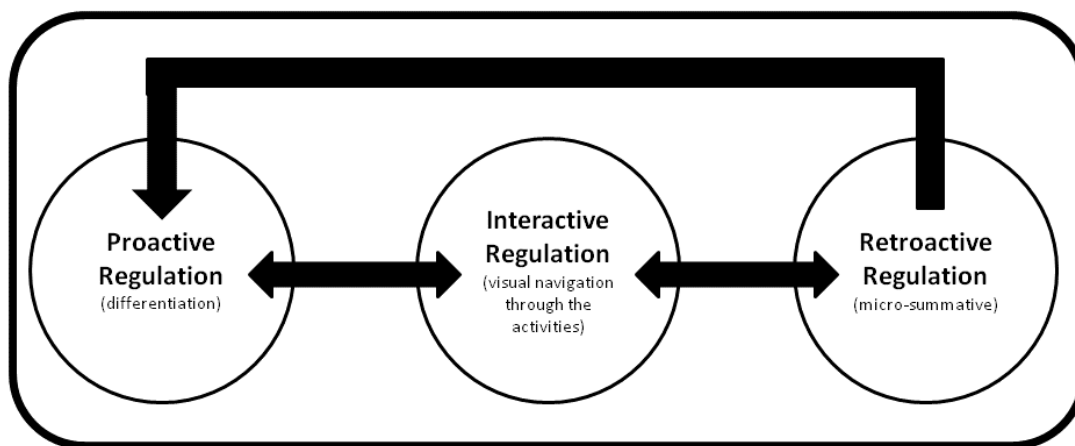
Figure 1   Three types of regulation

From the conceptual framework presented in Figure 1, there is a perceived relationship between the three types of regulation. The two-way directional arrows signify that a teacher may move freely between proactive and interactive regulation and retroactive and interactive regulation, whilst the one-way directional arrow signifies the way in which the evidence of student understanding collected through retroactive active may be used to inform proactive regulation (but not the inverse).

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[1] Throughout this study, the term 'instruction' is used to refer to the combined practice of teaching and learning and not in the more didactic sense of the word which is suggestive of active teachers and passive students.

At this point, it needs to be made explicit that the focus for this study will be on interactive regulation. It is evident, however, that this is an area that has already benefited from much research. Such research has been carried out in the area of formative assessment in particular, which this study conceptualises as a dimension of interactive regulation, and in the areas of self-regulated learning and scaffolding which, in their own way, are also further dimensions of interactive regulation. This introduction continues with a brief examination of these dimensions of interactive regulation before a more in-depth treatment is carried out in the literature review that follows.

Formative assessment as a dimension of interactive regulation: for the past fifteen years there has been much interest in formative assessment, also known as assessment for learning or AforL. The two terms are largely synonymous with the first being used mainly by the research community and the second used more frequently in educational institutions (this study adopts the term formative assessment). The following definition of formative assessment is proposed by Dylan Wiliam:

> An assessment functions formatively to the extent that evidence about student achievement is elicited, interpreted, and used by teachers, learners, or their peers, to make decisions about the next steps in instruction that are likely to be better, or better founded, than the decisions they would made in the absence of that evidence.

> (Wiliam, 2011, p. 43)

From this definition, it is clear that formative assessment concerns both teacher and students as agents in the decision making process, an observation which will be returned to towards the end of this study when the concept of self-regulated learning is brought into the discussion. Of particular interest in the above definition is the notion that evidence of student understanding is elicited, interpreted and used in order to plan *the next steps* in instruction. This is an important observation because this will help to distinguish interactive regulation in the form of formative assessment from the more immediate regulation that is the focus of this study.

This study considers formative assessment a form of interactive regulation because it involves the visual navigation through the activities that are, in the main, set up by the teacher. Wiliam (2011, p. 43) points out that formative assessment involves making decisions 'to adjust the instruction in order to better suit the learning of needs of the class'. It involves either doing something different, such as setting up a more suitable learning activity or, as Wiliam's definition also suggests, it may involve doing the same thing (for example, moving on to a new topic) but with more confidence than would have been the case had the evidence of student achievement not been elicited. This is what Wiliam refers to as making 'smarter decisions' (*ibid,*. p. 43).

Formative assessment is 'not happening': the Black and Wiliam review may be seen as a catalyst for Government investment in developing formative assessment practices in schools. An Assessment for Learning Strategy (2008) was developed, the main aim of which was to 'support schools in developing their assessment of pupils to enhance learning and improve the rate at which pupils progress' and £150 million pounds over three years has been invested to facilitate this (source DCSF, 2008). Formative assessment is now being recognised as a teaching strategy of 'very high leverage' (Hargreaves, 2004). High hopes have been placed on formative assessment as a strategy to improve student learning, however what appears to be happening in the classroom is perhaps less positive. For example, the Office for Standards in Education has reported that formative assessment 'is still not consistently embedded across phases and subjects and it remains a comparative weakness in provision' (OFSTED, 2009). In an article in the Times Educational Supplement in 2010, one of the two main proponents of formative assessment, Professor Paul Black, acknowledged that formative assessment 'isn't happening' in classrooms (TES, 2010). It is clear that many teachers are struggling to integrate formative assessment into their practice.

Focusing on alternative approaches to interactive regulation: formative assessment is not the only means of interactive regulation available to teachers and there exist alternative approaches that may offer fruitful lines of research into how to enhance student learning. Knowing where to begin is made difficult, however, because formative assessment is not clearly conceptualised in the literature. As Torrance and Pryor suggest, it lacks a widely agreed definition (1998, p. 10). The concept of formative assessment has developed over time, from a behaviourist view that involves testing followed by remediation to a more advanced concept that sees it as an on-going process in which the notion of students taking responsibility for their own learning becomes central. The concept does, however, appear to lack exactness. Some researchers, for example Black and Wiliam (2009, p. 10) talk about 'real-time adjustments during one-on-one teaching or whole class discussion', others such as Marshall and Drummond (2006, p. 137) refer to the way teachers 'probe', 'polish' and 'refine' the learner's contributions, and still others for example Torrance and Pryor (1998, p. 34) note how formative assessment may involve teachers in 'rewording' their questions or statements. It is clear that in each of these cases the teacher is involved in eliciting, interpreting and using evidence of student understanding (as per Wiliam's definition of formative assessment) however the extent to which these examples really involve making decisions about the next steps in instruction is questionable.

Widening the conceptual framework: there remains the question of whether it is appropriate to refer to this more immediate adjustment as formative assessment. This is particularly the case given that the boundaries have now been blurred between formative assessment and other areas of research in particular that into classroom discourse which focuses on the in-depth examination of how language is used. As such, it will become necessary in the literature review that follows to widen the conceptual framework by moving beyond formative assessment and considering the body

of research that exists into related areas. This will include examining work on classroom discourse with important contributions from Sinclair and Coulthard (1975), Mehan (1979) and Mercer (1995). In addition, a wider conceptual framework will necessitate examining research into scaffolding, focussing in particular on the work of Vygotsky (1978), Cazden (1979), Wood *et al.* (1976), Tharp and Gallimore (1988) and van de Pol *et al.* (2010). Furthermore, and linked to scaffolding, are the concepts of contingency and responsiveness that features in the work of van Lier (1989) and Jarvis and Robinson (1997). The result of examining related research will be a fusion between formative assessment and classroom discourse, two areas that have historically tended to remain separate. It is argued in this study that it makes sense both to consider formative assessment as *a form of* interactive regulation and to restrict how it is conceptualised to being concerned with adapting the next steps in instruction. Linked to formative assessment, in all likelihood informing those decisions regarding the next steps, will be the construct of micro regulation.

Self-regulated learning: one further dimension of interactive regulation remains to be discussed. In addition to formative assessment and what in this study is referred to as micro regulation, there is another dimension of interactive regulation which is that of self-regulated learning. Self-regulated learning is concerned with the internal cognitive processes of the student. Important contributions in this area have come from Zimmerman (1998) and Schunk and Zimmerman (2003) and, more recently and focusing more specifically on self-regulation in a social context, Grau and Whitebread (2012). Schunk and Zimmerman (2003) define self-regulated learning as resulting from 'students' self-generated thoughts and behaviours that are systematically oriented toward the attainment of their learning goals'. Students that are effective at regulating their own learning are able to generate and use feedback during the act of production. The agent here is clearly the student, however the part that the teacher plays remains central, especially in encouraging what Sadler (1989, p. 122) refers to as a transition from teacher-generated feedback to self-regulation which, he claims, is 'the goal of many instructional systems'. Self-regulated learning may therefore be considered a further form of interactive regulation and, whilst this study does not deal specifically with self-regulated learning, it is nonetheless an important concept and will be returned to at a later stage.

The proposed intervention: Perrenoud (1998, p. 99) notes how there exists a 'lack of completion of a theory of regulation' and calls for research that is designed to 'conceptualise and observe … the process of regulation at work in classroom situations … to observe more closely the mechanisms for regulating the learning process'. It is clear, however, that much research has already been carried out into particular dimensions of interactive regulation. Leahy *et al.* (2005) for example propose five key strategies of formative assessment that may be adopted to establish where the learner is currently with in his or her learning, where the learner is going and what next steps need to be done to get there (i.e. to close the gap). Wiliam (2011) takes a close look at these five strategies and offers a number of practical techniques that may be used to realise them. A further dimension of interactive regulation is clearly also self-regulated learning and here Zimmerman's (1998) three-part

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cyclical process of forethought, performance and self-reflection in self-regulated learning offers a useful means of conceptualising the internal mental processes of the student. There is also evidence of a crossover between formative assessment and self-regulated learning. This is particularly apparent in the form of Leahy *et al.*'s fifth formative assessment strategy 'activating students as the owners of their own learning' and which may be enacted by a self-assessment activity . In this way, self-assessment may be seen as a way in which teachers may facilitate or encourage self-regulated learning in students. The literature review that follows will examine these areas in more detail.

This study proposes to investigate the process of micro regulation that takes place prior to formative assessment which, as has already been noted, is more specifically concerned with the next steps in instruction. There are two reasons for this decision. First, whilst there is a rapidly expanding literature on formative assessment, it has been recognised that there exists a 'comparative weakness in provision' at best (OFSTED, 2009) and at worst that it is 'not happening' (TES, 2010). If formative assessment is indeed not happening, it makes sense perhaps to examine the regulation that occurs before formative assessment takes place as it is arguably this initial regulation that serves to inform subsequent formative assessment. Second, whilst there exists some research into this more immediate regulation, there would appear to remain a limited understanding surrounding the process at work, in particular the patterns that exist in the way teachers go about eliciting and using evidence of student understanding. For example, Jarvis and Robinson (1997) identified six categories of pedagogic functions for use in the analysis of this teacher responsiveness whilst Mercer (1995) identified a number of techniques that teachers use to respond to students however in neither of these studies is there any indication of how these techniques might combine to form part of a process of regulation. Where this process is in evidence, for example in Sinclair and Coulthard (1975) and in Mehan (1979), the focus is on classroom dialogue as a whole rather than specific features of this dialogue which could be said to have a regulatory effect.

It is by examining the fine-grained mechanisms that teachers use to regulate learning at a micro level that this study intends to make an original contribution to knowledge. In this study, it is first proposed to identify the mechanisms that teachers use at this micro level and second to examine the way in which these mechanisms are used. To achieve this, consideration will need to be given in particular to the research on scaffolding (including the concepts of contingency and responsiveness), as well as research into classroom discourse as it is through teacher – student discourse that learning is regulated. The outcome of the study will be twofold. First, this study will bring a better understanding of the theory of interactive regulation by examining how learning is regulated by the teacher at a fine-grained micro level. Second, the study will bring a better understanding of how this immediate form of micro regulation both relates to formative assessment and fits into the broader theory of regulation.

Review of the literature: the literature review that follows comprises two chapters. Chapter 1 focuses on formative assessment whilst Chapter 2 moves the discussion from formative assessment to micro regulation. There is a good reason for treating formative assessment first as it is arguable that the direction in which formative assessment has developed conceptually in the literature threatens an understanding of other forms of interactive regulation, in particular micro regulation. What must first be offered, therefore, is a clearer understanding of formative assessment that will enable the two concepts to be differentiated from one another. The purpose of Chapter 1, then, is to examine the way in which formative assessment has evolved conceptually; effectively Chapter 1 attempts to make sense of formative assessment. This chapter begins by discussing Black and Wiliam's substantial review Assessment and Classroom Learning (1998) and in so doing provides a context for the interest that formative assessment is currently experiencing. The discussion then proceeds by examining what may be considered a behaviourist approach which involves a three-stage process of instruction, testing and remediation. In such an approach, formative assessment happens after initial instruction has taken place. The concept of formative assessment is then brought up to date by considering contemporary approaches that derive from a social-constructivist perspective. These approaches locate formative assessment more firmly within the actual process of instruction. Important contributions in this area come from Tunstall and Gipps (1996a; 1996b), Torrance and Pryor (1998), Cowie and Bell (1999), Black *et al.* (2003), Marshall and Drummond (2006) and, most recently, from Wiliam (2011). Chapter 1 concludes by offering a clearer conceptualisation of formative assessment which is concerned specifically with using the evidence of student understanding to plan the 'next steps' in instruction.

The purpose of Chapter 2 is to discuss and highlight the main issues concerning regulation as it is conceptualised in the literature and in so doing to introduce the concept of micro regulation. This chapter begins by examining the key features of regulation and then proceeds to carry out a more specific review of the way regulation is conceptualised. This review involves broadening the discussion to include aspects such as scaffolding, classroom dialogue and the notions of contingency and responsiveness. It is towards the end of this chapter that the research questions that will be used to guide this study are introduced. The criticism may therefore be levelled that the first chapter of the literature review does not specifically cover aspects of the research. This may be true, however in the author's view such a criticism would be quite unjustified because of the importance of first setting out the context within which this study sits; the concept of the regulation of learning needs to be understood in relation to that of formative assessment.

Chapter 1 Making sense of formative assessment

1.1 Introduction

It is important to begin this chapter with the reassertion that the focus of this study is on what is referred to as micro regulation and not on formative assessment. It is clear, however, that the two concepts share a number of key characteristics. For example, both micro regulation and formative assessment involve a process of eliciting, interpreting and using evidence of student understanding. As such, it becomes important to differentiate between the two. Tunstall and Gipps (1996b, p. 194) point out that there has been a 'search for legitimation of formative assessment' in which 'activities once defined as teaching or learning strategies are being reconceptualised in assessment terms'. The consequence of this is that the concept of formative assessment appears to continually develop and evolve. As a result, formative assessment lacks a widely agreed definition (Torrance and Pryor, 1998, p. 10). This observation does not facilitate a study into micro regulation; it is important, therefore, first to make sense of formative assessment and only then to shift the focus from formative assessment to micro regulation.

It is argued here that Black and Wiliam's 1998 substantial review titled 'Assessment and Classroom Learning' is largely responsible for the huge amount of interest that formative assessment has enjoyed over the past fifteen years. As such, this chapter begins by examining this review in some detail. The way in which formative assessment has evolved conceptually is then considered, beginning by examining behaviourist approaches involving a three-stage process of instruction, testing and remediation. The behaviourist concept of positive reinforcement as developed by Skinner (1954) is briefly examined, as is the work of Bloom (1968) who incorporated the concept of formative assessment into his work on mastery learning. This is then built upon by reflecting on work on feedback by Kulhavy (1977) that is again in the behaviourist tradition. These approaches, taking place at the end of a phase of teaching, exist at the very limits of formative assessment. A conceptualisation of formative assessment then begins to move more towards a social-constructivist view of learning. The notion of using formative assessment to 'close the gap' is introduced, first through the work of Ramaprasad (1984) and then through the work of Sadler (1989). Towards the end of this chapter, it becomes clear how it may be possible to differentiate the two concepts of formative assessment and micro regulation. This is done in relation to the timing of the response by the teacher. Formative assessment is conceptualised as involving the use of evidence of student understanding to adapt *subsequent* teaching and learning whilst the regulation that this study will examine concerns the more *immediate* use of evidence of student understanding in order to keep student learning on track. It is important to make this distinction in order to avoid identifying all actions of the teacher with permanent formative assessment; in this way, the concept of micro regulation is clearly distinguished from that of formative assessment.

1.2 A catalyst for formative assessment: the Black and Wiliam review

Interest in formative assessment has been due in no small part to Black and Wiliam's substantial review 'Assessment and Classroom Learning' (1998). In fact, it does not seem unreasonable to make the claim that this review has been largely responsible for the interest from both researchers and teachers that formative assessment has been experiencing for well over a decade. For this reason, and to give a context to this research, the Black and Wiliam review is discussed in detail. Black and Wiliam reviewed material from 250 different sources in 76 different journals published between 1988 and 1997 and came to two main conclusions. First, Black and Wiliam concluded that formative assessment 'can lead to significant learning gains' (1998, p. 17) through the development of four areas of classroom practice: questioning to elicit information about students' learning, feedback that focuses on helping students to improve, sharing criteria, and peer- and self-assessment. Second, Black and Wiliam concluded that 'formative assessment is not well understood by teachers and is weak in practice' (*ibid.*, p. 20). These two claims will now be examined.

Formative assessment – the path to significant learning gains: after offering a definition of formative assessment, Black and Wiliam's review proceeds with a detailed examination of eight studies that, they argue, demonstrate the effectiveness of formative assessment. In all but one of the eight studies cited an experimental methodology is adopted, making use of pre- and post-tests as well as experimental and control groups. The first study by Fontana and Fernandez (1994 cited in Black and Wiliam, 2009, p. 10) documents how Portuguese teachers were trained in self-assessment which they used with students between the ages of 8 and 14. The self-assessment by the students took place on a mainly daily basis, with the students also being given the opportunity to choose their own learning tasks along constructivist lines. In this study the experimental group's mean gain was roughly double that of the control group. The second study by Whiting *et al.* (1995 cited in Black and Wiliam, 1998, p. 11) involved an intervention which Black and Wiliam described as a 'completely new learning regime for the students'. In excess of 7,000 students over 18 years were involved in this study, with almost all of the teaching being carried out by one teacher. The third study by Martinez and Martinez (1992 cited in Black and Wiliam, 1998, p. 11) involved two teachers, one experienced and the other inexperienced, engaged in developing mastery learning (Bloom, 1968). The students participating in this study were tested frequently, however Black and Wiliam do question whether the frequent testing that took place actually represented formative assessment. In the fourth study by Bergan *et al.* (1991 cited in Black and Wiliam, 1998, p. 12) the experimental group teachers were trained to 'implement a measurement and planning system' that involved the 'embedding of a rigorous formative assessment routine within an innovative programme'. The fifth study by Butler (1988 cited in Black and Wiliam, 1998, p. 12) focused on a non-curriculum-related experiment on the varying nature of teacher feedback (e.g. grade only, comment only, comments with grades etc.). Interestingly, the feedback in this study was not given by the teacher but by the

researchers themselves. In the sixth study by Schunk (1996 cited in Black and Wiliam, 1998, p. 13) students worked for seven days on seven packages of instructional material 'under the instructions of graduate students' and followed this up with frequent self-assessment. The seventh study by Frederiksen and White (1997 cited in Black and Wiliam, 1998, p. 14) was a science project which involved both peer- and self-assessment and the implementation of a 'carefully constructed curriculum plan'. The eighth and final study by Fuchs and Fuchs (1986 cited in Black and Wiliam, 1998, p. 15) was a meta-analysis of 21 separate studies which revealed a much larger effect size (0.92 compared with 0.42) for those teachers who were 'constrained to use the [assessment] data in systematic ways which were new to them'.

Black and Wiliam's main argument in citing these eight studies is the impressive learning gains, recorded mainly in quantifiable terms, which were achieved through the implementation of formative assessment. Whilst they do call into question the validity of some of the studies they cite, their claims remain bold: 'the consistent feature across the variety of these examples is that they all show that attention to formative assessment can lead to significant learning gains' (1998, p. 17). On reading the first section of this review, the reader is likely to be left in no doubt about the impressive learning gains of formative assessment; the authors make a very strong claim in favour of formative assessment.

Formative assessment – poorly understood and weak in practice: if the purpose of the first section is to demonstrate how 'attention to formative assessment can lead to impressive learning gains' (Black and Wiliam, 1998, p. 17), the second section of the review highlights the current poor state of formative assessment practice by teachers. In this second section, Black and Wiliam outline three main features of teachers' current assessment practices:

1. Formative assessment is not well understood by teachers and is weak in practice
2. The context of national or local requirements for certification and accountability will exert a powerful influence on its practice
3. Its implementation calls for rather deep changes both in teachers' perceptions of their own role in relation to their students and in their classroom practice

(Black & Wiliam, 1998, p. 20)

Black and Wiliam support these claims by citing three reports into formative assessment. The authors quote from the first report by Russell *et al.* (1995 cited in Black and Wiliam, 1998, p. 18), the claim that formative assessment is 'seriously in need of development'. From the second report by Daws and Singh (1996 cited in Black and Wiliam, 1998, p. 18) they highlight a rhetorical question that asks why the nature of formative assessment in science is 'so impoverished'. Finally, from the

third report by Dassa *et al.* (1993 cited in Black and Wiliam, 1998, p. 18) they draw on a quote claiming that 'teachers pay lip service to it [formative assessment] but consider that its practice is unrealistic in the present educational context'. The authors then go on to cite at length an American study by Johnson *et al* (1995 cited in Black and Wiliam, 1998, p. 18) into teachers' perceptions of formative assessment that argues that teachers are 'caught in conflicts among belief systems, and institutional structures, agendas and values'. Black and Wiliam paint a bleak picture in which even when changes involving formative assessment have been introduced with a high level of initial training and on-going support, progress has been slow; this, they argue, is because it is 'difficult for teachers to change practices which are closely embedded within their whole pattern of pedagogy' (*ibid.* p. 19).

Formative assessment – examples of practice: the next section of the review begins by evoking the concept of 'closing the gap' that was first introduced by Ramaprasad (1983) and then developed further by Sadler (1989). Black and Wiliam stress the importance of not viewing the student as 'the passive recipient of a call to action' (1998, p. 21) and argue that the teacher effectively has two options: he or she can remain responsible for generating formative feedback or he or she can begin to develop the ability to do this in the student (i.e. the skill to self-assess). Clear comparisons can be drawn here with Sadler (1989) who argued that the ultimate goal is for the student to develop the ability to monitor his or her own learning. A number of studies involving self-assessment are cited: Baird *et al.* (1991 cited in Black and Wiliam, 1998, p. 28) report the way in which 'teachers were helped to know more about their students ... by a strategy based on meta-cognitivism', Maqsud and Pillai (1991 cited in Black and Wiliam, 1998, p. 28) refer to the way in which the researchers 'trained a class of high-school students in self-scoring of their tests' and Delclos and Harrington (1991 cited in Black and Wiliam, 1998, p. 27) note how the students involved in their study were given 'meta-cognitive training'. Peer-assessment is also discussed however Black and Wiliam (*ibid.,* p. 29) acknowledge that 'it is often difficult to disentangle the peer-assessment activity from other novel activities'.

To summarise the later sections of the review, the fourth section examines in detail a number of strategies and tactics which the authors argue represent effective formative assessment. Black and Wiliam use what they call the 'temporal sequence of decisions and actions' (*ibid.*, p. 31) as a framework to break this section into four sub-sections: choice of task, discourse, questioning and tests and feedback. The fifth section of the review considers the position of formative assessment within more comprehensive teaching systems including mastery learning, assessment driven models, portfolios and summative examination models. The sixth focuses on feedback (both written and spoken) which the authors define as 'any information that is provided to the performer of any action about that performance' (*ibid.,* p. 53). A number of studies are cited that demonstrate the effectiveness of feedback including a study by Kluger and DeNisi (1996 cited in Black and Wiliam, 1998, p. 48), a study by Tunstall and Gipps (1996a) on the different types of feedback teachers

provide and a study by Dweck (1986 cited in Black and Wiliam, 1998, p. 50) on how students attribute success and failure. Also drawn upon is the work of Bangert-Drowns (1991 cited in Black and Wiliam, 1998, p. 51) who examined the effects of review tests that took place 'at the end of a block of teaching'.

In the final section of the review, Black and Wiliam discuss the prospects for the theory and practice of formative assessment. The authors acknowledge that many of the studies that they reviewed involved a particular pedagogy, 'one that in many cases has been constructed as the main element of the innovation under study' (*ibid.,* p. 53) and also question the value of the many quantitative studies that have used meta-analysis on the basis that these studies 'focus on narrow aspects of formative work, for example the frequency of questioning' and often lack 'adequate and comparable quantitative rigour' (*ibid.*, p. 53). Black and Wiliam also call into question the generalisability of some of the quantitative studies they cited on the basis that they ignored the quality of the teacher-to-student and student-to-student interactions that took place. Black and Wiliam make the case that 'a great deal of theory building still needs to take place in the area of formative assessment' (*ibid.,* p. 53) not least because 'there does not emerge … any one optimum model on which such a policy might be based (*ibid.*, p. 62).

1.3 A behaviourist view of formative assessment

Early work that can be linked to a contemporary understanding of formative assessment is often associated with a behaviourist approach to learning. Woollard (2010) notes how behaviourism, when applied to education, is a pedagogical approach whereby the 'behaviour of a learner is changed by positively reinforcing (i.e. rewarding) an appropriate behaviour'. For behaviourists, learning takes place in small, manageable portions that are 'contingent upon the accomplishment of each step' (Skinner, 1954, p. 94). Learning is sequenced in as far as one unit of work needs to be completed satisfactorily before the next one is attempted. Underpinning various teaching strategies such as task analysis, sequencing, modelling and shaping is the concept of positive reinforcement (Woollard, 2010). Behaviourists would argue that it is the positive reinforcement that effectively keeps learning on track, ensuring it takes place as intended. Shepard (2001, p. 12) notes how behaviourism, when it is applied to the concept of formative assessment, involves situations where 'instruction is of short duration, post-tests closely resemble pre-tests, feedback is in the form of being told the correct answers'. When it takes this form, feedback is referred to by Perrenoud (1998, p. 91) as 'criterion referenced evaluation'. Such feedback works at the limits of formative assessment, that is at the end of a phase of teaching, and may perhaps be more correctly termed 'micro-summative'. However, if the results of the testing are used to adapt future teaching then formative assessment can be said to have taken place. As Perrenoud (1998) points out, it relates more to levels of understanding and leaves processes in the shadows.

In a behaviourist approach to formative assessment there is a clear separation between initial instruction and subsequent remediation. This is seen clearly in Bloom's (1968) conception of mastery learning in which instructional units are divided into phases of activities with each phase being followed up by a formative evaluation (micro-summative) and remediation. In Bloom's model, the formative assessment becomes a specific event that takes place following instruction. In this approach formative assessment is confined to tests 'which are quite distinct from lessons even if one follows the other' (Perrenoud, 1998, p. 91). Such a concept of positive reinforcement focuses on correct responses whilst ignoring incorrect ones. The following section deals with this point in more detail, by examining a period when the focus began to shift away from positive reinforcement and towards the concept of feedback.

This shift began during the 1970s when research began to examine the benefits of providing feedback to learners that told them when they were wrong as opposed to merely when they were right. In studying these instructional effects of feedback, Kulhavy (1977) acknowledges that the two concepts of instruction and feedback should be considered together. Kulhavy's paper is significant both because of what it has to say about the way in which feedback was conceptualised more than 30 years ago, and also because of how the research that he carried out reflects the predominant methodology of the time. Kulhavy's approach to the study of feedback sits within a behaviourist model of learning. He refers, for example, to 'the terminal goal of transferring the information from text to learner' (*ibid*., p. 218), and how, once a mistake has been recognised, the learner can 'attempt to eliminate it, and replace it with correct information' (*ibid.,* p. 218). Kulhavy goes to great lengths to distinguish his work on feedback from earlier studies into positive reinforcement. Defining feedback as 'any of the numerous procedures that are used to tell a learner if an instructional response is right or wrong' (*ibid.,* p. 211), Kulhavy argues that feedback is more effective on incorrect responses. This is significant given that the more widely held belief at the time was that positive reinforcement was more effective on correct responses. Whilst it may be easy to criticise Kulhavy's work for being predominantly behaviouristic, as indeed Sadler (1989, p. 123) does, a close reading reveals much that is of interest regarding the concept of feedback and how it was beginning to develop during this period. Clearly, as the following quote demonstrates, feedback was beginning to develop into a more complex concept:

> If we are willing to treat feedback as a unitary variable, we can then speak of its form or composition as ranging along a continuum from the simplest "Yes-No" format to the presentation of substantial corrective or remedial information that may extend the response content, or even add new material to it.
>
> (Kulhavy, 1977, p. 211)

Kulhavy argues that nothing separates instruction from feedback, and notes how 'as one advances along the continuum, feedback complexity increases until the process itself takes on the form of new instruction, rather than informing the student solely about correctness' (*ibid.,* p. 211). Here there is little, if anything, to distinguish instruction from feedback; it may be considered that the two concepts in fact function in seamless interaction with one another. This is an important step forward, however in the author's view it is regrettable that, after highlighting the instructional properties of feedback (and therefore their inseparable nature), Kulhavy appears to retreat from this position: 'until more definitive research becomes available, this paper is willing to treat feedback as a unitary concept, leaving the complexity issue to some future reviewer' (*ibid.*, p. 212).

Kulhavy's paper offers a perspective on how the concept of formative assessment has developed over time. Kulhavy, for example, describes how feedback can have two effects on a learner's response: (a) to let him know when he is right, and (b) to correct him, or let him correct himself, when he is wrong. Whilst Kulhavy appears upbeat about the positive effects of feedback, noting for example how 'there is little doubt that feedback works to increase what a person learns from an instructional unit' (1977, p. 234), clearly there remains a separation between initial instruction and remediation in the form of feedback. The discussion now begins to shift away from considering feedback as a unitary concept and moves towards a broader concept of formative assessment in which, as will be demonstrated, feedback becomes a central feature of instruction.

1.4   1980s formative assessment: closing the gap

This section demonstrates how formative assessment begins to move away from the behaviourist notion of instruct – test – remediate to a conceptualisation of it which is both more embedded in instruction and where the students' role becomes more important. Much cited is the work of Ramaprasad (1983) whose paper on the concept of feedback in management theory is regularly applied to the field of education. Ramaprasad defines feedback in terms of its effect rather than its informational content, noting how 'feedback is information about the gap between the actual level and the reference level of a system parameter which is used to alter the gap in some way' (*ibid.*, p. 4). Ramaprasad stresses that this is feedback 'only if, and when, the information is used to alter the gap' (*ibid.*, p. 4). Ramaprasad makes three key points that are relevant to this study. First, there is the notion that feedback may be either quantitative or qualitative in nature. As such, feedback is not only concerned with correct and incorrect responses as previously had been the case. Second, as has been stated above, the focus is now on moving the learning forward, that is to say establishing what needs to be done to reach a particular objective. This is what Ramaprasad means when he talks about altering the gap. Third, there is a shift away from the locus of control being in the hands of the teacher (often associated with a behaviourist approach) towards the student taking more responsibility for his or her own learning (more of a constructivist approach). Ramaprasad notes how 'only when the awareness is translated into action (encouragement, reprimand, punishment) does the information about the shortfall become feedback' (*ibid.*, p. 8). Developing Ramaprasad's

concept of feedback from an educational perspective, Wiliam and Thompson (2007) identify three key processes:

1. Establishing where the learners are in their learning
2. Establishing where they are going
3. Establishing what needs to be done to get them there

(Wiliam & Thompson, 2007)

The key here is that feedback is only formative when it is actually used by the student to improve his or her performance: 'the learner first has to understand the evidence about this gap and then take evidence on the basis of this gap' (Black *et al*, 2003, p. 14). This brings into the discussion the concept of self-assessment (also known as self-monitoring).

1.5   Formative assessment enlarged to include self-monitoring

The third of Wiliam and Thompson's key processes is central to Sadler's (1989) much cited work on formative assessment in which, also building upon Ramaprasad's notion of closing the gap, he develops an argument for self-monitoring. Feedback, Sadler notes, is 'a key element of formative assessment and is usually defined in terms of information about how successfully something has been or is being done' (*ibid.*, p. 120). Here Sadler has effectively widened the conceptual field, placing the concept of feedback (and self-monitoring) within that of formative assessment: 'formative assessment includes both feedback and self-monitoring' (*ibid.*, p. 122). Sadler evokes Kulhavy regarding the instructional effects of feedback, quoting him as saying that feedback is 'any of the numerous procedures that are used to tell a learner if an instructional response is right or wrong' (Kulhavy,1977, p. 211). It was suggested above that Sadler has taken Kulhavy's words out of context, especially when Kulhavy also writes that 'the process itself takes on the form of new instruction, rather than informing the student solely about correctness' (*ibid.*, p. 211).

Sadler appears justified in arguing that the discussion has now moved beyond this stimulus-response approach towards an acceptance that student development is 'multidimensional rather than sequential' (1989, p. 123). For Sadler, 'it is more appropriate to think in terms of the quality of a student's response or the degree of expertise than in terms of facts memorized' (*ibid.*, p. 124). A consideration of the multi-dimensional nature of a student's development and the quality of a student's response represents a shift in thinking for with a multi-dimensional approach comes a shift towards constructivism and away from behaviourism's sequential approach and what Skinner referred to as the 'accomplishment of each step' (1954, p. 94).

Sadler deals with two main concerns: first that there is a 'lack of a general theory of feedback and formative assessment' (1989, p. 119) and second that even when students are provided with valid and reliable feedback 'improvement does not necessarily follow' (*ibid.*, p. 119). Sadler asserts that formative assessment is concerned with 'how judgements about the quality of student responses (performances, pieces or works) can be used to shape and improve the student's competence by short-circuiting the randomness and inefficiency of trial-and-error learning' (*ibid.*, p. 120). The notions of shaping and improving can clearly be linked to the third of Wiliam and Thompson's (2007) processes above. Self-monitoring is the key tenet of Sadler's argument: 'the goal of many instructional systems is to facilitate the transition from feedback to self-monitoring' he says (1989, p. 122). Sadler makes a clear distinction between feedback, which comes from the teacher, and self-monitoring, which is carried out by the student; the concept of formative assessment as posited by Sadler encompasses both feedback and self-monitoring. It is therefore the teacher's task to develop the skills of self-monitoring in his or her students. This self-monitoring should take place during the actual production of the work, and for this to happen the student must:

1. Possess a concept of the *standard* (or goal, or reference level) being aimed for
2. Compare the *actual* (or current) *level of performance* with the standard, and
3. Engage in appropriate *action* which leads to some closure of the gap

(Sadler, 1989, p. 121, original emphasis)

These three conditions clearly build on Ramaprasad (1983). In considering the first condition, Sadler notes how students must 'come to know what constitutes quality' (1989, p. 126). This condition, Sadler continues, involves the teacher in communicating standards to the students and may be achieved through a combination of verbal descriptors and exemplars which provide a practical and efficient means of externalising a reference level (*ibid.*, pp. 126 – 127). The second condition is met through the use of multiple criteria which Sadler notes can be either sharp or fuzzy. Importantly, quality is not necessarily judged in terms of correctness; marks or scores are assigned *after* the qualitative judgement has been made. Also noteworthy is the point Sadler makes regarding the final qualitative judgement of a student's work which 'is never arrived at by counting things, making physical measurements, or compounding numbers and looking at the sheer magnitude of the result' (*ibid.*, p. 125). In discussing the third condition, Sadler suggests that merely giving information about the gap will be insufficient in closing it:

> If the information is simply recorded, passed to a third party who lacks either the knowledge or the power to change the outcome, or is too deeply coded (for example, as a summary grade given by the teacher) to lead to appropriate action, the control loop cannot be closed and "dangling data" substitute for effective feedback.

(Sadler, 1989, p. 121)

It is essential, Sadler argues, that different options be considered if the gap is to be closed. Sadler discusses peer assessment as a technique that can be easily incorporated into lessons as the material of peers is so readily available. However, Sadler also concedes that the labour intensive nature of traditional approaches to formative assessment, of which peer assessment is an example, explains teachers' reluctance to engage with it: 'there is simply not the time to do it' he suggests (*ibid.*, p. 142). Without the resources to engage in time-consuming peer assessment, Sadler argues that teachers should concentrate on developing the skill of self-monitoring in their students. This self-monitoring takes place during the actual production of the work and in so doing reduces the reliance of students on the qualitative judgements of their teachers. Both self-monitoring (perhaps more commonly referred to as self-regulated learning) and feedback (which Sadler conceptualises as a feature of formative assessment) may be viewed as dimensions of interactive regulation.

1.6   A shift from behaviourist to social-constructivist approaches

Whilst Sadler's paper has a strong theoretical bias, the work of Tunstall and Gipps (1996a) is more grounded in classroom practice. These researchers studied eight primary school teachers and 49 Year 1 and 2 students in six schools across five London Local Education Authorities. The main focus of their research was on students' perceptions of the feedback they received from the teacher. Interviews lasting 30 to 45 minutes were conducted with teachers and students and dialogue from lessons was recorded. This study was carried out within the interpretative paradigm, a qualitative methodology was adopted and as such Tunstall and Gipps' approach is similar to the one adopted in this study.

Tunstall and Gipps define formative assessment as the process of 'appraising, judging or evaluating students' work or performance and using this to shape and improve their competence' (1996b, p. 186). For Tunstall and Gipps, formative assessment involves teachers using their judgement of students' knowledge, skills or understanding to feed back into the teaching and learning process, with this feedback taking the form of re-explaining a task or concept, giving further practice or moving on to the next stage. Tunstall and Gipps identified, coded and indexed the feedback that teachers gave to their students, and the outcome was a typology of feedback which the author has adapted in Figure 2 opposite.

	A	B	Behaviourist formative assessment	Social-constructivist formative assessment	
			C	D	
Positive feedback	Rewarding	Approving	Specifying attainment	Constructing achievement	**Achievement feedback**
Negative feedback	Punishing	Disapproving	Specifying improvement	Constructing the way forward	**Improvement feedback**

Evaluative   **Descriptive**

——————————————————————————————→

Figure 2   **Typology of feedback based on Tunstall and Gipps (1996a, p. 394)**

Teacher feedback, Tunstall and Gipps argue, appeared to function on an evaluative – descriptive continuum and was of four distinct types (not including what they termed 'socialisation' feedback which was more linked with behaviour): rewarding, approving, specifying attainment and constructing achievement. Feedback C, specifying attainment and improvement, was associated with a behaviourist approach which involved pre-specified criteria and sequential goals, whilst Feedback D, constructing achievement, was associated more with a social-constructivist approach. Feedback D was identified with the practices of pre-specified and emergent criteria, goal setting, self-monitoring, and collaboration between teacher and student. Interestingly, and as can be seen in the adapted model above, Tunstall and Gipps locate both Feedback C and D under the umbrella of formative assessment, whilst Feedback A and B (rewarding and approving) they locate outside of formative assessment. Contrary to the view offered by Shepard (2000) that formative assessment draws only on social-constructivist approaches to learning, Tunstall and Gipps' typology suggests that formative assessment is not restricted solely to one particular approach to learning: Tunstall and Gipps argue that 'formative assessment can be seen to draw on both behaviourist and constructivist theory' (1996b, p. 186).

Interestingly, Tunstall and Gipps note the confusion that existed in the minds of some students when talking about the feedback that teachers give them: 'a number of responses could be interpreted purely as examples of children reporting instructional approaches rather than children's perceptions of formative assessment' (1996b, p. 193). This is perhaps not surprising given the young ages of the children involved (from 5 to 7 years). More important perhaps is the observation made by these authors regarding how formative assessment is conceptualised:

The borderline between what is defined as teaching, feedback and learning strategies is very close ... The search for legitimation of formative assessment in constructivist approaches does mean that activities once defined as teaching or learning strategies are being reconceptualised in assessment terms.

(Tunstall & Gipps, 1996b, p. 194)

It is clear from this observation that the way formative assessment is conceptualised has evolved as the focus for teaching and learning began to shift from a behaviourist approach to a more constructivist one. This conceptual shift is not particularly helpful when an attempt is being made (as is the case here) to determine exactly what is meant by the term formative assessment.

1.7   Formative assessment as part of an on-going process

The work of Torrance and Pryor sought a conceptual shift for formative assessment from a behaviourist approach to a constructivist one which was seen more as part of the on-going process of teaching and learning. These authors note that 'if arguments in favour of formative assessment are to survive and prosper they must be articulated more fully and explicitly, and built on more than taken-for-granted assumptions about what constitutes 'good practice'' (Torrance and Pryor, 1993, p. 339). In a different paper, Torrance notes how the current approach to formative assessment is at best a 'fairly mechanistic and behaviouristic one' and at worst 'essentially summative' (1993, p. 340). A subsequent paper by Torrance and Pryor's (2001) reports the growing awareness (both in the minds of the researchers themselves and in the minds of the teacher participants) of formative assessment as a dynamic process. Torrance and Pryor's research offers a detailed description and explanation of how teachers go about implementing formative assessment. Unlike the Black and Wiliam approach to the development of formative assessment which appears to call for a 'radical change in classroom pedagogy' (1998, p. 10), Torrance and Pryor allowed the teachers participating in their study to begin to explore a repertoire of assessment strategies, in so doing 'getting away from the idea that somehow they had to implement something completely new' (2001, p. 628).

Torrance and Pryor's later paper (2001) sought to build on earlier research (Torrance and Pryor, 1998) in which they developed an analytic framework which was based on teacher's informal assessment practices with English primary school children aged 4 – 7. In this framework, Torrance and Pryor identify two 'ideal-typical' (but not mutually exclusive) approaches to assessment which they termed convergent and divergent. They conceptualise convergent assessment as assessment that is intended to discover '*whether* the learner knows, understands or can do a predetermined thing' (Torrance and Pryor, 1998, p. 153). Torrance and Pryor associate this type of assessment with a behaviourist approach to learning. Divergent assessment is conceptualised as assessment which aims to discover '*what* the learner knows, understands or can do' and is associated with a constructivist view of learning (*ibid.,* p. 154). Torrance and Pryor suggest that divergent assessment

'accepts the complexity of formative assessment' (*ibid.*, p. 154) whilst convergent assessment is less related to formative assessment and more akin to 'repeated summative assessment or continuous assessment' (*ibid.*, p. 153). These authors further note how 'the theoretical implications of divergent assessment are that a social-constructivist view of education is adopted' (*ibid.*, p. 154). Although the characteristics of Torrance and Pryor's two types of assessment are not mutually exclusive, their position does appear to be at odds with that of Tunstall and Gipps (1996a) who suggested that formative assessment can be present in both a behaviourist and a social-constructivist view of learning.

Directly linked to learning theory is a teacher's adopted pedagogy which, according to Woollard (2010) 'arises from considering theories related to learning and developing models for teaching'. Torrance and Pryor note that divergent and convergent assessment reflect the teachers' 'differing views of learning and the relationship of assessment to the process of intervening to support learning' (2001, p. 616). One teacher, for example, found herself more confident in dealing with the changing requirements of students in an 'ad-hoc' manner (rather than pre-planning questioning), another teacher found that 'more thought' was being put into the presentation of a new topic, whilst another felt 'more fluid' in lessons (*ibid.*, p. 64). Here there is the suggestion that formative assessment can be implemented in a number of different ways as opposed to simply applying a rigid, mechanistic practice. Moreover, terms such as 'ad-hoc' and 'fluid' have a continuous feel about them, akin perhaps to micro regulation which is more immediate and fine-grained than formative assessment. This point is covered below when Marshall and Drummond's concept of the letter and spirit of formative assessment is discussed and, of course, it is addressed in detail in Chapter 2 when the discussion shifts from formative assessment to micro regulation.

Torrance and Pryor note how in the early stages of their action research study formative assessment, whilst no longer considered as simply a test followed by remediation, was nonetheless perceived as something extra: 'assessment, even within the regular routines of the classroom, was seen as an additional task, separate from teaching' (*ibid.*, p. 621). The authors note how there was 'little sense at this stage that classroom assessment might be part of a wider process' (*ibid.*, p. 621). In the later stages of the study, the teachers not only 'began to operationalise changes in their practice' (*ibid.,* p. 622) but also began to view the framework more critically. The realisation grew that in practice the processes presented in the framework 'were often embedded one within another, or occurred in linked sequences or progressions' (*ibid.*, p. 622).

An example of this is found in the area of spoken dialogue where the clarification of task and quality criteria became the focal point and purpose of the dialogic interaction between teacher and students. Whilst the need to establish learning goals and criteria for judgement, and to communicate these clearly to students, had come through very strongly in the first part of the action research, Torrance

and Pryor found that 'actually accomplishing this came to be perceived as a continuing dynamic and interactive process' (*ibid.*, p. 622). This would have been a significant landmark for the authors as it began to emerge that the teachers involved in the research, as a direct result of their classroom practice, were beginning to conceptualise formative assessment as a continuous process, fully integrated into instruction, rather than a number of practices, separate from instruction. The teachers were beginning to see Torrance and Pryor's original 1998 model of convergent and divergent assessment as too restrictive; they experienced difficulty with the original model because it did not accurately reflect actual classroom practice. The outcome of Torrance and Pryor's research was a revision that moved away from conceptualising formative assessment as merely a distinct set of practices towards considering it more as a dynamic process. Torrance and Pryor's revised model places 'making task and quality criteria explicit' at the very centre of a trilateral model that involves questioning, observation and feedback is an attempt to represent this process; the interaction that takes place between them does so not as a set of practices but, in the authors' own words, as a 'continuing dynamic and interactive process' (*ibid.*, p. 622).

1.8   Blurring the boundaries between formative assessment and teaching and learning

Working on the premise that 'the complexity of classroom teaching and learning in general, and of formative practices in particular, necessitates detailed description of practice', Marshall and Drummond (2006, p. 136) describe the practice of four teachers who were already familiar with formative assessment but who engaged with it in markedly different ways. Data was gathered through the use of video recordings of lessons and open-ended interviews in which a conversational style was adopted. The findings of an earlier survey carried out by James and Pedder (2006) were also used to provide a focus for the data collection. In particular, Marshall and Drummond used the three categories identified in the James and Pedder survey (making learning explicit, promoting student autonomy, performance orientation) to aid more focused viewing and interpretation of the video recordings.

Marshall and Drummond begin their paper by evoking the four formative assessment practices identified in Black *et al.* (2003), namely rich questioning, feedback through marking, self and peer assessment, and the formative use of summative tests. Quickly, however, Marshall and Drummond distance themselves from considering formative assessment as merely the 'application of certain procedures' noting that it is more about the 'realisation of certain principles about teaching and learning' (2006, p. 135). Marshall and Drummond refer to Drummond's earlier paper in which formative assessment is 'essentially provisional, partial, tentative, exploratory and, inevitably, incomplete' (Drummond, 2003, p. 14), words that could also quite easily be used to describe the regulation of learning.

Two lesson features were selected by Marshall and Drummond, the choice of tasks and classroom dialogue. The practice of two teachers was then described and analysed for each feature. For both of the lesson features, Marshall and Drummond make an important distinction between teachers who engage in the 'letter' of formative assessment and those that engage in the 'spirit'. They suggest that teachers who engage with the letter of formative assessment make use of a number of practices 'which can be adopted' (*ibid.*, p. 146). Conversely, teachers engaging with the spirit of formative assessment were characterised as being involved in 'high organization based on ideas' (*ibid.*, p. 137). The practice of these teachers was considered to be far removed from the simplistic application of a set of practices.

On analysing the teachers' choice of tasks, it was found that whilst both teachers made criteria explicit and employed peer and self-assessment, the way they accomplished this differed greatly. The first teacher focused on accuracy and had an approach which, to use Torrance and Pryor's (1998) analytic framework, might be said to be convergent; this teacher engaged in the letter of formative assessment. Marshall and Drummond note how the second teacher's approach was more divergent in nature and did not focus on getting answers correct: 'suggestions all came from the pupils while she probed, challenged and polished their contributions' (2006, p. 139). The authors suggest that this teacher is more engaged in the spirit of formative assessment. The authors note the main differences between the two teachers as being concerned with 'the potential scope of the tasks and the opportunities these afforded for current and future pupil independence' (*ibid.*, p. 139).

Examining classroom dialogue, Marshall and Drummond again differentiate the practice of the two teachers along letter and spirit lines. For the teacher whose practice is associated with the letter of formative assessment, 'learning is made explicit through instruction, which is then teased out through a series of closed questions' (*ibid.*, p. 140). It is worth noting here that Marshall and Drummond use the term instruction to refer to a didactic approach to teaching and not, as is the case in this study, to refer to the combined practice of teaching and learning. Formative assessment practices as engaged in by this teacher appear as 'surface features' where 'one activity does not arise out of the previous one' (*ibid.*, p. 143). The authors note how there is a 'disjunction between the initial expression of the intended learning outcome ... and the subsequent activity' (*ibid.*, p. 140) which results in the lesson feeling 'fragmented' (*ibid.*, p. 143). In the practice of the teacher engaged in the spirit of formative assessment 'exchanges between pupils and between teacher and pupil are all understood in terms of refinements of the central aim' (*ibid.*, p. 140).

1.9   A tighter conceptualisation of formative assessment: the next steps

Marshall and Drummond have suggested that teachers who engage in the spirit of formative assessment 'probe', 'polish' and 'refine' the learner's contributions (2006, p. 137). In Torrance and Pryor's study, one teacher talks about how she rewords her question based on the response of the

student (1998, p. 34) however, it is unclear whether these actions on the part of the teacher actually represent formative assessment. If this were indeed the case, it would appear that the concept of formative assessment has begun to lose much of its exactness and a situation where it is an almost permanent feature has arisen. This would be surprising if it is accepted that, as Professor Paul Black observes formative assessment is 'not happening' (TES, 2010) or if it must be conceded, as OFSTED (2009) suggest, that formative assessment remains a 'comparative weakness in provision'. It is clear that not all actions of the teacher should be identified with permanent formative assessment; one part, that of formative assessment, should not be allowed to represent the whole. As such, a much tighter conceptualisation of formative assessment is needed.

It is argued by Gipps (1994) that formative assessment involves teachers in re-explaining a task or concept, giving further practice or moving on to the next stage. A practical example of this comes from the work of Cowie and Bell (1999). These researchers identified two types of formative assessment, 'planned' and 'interactive' with each type comprising three distinct phases. For Cowie and Bell, the purpose of planned formative assessment is to obtain information from a whole group of students about progress in their learning. This was usually done either during or at the end of a unit of work, and was characterised by a three-stage process that involves teachers eliciting, interpreting and acting. Strategies for eliciting evidence of student understanding included the use of questioning to judge students' progress and encouraging students to develop their own questions. The final part of the process – acting – was seen as an essential element that helped to distinguish planned formative assessment from summative assessment; in this way, the teachers acted on the information gathered to plan the next steps in instruction. The purpose of interactive formative assessment was to 'mediate in the learning of individual students' in a way that was 'fine-tuned' with 'lots of little purposes to support the major picture or purpose' (*ibid.*, p. 111). Interactive formative assessment took place during teacher – student interaction in small groups or with individual students and arose out of the activity rather than being a planned assessment activity. Interactive formative assessment is characterised by a three-stage process involving teachers noticing, recognising and responding. Cowie and Bell describe the way in which a teacher, after having elicited evidence of gaps in student understanding, had to revisit the topic and review her timeframe, in so doing adapting her goals. Cowie and Bell also describe a situation in which a teacher notices a misconception in the students' understanding and responds to this by switching from single to whole class teaching. In so doing, this teacher uses the information gathered in a formative way to better address the learners' needs.

It is clear how in Cowie and Bells' study, the teachers use the information elicited to plan the next steps in instruction. As Wiliam points out, this is a process that involves 'getting the best possible evidence about what students have learned and then using this evidence to decide what to do next' (2011, p. 50). What Cowie and Bell do not do, however, is give any indication of how the teachers involved in their study actually went about noticing and responding to students. Detail is missing

regarding the language the teachers used, the questions that they may have asked the students or the way the teachers may have followed these up. It is this more fine-grained process that is the focus for this study and which is referred to as the construct 'micro regulation'.

A feature that may hold the key to making sense of formative assessment is present both in Black and Wiliam's (2009) definition of formative assessment and in Wiliam's (2011) slightly revised definition. This is the notion that formative assessment involves a process of eliciting, interpreting and using evidence of student understanding to inform *the next steps* in instruction. The type of interactive regulation that this study will examine – micro regulation – also inevitably involves teachers eliciting, interpreting and using evidence. Crucially, the difference between the two concepts may be considered to lie in the timing of the response by the teacher. This study conceptualises formative assessment as involving the use of evidence of student understanding to adapt *subsequent* teaching and learning, whilst micro regulation is conceptualised as involving the more *immediate* use of evidence to keep student learning on track (this view of the difference between formative assessment and micro regulation is dealt with in more detail in Section 2.3).

1.10   Summary

The purpose of this first chapter has been to provide the context for the study. The Black and Wiliam review has been treated in depth because of the interest in formative assessment that it succeeded in generating and arguably continues to generate even today. Black and Wiliam's reference to a lack of an optimum model for formative assessment is echoed by Torrance and Pryor (1998, p. 10) who talk about a 'lack of agreement over the definition and practical realization of formative assessment'. It is this apparent confusion over how formative assessment is conceptualised that poses a problem for a study into the mechanisms that teachers use to regulate learning on a more immediate level. This is because of the clear overlap between the two due to the way in which both involve a process of eliciting, interpreting and using evidence of student understanding. This chapter has examined how the concept of formative assessment has evolved in the literature: formative assessment is conceptualised as a process of eliciting, interpreting and using evidence of student learning to plan *the next steps* in instruction. At the same time, there is a further dimension of interactive regulation that also involves eliciting, interpreting and using evidence of student understanding but which also involves responding to students on a more immediate level in an effort to ensure that learning takes place as intended or, as Wiliam notes, 'on track' (2007, p. 32). This dimension of interactive regulation is likely to include techniques such as the 'rewording' referred to by Torrance and Pryor's study (1998, p. 34) and the 'probing', 'polishing' and 'refining' referred to by Marshall and Drummond (2006, p. 137). The following chapter reviews in detail the way that regulation (proactive, interactive and retroactive) in general, and micro regulation in particular, are represented in the literature and also introduces the research questions that this study will address. In this way, the discussion is moved from formative assessment to micro regulation.

Chapter 2   From formative assessment to micro regulation

2.1   Introduction

In the previous chapter, formative assessment was positioned within the broader concept of regulation, such a move effectively resulting in formative assessment becoming one means, amongst others, of interactive regulation. This chapter takes a closer look at how regulation, in particular interactive regulation, is conceptualised in the literature. Section 2.2 begins by discussing three types of regulation – proactive, interactive and reactive – as identified by Allal (1988a) and considers the important distinction that Perrenoud (1998, p. 87) makes between two levels of interactive regulation – the regulation of the *activity* and the regulation of the *learning*. Interactive regulation is conceptualised as involving the 'visual navigation of activities' (*ibid*., p. 88) and this forms the basis of Section 2.3 which looks specifically at what this visual navigation may look like in practice at a fine-grained or micro level. In this section, examples of what may be referred to as micro regulation are discussed, in particular the way in which teachers probe, adapt, reword and simplify what they say to students on a more immediate level. Perrenoud (*ibid.*, p. 99) calls for research designed to 'observe more closely the mechanisms for regulating the learning process' and as such it is these mechanisms and, more specifically, how they are used by teachers to regulate learning that will be the focus for this study.

Sections 2.4 and 2.5 both examine the literature that is clearly related to regulation but which does not necessarily refer to it as such. Section 2.4 discusses Vygotsky's social-cultural theory and the notion of the Zone of Proximal Development (ZPD) and, importantly, the literature on scaffolding. The notion of contingency, in particular the extent to which teachers' responses are both meaningful and authentic, is discussed as this will be central to the theory of micro regulation as it develops. In Section 2.5 it becomes necessary to broaden the discussion to consider the literature that exists on classroom discourse and in particular on questioning, whilst in Section 2.6 the importance of examining two specific characteristics of regulation (in as far as it takes place both at the point at which evidence of student understanding is *elicited* and also at the point at which this evidence is *used* by the teacher to move learning forward) is emphasised. Linked to this (but not fully involving regulation) are the three-part Initiation-Response-Evaluation (IRE) and Initiation-Response-Feedback (IRF) sequences as revealed by Sinclair and Coulthard (1975) and Mehan (1979) respectively. In Section 2.7, the main issues to emerge from the review of the literature are highlighted. These concern the extent to which existing studies have tended to categorise teacher responses (e.g. confirmation, clue, accept etc.) and the way in which such studies have focused either on the way teachers elicit evidence of student understanding or on the way in which it is used by teachers to move learning forward but not both. It becomes clear, however, that categories do not exist in isolation and the provision of a list of techniques or strategies is only likely to prove of limited use. Likewise, it is also clear that regulation is present at both of the points in the process (the eliciting and the using of evidence of student understanding). Whilst some studies have examined both sides of this process, there is little to suggest the ways in which the mechanisms

used to 'elicit' and 'use' evidence may interact with, and impact upon, one another. Furthermore, these studies do not focus specifically on interactive regulation which is concerned with the way in which teachers respond contingently to students. The main issue therefore concerns a lack of understanding surrounding the process of interactive regulation, specifically that dimension which unfolds in real-time and on a more immediate basis than formative assessment. These issues form the underlying rationale for this study, which is to bring a better understanding of the theory of interactive regulation by examining how learning is regulated by the teacher at a fine-grained micro level. Finally, Section 2.8 introduces the main and subsidiary research questions that will be used to guide this study. These questions focus on first identifying the mechanisms that teachers use to regulate learning on a micro level and then, more specifically, on understanding the processes that take place.

2.2   Introducing the concept of the regulation of learning

Published in the same journal as Black and Wiliam's 1998 review on formative assessment was a paper by the French language researcher Philippe Perrenoud which called for 'the fusion or dissolution of formative evaluation into a larger conception of the mechanisms of regulation' (1998, p. 99). Perrenoud takes Black and Wiliam to task for examining formative assessment practices which, he argues, are 'weak in points of comparison' (1998, p. 92). Perrenoud criticises the predominance of experimental or quasi-experimental research designs favoured by English language researchers noting how research in this tradition 'appeal to the common sense inspired by behaviourism, which suggests that all feedback assists learning, or to the classic teaching of control, with the trilogy of: objectives, criteria-referenced tests and remediation' (*ibid.*, p. 86). This approach can be contrasted with that adopted by the researchers Allal and Lopez (2005) who carried out a review of French language literature on formative assessment in which only two of the 105 articles in their database involved experimental versus control group comparisons (*ibid.*, p. 252). Perrenoud stresses how a review of the French language literature would 'attempt to construct a conceptual field more complex than that of Black and Wiliam' (1998, p. 86). He argues in favour of going beyond the comparison of those students who have experienced formative assessment and those who have not:

> Clearly there is some merit in verifying whether regular feedback encourages more substantial, better integrated or more stable learning amongst a greater number of pupils, and therefore raises the level of understanding. This no longer seems to me, however, to be central to the issue. It would seem more important to concentrate on the theoretical models of learning and its regulation and their implementation. These constitute the real systems of thought and action, in which feedback is only one element.

> (Perrenoud, 1998, p. 86)

Perrenoud (1998, p. 85) notes how 'for the last 10 to 20 years, French language contributions associate more and more closely formative evaluation, the didactic content of disciplines and differentiation in teaching around an integrated concept: individualised regulation of learning'. Interactive regulation is defined by Allal and Lopez (2005, p. 245) as contributing 'to the progression of student learning by providing feedback and guidance that stimulate student involvement at each step of instruction'. As was noted in the introduction, this will inevitably involve a process of identifying obstacles to learning, making decisions about how best to overcome these obstacles and then taking action to achieve this.

Perrenoud draws on Allal's (1988a) three types of regulation – proactive, interactive and retroactive – with each type referring to the moment at which it features during the teaching and learning process (see Figure 1). Perrenoud (1991c, p. 81) explains that proactive regulation 'takes place when the pupil is set an activity or enters a learning situation'. Proactive regulation takes place at the very limits of formative assessment (Perrenoud, 1991b, p. 5) and is arguably more closely linked to differentiation in which the teacher sets up situations in which each student is most likely to learn. Retroactive regulation takes place 'after a shorter or longer learning sequence, on the basis of micro-summative evaluation' (1991c, p. 81). Retroactive regulation, Perrenoud (1998, p. 91) notes, is weak 'when limited to a subsequent criterion referenced evaluation which, at the end of a phase in teaching, highlights gaps in knowledge, errors and an insufficient grasp of the subject, leading to remediation'. This type of regulation has clear similarities with Bloom's (1968) mastery learning in which each activity phase was followed by a formative evaluation and subsequent remediation. Interactive regulation takes place throughout the learning process and works on two levels: the first level involves the 'setting up of situations which favour the interactive regulation of learning processes' and the second involves the 'interactive regulation of these situations' (Perrenoud, 1998, p. 88). Such a distinction is important, Perrenoud argues, in order to 'avoid identifying all actions of the teacher with permanent regulation' (*ibid.*, p. 88). Perrenoud goes to great pains to emphasise the difference between these two levels of regulation: 'regulation [of learning] does not include setting up the activities suggested to, or imposed on, the pupils, but their adjustment once they have been initiated' (*ibid.*, p. 88). The activities, Perrenoud argues, are merely 'contrivances to assist learning' (*ibid.*, p. 90) and as such 'can only have an indirect effect on mental processes' (*ibid.,* p. 89). What is more, Perrenoud argues that the regulation of the activities 'does not always have as its main objective the regulation of the learning process' (*ibid.*, p. 88). There may be some truth in this argument, for it is quite conceivable that the activity itself may be used by the teacher for other purposes other than learning with the most obvious one being to maintain order in the classroom.

The distinction that Perrenoud makes between the (interactive) regulation of the learning and the regulation of the activity is fundamental. To illustrate the difference between the two levels, Perrenoud uses the example of a teacher who is helping a student to understand a theory. In such a situation, merely regulating the activities (i.e. moving from one activity to another without any

regulation or adjustment from the teacher) will not facilitate the learning of the theory. This is because the mastery of the activity itself is not the goal; the real goal is to acquire the central concepts that underpin the theory itself (*ibid.*, p. 90). What is needed for this to take place is interactive regulation, in the form of continuous communication, between teacher and student. Conceptually, for Perrenoud the regulation of the learning process is confined to 'the visual navigation through these activities … to the initiatives taken to thoroughly engage pupils to help them to understand the purpose of the activity and find their own place in relation to it in order to prevent them from abandoning it at an early stage' (*ibid.*, p. 88).

2.3 The visual navigation of activities on a micro level

In the above section, it was noted how Perrenoud conceptualises the regulation of learning as involving the adjustment of activities 'once they have been initiated' (*ibid.*, p. 88) and how he conceives of interactive regulation in particular as involving the 'visual navigation' through these activities (*ibid.,* p. 88). As can be seen from Chapter 1, such visual navigation is particularly well documented regarding formative assessment (which in this study is conceptualised as a form of interactive regulation). The main purpose of the previous chapter was to offer a clearer, and indeed restricted, conceptualisation of formative assessment. This was achieved by considering formative assessment as involving a process whereby evidence of student understanding is elicited, interpreted and then used to 'make decisions about the next steps in instruction' (Wiliam, 2011 p. 43). At the same time as making decisions about the next steps in instruction, teachers will also be involved in more immediate navigation through the activities. This is clear from the following excerpt from an interview with a teacher of students with special educational needs (Torrance and Pryor, 1998).

> You're listening to their responses to see if they've actually understood the concept that you're trying to put across and if they haven't then you have to *reword it* ... and *try again* and you've, you've got to *watch them the whole time*, because you may think that they've understood but when they try and put something on paper, it becomes obvious that they haven't or there's something they've forgotten or something they've got confused, at which point you *intervene again* ... if necessary *modify* what you're wanting them to do so that they're more able to cope with it.

> (Torrance & Pryor, 1998, p. 34)

This excerpt demonstrates the way in which two dimensions of interactive regulation – that is to say formative assessment and micro regulation – appear to work together. The micro regulation takes place before the formative assessment and, as this teacher notes, involves rewording concepts, trying again, and constantly observing the students. The formative assessment comes second and in this example involves the teacher in modifying what she wanted the students to do so that the

activity is more suited to their current level of understanding. Torrance and Pryor describe another activity in which the teacher helps students to categorise leaves according to their size, shape and colour. This teacher probes one-word answers 'so that the pupils' vocabulary is extended while at the same time their level of understanding is confirmed', and 'adapts her questioning to the children's responses' (*ibid.*, p. 148). The rewording in the first example and the probing and adapting in the second are clear examples of the way in which the visual navigation through the activities may take place on a more immediate micro level. It is the mechanisms that are present at the point of this immediate adjustment, termed micro regulation, that are the focus for this study. This is done in order to satisfy Perrenoud's call for research designed to 'observe more closely the mechanisms for regulating the learning process' (*ibid.*, p. 99). In order to understand where this study intends to make an original contribution to knowledge, it becomes necessary to consider the literature that already exists on approaches that may be considered regulatory.

2.4   The ZPD, scaffolding and the notion of 'contingency'

The discussion is now broadened to examine the research that exists into more immediate approaches of eliciting, interpreting and using evidence of student understanding. These approaches move beyond that of formative assessment which, as the definition notes, is concerned with planning the next steps in instruction. The concept of keeping learning on track through teachers' micro regulation would appear to link to Vygotsky's socio-cultural theory. Socio-cultural theory states that mental processes are mediated and developed through social interaction, and in particular through the use of language. The development of mental processes take place in what Vygotsky referred to as the learners' Zone of Proximal Development (ZPD). The ZPD is defined as 'the distance between the actual development level as determined by independent problem-solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers (Vygotsky, 1978, p. 86). Effectively this means that the guidance offered by the adult must be one step ahead of the current level of development of the child / learner. Kublin *et al.* (1998, p. 287) emphasise how Vygotsky 'described learning as being embedded within social events and occurring as a child interacts with people, objects, and events in the environment'. Vygotsky's social-cultural perspective effectively highlights the importance of talk as a tool for learning and, according to Tharp and Gallimore (1988, pp. 6 – 7), has 'profound implications for teaching, schooling, and education'.

One approach to teaching which links to Vygotsky's concept of the ZPD is scaffolding. Wood *et al.* (1976, p. 90) offer the following definition of scaffolding as being concerned with 'those elements of the task that are initially beyond the learner's capacity, thus permitting him to concentrate upon and complete only those elements that are within his range of competence'. Scaffolding therefore refers to the gradual withdrawal of adult control and support in direct relation to a child's increasing mastery of a given task. In an attempt to offer a classification of scaffolding, Wood *et al.* posit that scaffolding comprises six functions:

- recruiting interest in the task
- reducing the degrees of freedom (simplifying the task)
- maintaining direction toward the goals of the task
- marking critical features
- controlling frustration
- modelling the preferred procedures by demonstrating

(Wood *et al.,* 1976*,* p. 98)

Building on Wood *et al*'s classification, van de Pol, Volman and Beishuizen (2010) provide the following six means to support the learning activities:

- Feeding back involves the provision of information regarding the student's performance to the student him/herself.
- The giving of hints entails the provision of clues or suggestions by the teacher to help the student go forward. The teacher deliberately does not supply the entire solution or detailed instructions under such circumstances.
- Instructing involves the teacher telling the students what to do or explanation of how something must be done and why.
- Explaining refers to the provision of more detailed information or clarification by the teacher.
- Modelling includes the demonstration of particular skills.
- Questioning involves asking students questions that require an active linguistic and cognitive answer.

(van de Pol, Volman and Beishuizen, 2010, p. 277)

It would appear that in the literature the term scaffolding is overused, becoming synonymous with the notion of support given by the teacher to the student. As Wang (2011, p. 47) points out, however, scaffolding 'is not simply another word for help. It is a special kind of help that assists learners to move toward new skills, concepts, or levels'. In an attempt to provide a tighter conceptualisation of scaffolding, van de Pol, Volman & Beishuizen (2010, p. 277) distinguish three key characteristics: contingency, fading and the transfer of responsibility. Each one of these characteristics is discussed below with the third – the transfer of responsibility – being linked to the concept of self-regulated learning.

The notion of contingency: it is inevitable that contingency will play a central role in this study and for this reason it deserves some elaboration here. The notion of contingency has been used in the

study of turn taking in conversation (Sacks, Schegloff and Jefferson, 1974) and in the study of oral proficiency interviews (van Lier, 1989) and has subsequently been adopted as a means of making sense of the interaction that takes place in the classroom, in particular with regard to second language acquisition. Recognising the way in which the concept has developed, Baynham (2006) describes contingency as referring to:

> …the situated, responsive adaptation in interaction typical of casual conversation, but in pedagogical contexts often involving a departure from the script of the lesson plan in local response to some intervention from a student…

(Baynham, 2006, p. 26)

The notion of responding to unpredictable utterances is central to the concept of contingency. For example, van Lier (1996) characterises contingency as talk that is unpredictable yet responsive to others' talk on a turn-by-turn basis. When talk is contingent, van Lier (2001) suggests, 'utterances are constructed on the spot, rather than planned in advance' (p. 99). For van de Pol, Volman and Beishuizen (2010, p. 274) contingency is synonymous with responsiveness, tailored, adjusted, differentiated, titrated, or calibrated support. These authors suggest that a teacher acts contingently when he or she 'adapts the support in one way or another to the students' (*ibid*., p. 275). Jarvis and Robinson (1997) refer to two types of responsiveness: 'the minute by minute choice of contingent response to what the students say and the ability to use it and 'build on it' and the ability to identify potential problems and raise them as topics for discussion'. Here again the two dimensions of interactive regulation are evident: the minute by minute choice of contingent response equates to some extent to micro regulation, whilst raising topics for discussion equates more to formative assessment. Cullen (2000, p. 125) draws on the work of Jarvis and Robinson (1997) to define responsiveness as 'the general quality the teacher exhibits of listening and responding meaningfully, and with genuine interest, to the content of what the student is saying'. Therefore, it is clear that when a teacher acts contingently, he or she is not merely responding to what a student says or does but, crucially, is doing so in a meaningful and authentic way. This comes across clearly in a study by Waring (2008) who researched teachers' use of positive assessment terms. Whilst Waring studied the use of such terms as 'good' or 'excellent', he excluded what he referred to as 'matter-of-fact receipts' such as 'OK' or 'right' (p. 578). The key here is that Waring only considers those teacher responses that were genuinely contingent i.e. meaningful. This is an important point, as when the same principal is applied to the data analysis in this study it will help to differentiate clearly micro regulation from other elements of teacher talk. Section 4.8 describes the way in which the notion of contingency becomes important as the data analysis for this study was carried out.

Fading, the transfer of responsibility and self-regulated learning: fading refers to the practice of reducing the support available to the student in direct relation to the skills, knowledge or

understanding the said student acquires. At the same time as fading such support, the teacher is also involved in transferring the responsibility for the learning to the student and in so doing encourages the student to take more control over his or her learning (van de Pol, Volman and Beishuizen, 2010, p. 275). The gradual withdrawal of scaffolding and transfer of responsibility is closely linked to the concept of self-regulated learning (also referred by some, for example Sadler (1989) as self-monitoring). In fact, Hadwin, Järvelä and Miller (2011, p. 71) suggest that providing support to students on an as-needed basis is a key aspect of promoting self-regulated learning. Schunk and Zimmerman (2003) define self-regulated learning as resulting from 'students' self-generated thoughts and behaviours that are systematically oriented toward the attainment of their learning goals'. Self-regulation is viewed as a cyclical activity containing forethought, which precedes learning, the performance itself, which takes place during learning and the self-reflection phase, which takes place after learning (Borkowski and Zimmerman, 1992; Zimmerman, 1998). From a scaffolding perspective, as support is gradually withdrawn through fading, the intention will be for the student to become more self-regulated and in so doing, the responsibility for the learning is transferred from teacher to student. This is what Sadler (1989, p. 122) meant when he suggested that 'the goal of many instructional systems is to facilitate the transition from feedback to self-monitoring'. Whilst a detailed examination of self-regulated learning is beyond the scope of this study, there may be instances when teachers encourage exactly this type of self-reflection. For this reason, the concept of self-regulated learning may be considered a further dimension of interactive regulation and, as such, it is one that will need to be returned to at a later stage in this study.

Examples of contingency in practice: at this point, it becomes necessary to begin to consider more fine-grained techniques that teachers may use in the classroom to respond contingently to their students. Returning to the concept of responsiveness, Jarvis and Robinson outline the following six categories of pedagogic function for use in the analysis of teacher responsiveness. These are:

- Accept
- Rephrase
- Give clues
- Extend/guide; Extend/bridge
- Check; set; summarise
- Ignore; Reject

(Jarvis and Robinson, 1997)

Whilst it is quite possible that some or all of these functions may be observed during the course of this study, it is also clear that they do not all fully concern micro regulation, the purpose of which is to address students' error and approximation in an attempt to ensure learning takes place as intended. Whilst the first of Jarvis and Robinson's pedagogic functions (accept) is a feature of responsiveness,

it is, however, less relevant to a concept of micro regulation that specifically concerns student error and approximation. The same may also be said of the last function (ignore) as this function does not appear to regulate learning directly. Rephrasing, the giving of clues and extending and, perhaps to a lesser extent rejecting are, however, more closely linked to micro regulation. What Jarvis and Robinson also appear to have done is put into one large group two very different actions of the teacher, that is to say the way teachers first elicit evidence of student understanding and the way this evidence is then used. In order to bring a better understanding of interactive regulation it will be necessary to examine closely both sides of the process – the way teachers elicit evidence *and* the way this evidence is subsequently used. Relevant research comes from that carried out into classroom discourse.

2.5 Classroom discourse and the use of questioning to regulate learning

This section examines the language that teachers and students use in the classroom. Understanding micro regulation will inevitably involve looking at how teachers and students talk, and for this reason it becomes necessary to consider the research that has been carried out into classroom discourse. Mercer (1995) analysed the language used by teachers and learners for the purpose of what he refers to as the 'guided construction of knowledge' (p. 9). Mercer draws on the work of Vygotsky and focuses in particular on 'how talk is used to shape representations of reality and interpretations of experience' (*ibid.*, p. 2). In the form of an explanatory model of teacher – student talk, Mercer offers a number of guidance strategies or techniques that are used by teachers. He groups these under three headings, the first two of which (eliciting and responding) are relevant to this study. It is possible to draw comparisons with the techniques that Mercer suggests teachers use to respond to what students say, and Jarvis and Robinson's pedagogic functions of responsiveness. Mercer posits that teachers respond, and in so doing sustain dialogues with their students, by using the following five techniques: confirmation, repetition, rejection, reformulation and elaboration. The first three of Mercer's techniques are self-explanatory and as such need no further comment here. It is, however, worth pointing out here that Mercer characterises a reformulation as happening when a teacher paraphrases a student's remark 'so as to offer the class a revised, tidied up version of what was said which fits in better with the point the teacher wishes to make' (*ibid.,* p. 32). Elaborations, he suggests, take place 'when a teacher picks up on a cryptic statement made by a pupil … explains its significance to the rest of the class' (*ibid.*, p. 33). These two techniques will be drawn upon during the data analysis stage of this study.

Much research has subsequently been carried out into examining in detail these and other techniques. For example, Cullen (2002), studying second language acquisition, concentrates on the pedagogical importance of the way teachers respond to students. Cullen identifies two functions – evaluative and discursive – with the first being concerned with 'formal correction' and the second with a 'rich source of message-oriented target language input' (p. 122). Drawing on Mercer's categorisation of teacher responses, Cullen identifies confirmation, repetition and rejection as what

he terms 'evaluative moves' and reformulation and elaboration as 'discoursal moves'. Waring's (2008, p. 578) research is more finely focused, examining in particular teachers' use of what he calls 'explicit positive assessment' or 'EPA'. Waring characterises EPA as the teachers' use of terms such as 'good, very good, excellent, perfect', all of these linked to the confirmation technique identified by Mercer. Whilst the focus of these studies is on the finer details of the teachers' response, this study does not restrict itself to this side of the process alone. Of equal interest and relevance to this discussion is the inclusion by Mercer of techniques that teachers use to first elicit evidence of understanding from students. Elicitations, he suggests, are divided into direct and cued, with the first being linked to direct questioning and the second used in what Mercer considers to be a more progressive approach to teaching and learning in which teachers draw out from students the information they seek (*ibid.*, p. 26). All of the studies reviewed up to this point have focused on how teachers respond to the evidence of student understanding that has been elicited. Regulation may, however, may also be present in the way that teachers actually elicit this evidence of student understanding. This becomes evident when examining the literature that exists on teacher questioning.

The research that exists into the broad area of teacher questioning is extensive. What will be focused on in this section is the use of questioning to regulate learning, that is to say the ways in which questions may be used to address students' error and approximation in an attempt to ensure learning takes place as intended. Cotton (1989) for example refers to a number of questioning strategies such as 'redirecting of questions when initial responses are unsatisfactory or incomplete, probing for more complete responses, and providing reinforcement of responses'. Morgan and Saxton (1991) also refer to probing questions, which they say 'help students to think out answers more thoroughly, to encourage quantity and quality of participation, to require students to be more accurate and specific'. Chin (2006) examined how teachers use questions to scaffold student thinking and identified a number of approaches to questioning including the technique of 'focusing and zooming'. Chin (*ibid.,* p. 189) notes how the concept of focussing and zooming refers to responsive questioning 'where the teacher adjusted her questions to students' responses, with each subsequent question building on to the previous one(s)'. Again, here is the notion of responsiveness (contingent, meaningful, authentic) which is so central to regulation. Probing questions would appear to be regulatory by virtue of the way in which they may encourage the student to engage in more sophisticated forms of reasoning. This was found to be the case by Nathan and Kim (2009) who revealed that when students provided responses that were mathematically accurate, the teacher usually increased the elicitation level. Conversely, and of equal interest and relevance to this discussion, Nathan and Kim found that when students gave inaccurate or incomplete answers, 'subsequent elicitations usually made reduced demands for the level of cognitive complexity needed to respond' (*ibid,.* p. 111). Adjusting the cognitive complexity of questioning in this way is clearly more focused on student error than on student approximation but remains nonetheless an attempt on the part of the teacher to regulate student learning during the activity itself.

2.6   Two possible sides to regulation

Up to this point, the studies discussed here have focused either on the way teachers elicit evidence of student understanding through questioning or on the way in which they use this evidence to respond to students. The two have not been examined together. Arguably the most significant studies to look at both sides of the process are Sinclair and Coulthard (1975) and Mehan (1979). These researchers investigated the interaction that takes place in the classroom with a particular emphasis on the linguistic aspects and functions of teacher – student discourse. Both studies located a recurring pattern involving three moves. Sinclair and Coulthard (1975, p. 21) conceptualise the structure of discourse in terms of what they call IRF sequences which comprise an 'initiation by the teacher, followed by a response from the pupil, followed by feedback to the pupil's response from the teacher'. In a similar vein, Mehan (1979) posits what he refers to as IRE sequences involving a teacher initiation, a student response and a further teacher evaluation; the instructional phase of a lesson, he argues, 'is composed primarily of elicitation sequences' (*ibid.,* p. 28).

Sinclair and Coulthard (1975, p. 40) divide the initiating move into three acts: elicitation, directive and informative. The function of 'elicitation' is to request a linguistic response (realised by a question), the function of a 'directive' is to request a non-linguistic response (realised by imperative), whilst the function of 'informative' is to provide information (realised by a statement). It is clear that the elicitation act is of most relevance to this study as it is at this point that evidence of student understanding is elicited by the teacher. However, beyond identifying the elicitation act as being realised by a question, Sinclair and Coulthard do not appear to offer any extra detail regarding how this may be accomplished. Mehan (1979, p. 36) also divides the initiation move into elicitation, directive and informative sequences. Unlike Sinclair and Coulthard, Mehan does elucidate upon the elicitation act by splitting it into four types that, interestingly, are not referred to as questions. The four types are 'choice' elicitations which call upon the student to agree or disagree, 'product' elicitations which invite a factual response, 'process' elicitations which invite an opinion, and finally 'meta-process' elicitations which encourage meta-cognition (see Figure 3).

Of relevance to this study is Mehan's identification of two types of IRE sequence: the three-part and the extended sequence. In the three-part sequence, 'once an instructional sequence has been initiated, interaction continues until the symmetry between initiation and reply acts is obtained' (*ibid.*, p. 52). However, an extended sequence will be observed where symmetry is not forthcoming, with the result that 'the initiator employs a number of strategies until the expected reply does appear' (*ibid.*, p. 52). Mehan suggests a number of techniques present in the extended sequence that are used for obtaining the expected reply and which include prompting, repeating and simplifying (*ibid.*, p. 55). Here the technique of repeating is clearly the same as the repetition technique identified by Mercer (1995) whilst the simplifying may be seen as a technique teachers use to reduce demands for the level of cognitive complexity as noted above by Nathan and Kim (2009).
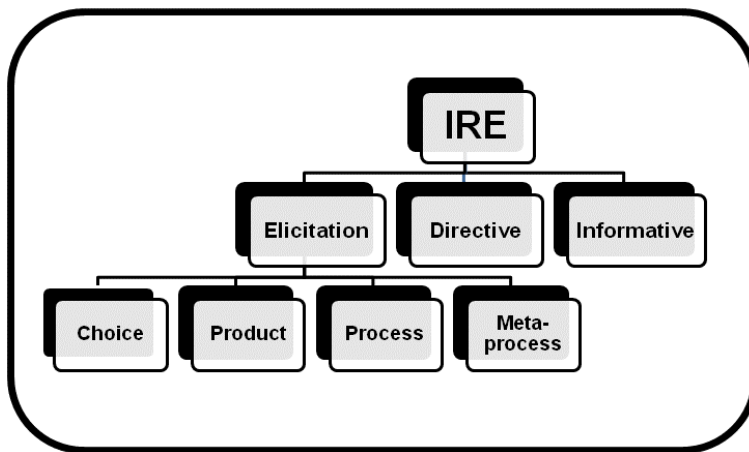
Figure 3   Visual breakdown of IRE sequence (Mehan, 1979)

Whilst Mehan does deal with both sides of the teacher's role in the process of classroom discourse (to use his own terms the initiation and the evaluation) and whilst he identifies extended sequences that are linked to regulation, his work does not fully involve that aspect of regulation that is of interest in the study, which is of course the process. For example, there is no indication of how the four types of elicitation may be used together (i.e. interact with one another) in order to keep learning on track. In Mehan's work there is also the suggestion that the teacher's main concern is to achieve symmetry between the initiation and reply acts and that where this is not immediately achieved he / she will regulate learning through the act of simplifying. This appears to ignore those instances, as identified by Nathan and Kim (2009), in which teachers regulate learning by increasing the cognitive demands placed on students.

2.7   Highlighting the issues

From a review of the literature, it is clear where the main issues lie and where this study into interactive regulation will be able to make an impact. What has become apparent is that none of the studies cited here fully involves the process of interactive regulation on a fine-grained micro level. Studies have tended to categorise responses. Wood *et al.* (1976) for example identified six functions of scaffolding and van de Pol, Volman and Beishuizen (2010) followed this up by providing six means to support the learning activities. However, these are studies specifically into scaffolding (with its three key characteristics of contingency, fading and the transfer of responsibility) which is not the focus here. Jarvis and Robinson (1997) identified six pedagogic functions that described teacher responsiveness but these functions appear to combine the acts of eliciting and using evidence of student understanding. Smit *et al.* (2012) also combined eliciting and using evidence in their conceptual framework of the strategies teachers use for whole class scaffolding of language. These categories do not exist in isolation however, and the provision of a list of techniques or strategies is therefore only likely to prove of limited use.

Considering interactive regulation from the perspective of eliciting evidence of student understanding, many studies have also generated categorisations. Both Cotton (1989) and Morgan and Saxton (1991) spoke about the use of probing questions, a technique which Chin (2006) refers to as 'focusing and zooming'. This type of questioning regulates learning by increasing the elicitation level (Nathan and Kim, 2009) and in so doing works to tackle the approximation that may exist in the mind of the student. The result of this type of questioning is to promote more sophisticated forms of reasoning. The use of questioning may also work in the opposite direction by reducing, and in so doing tackling, student error. This was found to be the case by Nathan and Kim (2009) who observed that teachers often responded to student error by reducing the cognitive demands of their questioning.

The studies carried out by Sinclair and Coulthard (1975), Mehan (1979) and Mercer (1995) all categorised the ways in which teachers both elicit and use evidence of student understanding. There is little to suggest the ways in which these two both interact with, and impact upon, one another, nor do these studies focus specifically on interactive regulation. Whilst there exists a proliferation of categorisations, there would appear to be a gap in understanding that is specifically concerned with the process of the interactive regulation of learning at an immediate and fine-grained level. As Perrenoud (1998, p. 99) points out, there is a 'lack of completion of a theory of regulation'. In order to develop the theory of the regulation of learning, Perrenoud called for research to 'observe more closely the mechanisms for regulating the learning process' (1998, p. 99). These are the mechanisms by which teachers operate (perhaps subconsciously or perhaps by design) as they intervene in an attempt to regulate (i.e. keep on track) the learning of their students. This study will attempt to bring together the two sides of regulation – the regulation that takes place at the point at which evidence of student understanding is elicited and the regulation that takes place at the point at which this evidence is used by the teacher.

2.8   Introducing the research questions

At this point, it becomes possible to introduce the main and subsidiary research questions that will be used to guide the study. It is important to emphasise that the regulation to be examined here is that which takes place during the instructional activity. This is the type of regulation that Allal (1988a) refers to as interactive and which may be contrasted with proactive regulation that takes place before a phase of teaching and retroactive regulation that takes place after. The specific dimension of interactive regulation which this study will focus on is that which takes place during lessons and which has been termed micro regulation. What is needed now is the identification of a specific activity that will be the focus for the study and from which the micro regulation will emerge. For Perrenoud, the nature of the activities significantly impacts upon the potential for subsequent interaction between teacher and student. He differentiates between 'traditional' sequences of activities within lessons, which merely allow for the remediation of narrowly prescribed concepts at the end of the sequence, and those where the tasks are not 'imposed on the pupils but [adjusted]

once they have been initiated' (Perrenoud, 1998, p. 88). This is also recognised by Marshall and Drummond who note how the choice of activities 'affects all subsequent interactions' (2006, p. 147). Whilst regulation of the activity may not impact directly upon the learning, it does at least set the scene making regulation more or less likely. It remains important, therefore, to consider the activity that the teacher sets up and then subsequently regulates. As such, the activity that will be the focus for this study will be whole class discussion as this type of activity is likely to involve teacher and questioning and feedback. Wiliam (2007, p. 32) for example refers to the way in which, during whole class teaching, teachers are 'constantly having to make sense of students' responses, interpreting them in terms of learning needs, and making appropriate responses'. Whilst the focus will be on whole class discussion, it will not be possible to more precisely define and delineate the unit of analysis until the study is underway.

The main research question asks 'How do teachers regulate learning during whole class discussion?' In order to answer this main question it becomes necessary to break it down into a number of subsidiary questions all of which will address issues that have emerged from the review of the literature. What is immediately evident is the need to identify the mechanisms that teachers use to regulate learning. As such, the first subsidiary research question asks 'What mechanisms are put in place by teachers during whole class discussion to regulate student learning?' To answer this question it will be necessary to give further consideration to contingency, in particular the notion that when a teacher acts contingently, he or she is not merely responding to what a student says or does but, crucially, is doing so *meaningfully* and in an *authentic* way.

Regulatory mechanisms will need to be differentiated from non-regulatory mechanisms in order to 'avoid identifying all actions of the teacher with permanent regulation' (Perrenoud, 1998, p. 88). As such, it becomes necessary to examine specifically how these mechanisms are used by teachers, in particular how the mechanisms interact with other elements of whole class discussion. This is an important point, as it will help to isolate the micro regulation from other elements of teacher talk. The second subsidiary research question therefore asks 'In what way does the regulation of learning interact with other elements of whole class discussion?'

Much has also been made of regulation as a continuous feature of instruction. For example, Perrenoud (1991b, p. 5) talks about the notion of the continuous communication between teacher and students. Sanmarti and Jorba (1993) suggest that 'there must be a continuous regulation of both the teaching and the learning process'. Wiliam (2007, p. 32) notes how teachers are 'constantly having to make sense of students' responses, interpreting them in terms of learning needs, and making appropriate responses'. It therefore becomes important to investigate the extent to which the micro regulation of learning is a continuous feature. As such, the third subsidiary research question asks 'To what extent is the regulation of learning a continuous feature of whole class discussion?'

Finally, in order that a more developed theory of micro regulation may offer some practical benefits (in as far as it may be used to improve practice) the perceived strengths and weaknesses of the said regulation will be considered. The fourth subsidiary research question asks 'What are the perceived strengths and weaknesses of the regulation that takes place during whole class discussion?' These, then, are the main and subsidiary research questions that this study will answer in order to bring a better understanding of the theory of interactive regulation.

2.9   Summary

This purpose of this chapter has been to review the literature that exists regarding regulation and to establish and highlight the main issues in this literature. The review of the literature began by considering three types of regulation – proactive, interactive (formative assessment is conceptualised as a dimension of interactive regulation) and retroactive. The distinction was made between the regulation of the activity and the interactive regulation of learning, which specifically involves the adjustment of the activity once it has been set up with the intention of ensuring that learning is kept on track. How this adjustment (in this study termed micro regulation) takes place in practice was considered, however it became clear that the theory of interactive regulation is incomplete. The review of the literature was widened to include a brief examination of social-cultural theory and the Zone of Proximal Development (ZPD) as well as the concept of scaffolding which may be said to comprise the notions of contingency, fading and the transfer of responsibility (the last two of which are linked to self-regulated learning). When linked to regulation, the notion of contingency becomes important as it concerns the extent to which teachers respond to students in a meaningful and authentic way. The review was further widened by examining what the literature on classroom discourse and questioning has to say in connection with regulation. Finally, a number of studies were examined that have looked at both the way teachers elicit evidence of student understanding and the way they use this evidence in an attempt to establish links to the theory of regulation. The main issues in the literature have centred around a tendency to focus on categories of responses rather than processes. As a result, a set of research questions have been developed that will bring a better understanding of the process of interactive regulation that unfolds during whole class discussion. The following chapter introduces the research design that will make a better understanding possible.

Chapter 3   Developing the research design

3.1   Introduction

As previously stated, the aim of this research is to bring a better understanding of the theory of interactive regulation by examining how learning is regulated by the teacher at a fine-grained micro level. This will involve examining the processes that are concerned with what this study refers to as micro regulation. This chapter builds on the arguments developed in the literature review and serves to provide a rationale for the data collection and subsequent analysis that is described in Chapter 4. Yin (1994, p. 18) reminds the researcher how the research design 'is the logic that links the data to be collected and the conclusions to be drawn to the initial questions of the study'. This chapter begins by examining ontological and epistemological questions that have a bearing on the initial research design. Positivist and anti-positivist positions are then discussed and their relevance for researching the social world considered. Quantitative and qualitative approaches to research are considered and an argument is made in favour of adopting a qualitative research methodology. The ethical dimension is considered including the costs/benefits ratio that links to the necessary practice of gaining voluntary informed consent.

Once ethical concerns have been addressed, the next stage of the design involves ensuring that there is quality in the research. This involves reflecting upon factors such as internal and external validity, reliability, triangulation and reflexivity. Part of the discussion on quality involves looking at the approaches to sampling and the issue of generalisation. Following a feasibility study, plans for data collection and analysis are refined. Refinements included the decision to focus on whole class discussion as opposed to small group work, the importance of sampling experienced teachers only and the need to define clearly the unit of analysis in order to aid its subsequent identification. Justification is given for the decision to combine audio recording of classroom interaction with observational field notes that focus on non-verbal interaction, as well as the decision not to carry out participant interviews. A rationale is given for carrying out a qualitative content analysis (Hsieh and Shannon, 2005) on the completed transcripts. This involves adopting an approach to data analysis known as analytic induction (Znaniecki, 1934) in which a provisional analytic scheme is developed and subsequently modified. The use of both descriptive and interpretive coding is described and the decision to draw upon the literature as a further means of validation whilst the data analysis is taking place is explained.

3.2   The ontological and epistemological dimension

Yin (1994, p. 7) notes how 'defining the research questions is probably the most important step to be taken in a research study'. The main research question and the four subsidiary research questions that emerged in the preceding chapter are the result of the literature review. Still, it is important to appreciate, as both Flick (2002, p. 48) and Silverman (2000, p. 51) do, that research questions do not simply appear 'out of thin air'. Flick, for example, suggests that they come from the researcher's

personal biography and social context. Behind every research question there is a story and so the process behind developing the questions is clearly not without a certain personal bias. Considering where research problems and questions come from is to ask questions of an ontological and epistemological nature.

Cohen, Manion and Morrison (2000, pp. 5 – 6) note how ontological assumptions concern 'the very nature or essence of the social phenomena being investigated' whilst epistemological assumptions concern 'the very bases of knowledge – its nature and forms, how it can be acquired, and how communicated to other human beings'. These authors point out that how a researcher aligns him or herself in this discussion 'profoundly affects how one will go about uncovering knowledge of social behaviour' (*ibid.*, p. 6). The nature and forms of knowledge are concerned with whether knowledge is considered hard and objective or softer and more subjective. A researcher who considers it possible to generate knowledge objectively will employ different methods of data collection to one who considers knowledge to be more subjective, and he or she will also communicate this knowledge to others in different ways. Choice of research problem and questions, then, is the result not only of the researcher's personal biography and social context referred to above, but also of the researcher's position with regards the very nature of being, of knowledge, the way it is constructed and how it functions. This position effectively provides the foundations on which the research problems and questions are based as well as the methodology that is chosen to answer them. The question, then, becomes first to what extent a researcher considers himself or herself a part of the universe that he or she is observing and, second, to what extent he or she can (or chooses to attempt to) report this universe in an objective manner. Those researchers who claim to remove themselves entirely from the universe and to report it 'how it is' are generally associated with a positivistic approach; the opposing camp is often known as anti-positivist. These two perspectives, and the relevance they have for the current study, are now examined.

3.3   Positivist and anti-positivist approaches to research

Cohen, Manion and Morrison (*ibid.*, p. 6) state that to subscribe to the position that knowledge is hard and objective is to be positivist whilst to consider it softer and more subjective is to be anti-positivist. Researchers with a positivist bias are to be found not only in the natural sciences but also in the social sciences. Positivistic researchers generally do not consider there to be a difference between the way the natural world and the social worlds can be studied; the positivist view holds that research methodologies that are suitable for attempting to understand the natural world are equally suitable for attempting to understand the social one. The options open to a positivist researcher will be of a traditional nature and are likely to include experiments, surveys, structured interviews and observations although each of these methods are also used by anti-positivist researchers.

For many years, however, there has been growing dissatisfaction with the results of social science carried out in the positivist tradition. Flick (2002, p. 3) for example points out that 'social science results are rarely perceived and used in everyday life because – in order to fulfil methodological standards – their investigations and findings often remain too far removed from everyday questions and problems'. Cohen, Manion and Morrison (2000, p. 19) sound a similar note with their claim that 'the findings of positivistic social science are often said to be so banal and trivial that they are of little consequence to those for whom they are intended'. An anti-positivist researcher who rejects the position that the social world can be studied and understood in the same way as the natural world is unlikely to adopt many of the positivist's methods. The options open to an anti-positivist researcher are likely to include more contemporary and still emerging techniques such as participant observation, depth interviewing and the use of narratives. Of course, the distinction between a positivist researcher and an anti-positivist one is rarely clear-cut; as Silverman (2000, p. 5) suggests, positivism is a 'very slippery and emotive term' with many researchers objecting strongly to having such a label attached to their work. Linked to the positivism – anti-positivism debate is the distinction that exists between quantitative and qualitative approaches.

3.4   Quantitative and qualitative approaches to research

Whilst positivist research is often associated with a quantitative approach to research, anti-positivist research is associated with a qualitative one. The terms 'quantitative' and 'qualitative' refer to the nature of the data collected, how it is analysed, and the form in which it is reported. It should be stressed that whilst both quantitative and qualitative methodologies are considered empirical (i.e. scientific) in their approach, the two approaches differ greatly. Quantitative methodology has a heavy bias towards numbers as a means of both generating and representing its data. It is more akin to scientific method, starting with general truths (hypotheses) and predicting a specific observation, in this way moving from the general to the particular. Reasoning in this way is known as 'deduction'. For many quantitative researchers there is a mistrust of the qualitative approach and its reliance on words. This is clearly illustrated by Huck (2000, p. 11) who warns against ignoring the results section of academic research, noting that those who do are 'forced into the unfortunate position of uncritical acceptance of the printed word'. Huck (*ibid.*, p. 59) also sounds a warning against the 'element of subjectivity' that is often involved when interpreting data. Clearly, for quantitative researchers the goal is to minimise, if not eradicated altogether, subjectivity. Ironically Silverman suggests that the aim of quantitative research is to achieve the 'gold standard' (2000, p. 3).

To the social scientist, qualitative research is often seen as a more attractive alternative to the quantitative approach. Silverman has the following to say in praise of qualitative research:

An insistence that any research worth its salt should follow a purely quantitative logic would simply rule out the study of many interesting phenomena relating to what people actually do in their day-to-day lives.

(Silverman, 2000, p. 7)

Whilst positivist, quantitative research fails to take into account the individual and notions of freedom, the qualitative researcher will begin from this very standpoint. Cohen, Manion and Morrison (2000, p. 20) for example point out the way in which 'understanding of individuals' interpretations of the world around them has to come from the inside, not the outside'. Research in the qualitative tradition, then, rather than steering a course away from the subjective accepts this standpoint. This is not to say that qualitative research is unscientific; the primary difference is that qualitative research is based on experimentation, observation and experience rather than on theory, and predominantly uses words to generate and represents its findings. Qualitative research generates, rather than tests, hypotheses and, as such, its approach is inductive.

Flick helpfully outlines what he considers the central features that guide qualitative research:

- Appropriateness of methods and theories
- Perspectives of the participants and their diversity
- Reflexivity of the researcher and the research
- Variety of approaches and methods

(Flick, 2002, p. 5)

Flick's first point follows the assumption in qualitative research that the object under study drives the choice of methods and theories and not the reverse. The second point considers the different and subjective ways in which people make sense of their own world and the effect this has on their viewpoints and practices; it is these that are the objects of qualitative research. The third point acknowledges the central role that the researcher plays in the research process and the influence that he or she will have on the research, especially when involved in the collection of data (reflexivity is discussed in more detail below). Flick's final point relates to what qualitative research actually tries to achieve. He argues that as qualitative research is not based upon 'a unified theoretical and methodological concept' it is characterised by a variety of approaches and methods. The researcher, then, clearly has a number of different approaches and methods from which to choose.

Of course, qualitative research has its critics. Silverman (2000, p. 9), for example, notes how 'in a world where numbers talk and people use the term 'hard' science, a failure to test hypotheses,

coupled with a rejection of natural science methods, certainly leaves qualitative researchers open to criticism'. One possible answer to this criticism would be to question where the theory is originally derived from that the hypotheses are subsequently able to test. As noted above, the inductive approach of qualitative research *generates* hypotheses and can therefore be considered a precursor to any research. The aim of this research is to bring a better understanding of the theory of interactive regulation by examining how learning is regulated by the teacher at a fine-grained micro level. The outcome of this study will be a model to represent how experienced teachers regulate learning during whole class discussion activities that will provide the opportunity for subsequent research that is based on developing testable propositions, in the form of hypotheses. This is the cornerstone of qualitative research in that any theory that it develops must be 'testable, relevant and valid' (Stake, 1995).

All of these approaches to research can be grouped under two all-encompassing paradigms that effectively provide a framework for how we look at reality. Cohen, Manion and Morrison (2000, p. 35) distinguish two generic research paradigms, the normative paradigm and the interpretative paradigm. The normative paradigm is often associated with a positivist, quantitative approach, and the interpretive paradigm with an anti-positivist, qualitative one. Whilst it should be clear that this research will be located within the interpretive, qualitative paradigm, it is worth pointing out once again the dangers of seeing research as exclusively associated with either camp. Hammersley (1986) sounds a clear warning regarding the tendency to see the different research strategies as competing with one another: 'such a state of affairs impedes rather than advances the development of classroom research' he argues. Yin (1994, p. 14) also notes the unhelpful distinction that has arisen between quantitative and qualitative research, stressing how some surveys and experiments have been purely qualitative and how certain case studies can be quantitative. Flick (2002, p. 25) notes the possibility of triangulating perspectives. Triangulation of methods (discussed below) is a technique used to tackle the question of a study's validity, however triangulation of perspectives is an equally legitimate approach and is one that cuts across the view that the various research strategies are in competition with one another. Notwithstanding a researcher's ontological and epistemological bias, it would still appear eminently sensible to concur with Cohen, Manion and Morrison (2000, p. 1) who suggest that 'fitness for purpose must be the guiding principle'. The notion of fitness for purpose, therefore, should arguably be the overriding factor when selecting from the numerous methodologies and methods that are at the researcher's disposal.

3.5   Ethics in educational research

It is imperative that ethical issues are considered right at the very outset of a study (Robson, 2002, p. 65; Cohen, Manion and Morrison, 2000, p. 48). Ethics in research is concerned with 'the appropriateness of the researcher's behaviour in relation to the subjects of the research or those affected by it' (Gray, 2004, p. 58). Whilst it is the teachers and the way in which they regulate the learning process that is the focus of this study, consideration must additionally be given to the

students as participants in as far as what they say and do may also become the object of observation. The following discussion on ethics has therefore been widened in places to consider issues relating to both teachers and students, two markedly different groups with widely differing needs.

Whilst many ethical decisions are simply a matter of common sense for the researcher, some are far less clear (Gray, 2004, p. 58). Ethics, similar to much of the discussion on developing the research design, is largely a subjective enterprise with many of the decisions taken having an epistemological dimension. In order to guide the researcher through the often-confusing ethical maze, there exist a number of guidelines produced by research organisations. Perhaps most well known in the United Kingdom are the British Educational Research Association (BERA, 2004) guidelines. Although the author is not a member of BERA, nor is the research sponsored or commissioned by the association, every effort will be made to follow these guidelines. Setting out a number of principles which underpin their guidelines, BERA state that educational research must be carried out with an ethic of respect for:

- The person
- Knowledge
- Democratic values
- The quality of education research
- Academic freedom

(BERA, 2004)

The University of Southampton has also produced its own guidance to assist researchers in drawing up their ethics protocol (see Appendix 4 for a completed ethics protocol). Additionally, for research involving human subjects, the University requires an Insurance and Research Governance application to be submitted and approved by the University Ethics Committee (see Appendix 5 for completed application). Whilst it is clear that no ethics protocol is able to anticipate all potential issues, it is essential to take these steps in order to fulfil the researcher's responsibilities not only to the participants, but also to the sponsors of the research, as well as to the wider community of educational researchers.

The fundamental dilemma faced by all researchers is that which requires researchers to 'strike a balance between the demands placed on them as professional scientists in pursuit of truth, and their subjects' rights and values potentially threatened by the research' (Cohen, Manion and Morrison, 2000, p. 49). Cohen, Manion and Morrison (*ibid.*, p. 49) refer to this as the 'costs/benefits ratio'. Central to addressing this ethical dilemma is the practice of gaining informed consent, the principal of

which 'arises from the subject's right to freedom and self-determination' (*ibid.*, 2000, p. 51). BERA (2004) takes *voluntary* informed consent to be the condition in which participants 'understand and agree to their participation without any duress, prior to the research getting underway'. There are a number of elements involved in the principle of informed consent: competence, voluntarism, full information, comprehension (Cohen, Manion and Morrison, 2000, p. 51). Heath *et al.* (2004) note, however, that the process of securing informed consent is often more of an aspiration than a reality. Whilst the notions of 'competence' and 'comprehension' appear straight forward, what is meant by 'full information' is open to a number of different interpretations. Hammersley (2007) asks whether giving participants full information will affect the participants and 'thereby possibly render the findings of the research invalid or non-generalizable'. Hammersley also underlines the different forms that full information may take, including information about the aim of the research, how the research will be carried out, the nature of any possible findings and any possible consequences of how the findings will be disseminated. It must also be accepted that there exist inequalities in status between 'gatekeepers, researchers and 'the researched'' (Heath *et al.*, 2004) and that this may have a bearing upon the notion of 'voluntarism'. As Robson (2004, p. 67) points out, there may in some cases be overt or covert penalties for not taking part in a study. The scenario of a Headteacher (as gatekeeper) in some way coercing a teacher into taking part in a research project as it may impact on the funding that the school receives is perhaps not entirely fabulous. Offering participants the right not to take part is especially important when the participants themselves are children. Cohen, Manion and Morrison (2000, p. 52) consider the power differential between adult researchers and children and in so doing suggest a two-step process when seeking informed consent from children: first, the researcher seeks permission from those responsible for prospective participants (i.e. parents or guardians) and second the researcher approaches the children themselves. An example of the completed Participant Information Sheet that was used in this study can be found in Appendix 7.

Cohen, Manion and Morrison (2000, pp. 60 – 63) also note a number of other dilemmas to be considered at an early stage in the research: privacy, anonymity, confidentiality, betrayal and deception. The researcher can attempt to address the issue of privacy through the confidential and anonymous treatment of participants' data. BERA (2004) notes how this is 'considered the norm for the conduct of research'. Cohen, Manion and Morrison (2000, p. 61) note that 'the essence of anonymity is that the information provided by participants should in no way reveal their identity'. These authors warn that the right to privacy 'may easily be violated during the course of an investigation or denied after it has been completed' (*ibid.*, p. 61). The notion of confidentiality is perhaps slightly less problematic. Here Cohen, Manion and Morrison (2000, p. 62) note how 'although researchers know who has provided the information or are able to identify participants from the information given, they will in no way make the connection known publicly'. If there does exist any threat to the right of confidentiality, then this should be explained at the access and data collection stage of the research. To preserve anonymity, this study will use pseudonyms in place of the students' real names.

Cohen, Manion and Morrison (*ibid.*, p. 63) defines betrayal as 'those occasions where data disclosed in confidence are revealed publicly in such a way as to cause embarrassment, anxiety or perhaps suffering to the subject or participant disclosing the information'. Betrayal can be as simple as failing to keep a participant anonymous or it can be more subtle such as where observations of lessons are presented in an overly critical light. When anonymity has been offered, betrayal represents, quite simply, a breach of trust. Another problematic dilemma is that of deception which links with the discussion above on informed consent. For Cohen, Manion and Morrison (*ibid.*, p. 63) the term is 'applied to that kind of experimental situation where the researcher knowingly conceals the true purpose of the research, or else positively misinforms the subjects, or exposes them to unduly painful, stressful or embarrassing situations'. Clearly, the researcher must ask him/herself whether deception is justifiable, whether it is reasonable to be able to avoid deception completely and, if not, how deception can be minimised. Cohen, Manion and Morrison (*ibid.*, p. 64) further note how deception may well be inherent in the various measurement devices since 'it is important to keep the respondent ignorant of the personality and attitude dimensions that we wish to investigate'. A balance must be struck between giving the participant enough information regarding the purpose of the research and giving away too much information and in so doing biasing the actual findings. One way of minimising the possible negative effects of deception is to ensure that participants receive feedback at the end of the research (*ibid.*, p. 64). This approach is likely to be adopted in this study not only because this is both normal and expected practice in the field of education but also because feedback (in the form of regulation) is one of the areas under study.

These, then, are some of the ethical issues that every researcher must address not only prior to the study commencing (in the form of obtain the required consents) but also whilst the research being carried out as well as at the very end when the final report is compiled. It is hoped that this section has demonstrated the researcher's awareness of the many possible pitfalls when carrying out research with both adults and children.

3.6   Early methodological decisions

Miles and Huberman (1994, p. 42) argue that 'knowing what you want to find out leads inexorably to the question of how you will get that information'. The process of collecting this information refers not to research methods in their narrow sense but to the much broader area of methodology. Mercer (2005) uses the term 'methodology' to refer to an integrated set of methods and practices whilst Silverman (2000, p. 79) defines methodology with both simplicity and clarity as 'how one will go about studying any phenomenon'. This study seeks to bring a better understanding of how teachers regulate the learning process during whole class discussion and it proposes to do so by adopting a theory-building qualitative methodology that is able to generate, rather than test, hypotheses. In addition to adopting a theory-building qualitative methodology, the methodology must also be capable of comprehensively describing the nature and pattern of both the whole class discussion activity and the regulation that exists within this activity. Rather than simply identifying the regulation

that takes place within the activity, it was considered important to first describe detail the activity in detail. In so doing, the way in which regulation interacts with the activity (for example, the extent to which the regulation is a continuous feature) may be understood. This is an important point that influences the type of methodology that is likely to be suitable. As a means of identifying the most appropriate methodology, a feasibility study was carried out in early stages of developing the research design. Yin (1994, p. 74) notes the importance of carrying out a feasibility study (which he refers to as a pilot-test) as it helps researchers to 'refine their data collection plans with respect to both the content of the data and the procedures to be followed'. The purpose of such a study was not to use any results or findings in the main research, but to highlight any inadequacies with the research design prior to commencing the study proper.

3.6.1 Refining the methodology: the feasibility study

For the feasibility study, one 35-minute geography lesson was observed. The lesson was taught by a 33-year-old male teacher in his second year of teaching. Teacher – student discourse was recorded using a digital voice recorder. The audio recording was not transcribed because it was not the intention to analyse the data. A number of inadequacies of the research design were indeed identified including the challenge of effective data capture, sampling of suitable participants and the identification of the unit of analysis. These issues are discussed below.

3.6.2 Data capture challenges

The feasibility study enabled the efficacy of recording spoken interaction using a digital sound recorder to be verified. Appropriate location of the device was found to be of paramount importance as this would impact directly on which actors in the classroom (teachers, students or both) could successfully be recorded, and therefore the type of interaction that it would be possible to capture. Achieving a recording of sufficient quality is vital, as this clearly has a bearing on the researcher's task of transcribing the interaction. Without a faithful transcription of the words spoken by the actors, it becomes impossible to carry out data analysis. Some researchers have set up an elaborate system for recording spoken interaction. Mehan (1979) for example located two microphones in the ceiling of the classroom in which observations were carried out and in so doing guaranteed adequate coverage of the classroom. Furthermore, Mehan's observations took place in the same classroom over a number of weeks. For this study, however, such an elaborate solution would in all likelihood be impractical given that the observations would be carried out in five different classrooms and with more than a week separating each observation.

The teacher – student discourse that unfolded during the whole class discussion phase of the feasibility study observation was easily picked up by the digital sound recorder. However, on the one occasion when the teacher set up an activity that required the students to work in small groups it became difficult to capture satisfactorily what was being said. Even when the sound recorder was

placed next to the group of students that the teacher was working with, the noise generated by the other groups made subsequent transcription all but impossible. An attempt was made to supplement the audio recordings by recording the dialogue by hand in real-time. This was soon abandoned, however, as the sheer quantity of spoken language produced in relatively short periods of time made such an approach prohibitive. As a result, it became necessary to shift the focus of the study onto whole class discussion as opposed to small group work. A similar approach was adopted by Mehan (1979, p. 27) as well as by Wimer *et al.* who note the following:

> Our assumption was that the teacher controls the questioning: no matter what teaching approach was employed, we assumed that the teacher controls the discussion. For example, it is the teacher who determines whether volunteers or non-volunteers will be called on. It is not unusual for teachers to have predispositions to that effect. Similarly, each teacher decides whether follow-up questions will be asked.
>
> (Wimer *et al.*, 2001, p. 88)

From a practical point of view, then, the feasibility study resulted in shifting the focus more firmly onto how teachers regulate learning during whole class discussion.

3.6.3   Sampling challenges

The feasibility study raised the researcher's awareness of the possibility, even likelihood, of a lack of evident regulation in the classroom observations and the implications this would have for sampling. The teaching style observed in the feasibility study was didactic and teacher-centred; there was very little opportunity for the students to play an active role in the lessons and even when the students worked in small groups, the activity was very tightly controlled by the teacher. The teacher did not appear to be regulating the learning of his students (i.e. responding contingently); very little evidence of understanding appeared to be elicited from the students and when evidence was elicited, the students were only required to recall factual information covered in previous lessons. As Perrenoud (1998, p. 91) notes, 'there is not much to observe in classes which practice 'frontal' teaching'. It was clear that very little regulation was taking place and the risks involved in spending a great deal of time engaged in similar classroom observations became apparent. Careful selection of the teacher sample therefore became a priority.

Similar challenges associated with sampling are highlighted by Garnett and Tobin (1988). These researchers chose to select the teachers for their study based on their ability to manage effectively students' behaviour. As classroom management was not the focus of their study, it was important that observation time was not taken up with attempts by the teachers to establish an environment conducive to learning. Peterson, Clark and Jawoski (in Cowie & Bell, 1999, p. 111) also chose to

work with experienced teachers, as did Doyle and Carter (in Hammersley, 1986, p. 138). The feasibility study therefore led the author to reconsider his original sampling strategy. Ultimately, the criteria settled on for sampling was to identify experienced teachers as those who had taught for a minimum of five years. The same criterion was used by Gatbonton (1999) who studied the pedagogical knowledge of ESL teachers and by Martin, Yin and Mayall (2006) who studied the difference in approach towards classroom management by novice and experienced teachers. Experienced teachers are not only likely to spend less time involved in classroom management but are also likely to be less involved in what Perrenoud above describes as 'frontal teaching'. This is supported by research by Wilen and Clegg (1986) which found that effective teachers ask more high-level cognitive questions than ineffective teachers.

3.6.4   Unit of analysis challenges

The feasibility study highlighted the importance of clearly identifying the unit of analysis, especially given that it is this that determines the limits of data collection. Given that this is a study into how teachers regulate student learning during whole class discussion, it might not be unreasonable to select the individual teacher as the unit of analysis. Another approach could be to select the lesson as the unit of analysis as was done by both Mehan (1979) and Sinclair and Coulthard (1975) in their studies of teacher – student interaction in the classroom. A different approach was adopted by Torrance and Pryor (1998, p. 4) who identified an 'assessment event' as the unit of analysis. Taking neither the teacher nor the lesson as the unit of analysis, this study follows Torrance and Pryor's approach and chooses instead to identify the unit of analysis with a specific event. The event selected as the unit of analysis becomes the whole class discussion activity.

Mehan (1979, p. 35) identified three component parts to a lesson – an opening phase, an instructional phase, and a closing phase – with each phase serving a different function. Mehan also identified a 'setting up' phase that precedes the opening phase. These observations were borne out by the feasibility study which also identified three very clear phases to the lesson. With the study's focus on regulation, it appeared inappropriate to consider the lesson in its entirety. As such, it became clear that the focus would need to be on the instructional phase where the primary activity, as Mehan (*ibid.*, p. 41) puts it, is the 'exchange of academic information'.

Having decided to focus on the instructional phase of the lesson, it became apparent that this in itself was not going to be sufficient primarily because during this phase there is a huge range of different activities that the teacher is able to set up and regulate. A more precise approach was needed. The decision was taken to focus on what Black *et al.* (2003) refer to as 'the most fundamental of all activities set up', that is to say the classroom discussion. Of course, simply referring to the unit of analysis as a 'classroom discussion' does not go far enough in aiding its identification during a lesson; a clear definition is needed. The research literature on classroom tasks and activities proved

useful in helping to define the whole class discussion activity. Brophy and Alleman (1990) suggest an activity is 'anything that students are expected to do beyond getting input through reading or listening, in order to learn, practice, apply, evaluate or in some other way respond to curricular content'. Cameron (1997, p. 346) defines an activity as a 'classroom event that has coherence and unity, with a clear beginning and an end, in which learners take an active role'. Mitchell and Parkinson (1979) suggest that students should be active when involved in whole class discussion, noting that 'if learners are not required to play an active role in a particular part of a lesson then we do not have a task, merely a 'segment' of a lesson'. It is possible to amalgamate these definitions in order to produce a definition that is acceptable to this study. The result is the following definition of the unit of analysis: 'a whole class discussion activity that has a clear beginning and end, and in which all students are required to play an active spoken role in order to learn, practice, apply, evaluate or in some other way respond to curricular content'. Of course, although the unit of analysis may be satisfactorily defined, it does not necessarily follow that it is easy to identify from what is likely to be tens of thousands of words of transcribed text. Challenges associated with identifying the unit of analysis are discussed in Chapter 4.

These, then, have been the three main ways in which the feasibility study has been used to refine the original methodology. The author believes that these issues have been surmounted in such a way that the modified and improved research design is now more able to investigate effectively the regulation of learning.

3.7   Ensuring quality in research

A number of different factors determine the quality of research. These generally come under the headings of 'validity' and 'reliability'. Validity is often split into internal validity and external validity with the latter relating to generalisation and sampling. Reliability links with the triangulation of methods. A number of steps may be taken by the researcher to ensure the study is robust in terms of both internal and external validity as well as reliability and these are discussed below.

3.7.1   Internal validity

Internal validity is the extent to which findings correctly map the phenomenon in question (Denzin and Lincoln, 1994, p. 100). Qualitative research is often criticised for failing to demonstrate in sufficient detail how conclusions are reached, with a not uncommon gap between the results of the research and the findings. It is important that the reader not be required to make a leap of faith; in this study, the findings and conclusions will emerge from the analysis of the data, and this process will be described in detail. In this way what Yin refers to as a 'chain of evidence' will be offered (1994, p. 34). During data analysis a process of respondent validation of the data will also be put in place to ensure a high level of validity, a process that Stake (2006, p. 37) refers to as member checking.

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3.7.2   External validity

External validity is the degree to which findings can be generalised to other settings similar to the one in which the study occurred (Denzin and Lincoln, 1994, p. 100). There exists a trade-off between the potential for learning about a particular situation and the potential for generalising this situation to others. Silverman (2002, p. 102) notes how there are two aims of generalisation: first, to be able to feel confident about the representativeness of the sample and, second, to be able to make broader inferences. Whilst Silverman (*ibid.*, p. 102) notes how 'generalisability is the standard aim in quantitative research' he goes on to note that there is no need to be defensive about claims that qualitative research is not generalisable (*ibid.*, p. 110). It is possible to address the problem of external validity by providing sufficiently rich data for the reader to be able to draw his or her own conclusions. This is sometimes known as an audit trail (Gray, 2004, p. 343) and is an approach that this study has attempted to adhere to.

3.7.3   Sampling

Closely linked to the concept of generalisation is the sampling strategy that is used in the research. Sampling refers to the process of selecting which cases to study out of any given population. Cohen, Manion and Morrison (2000, p. 92) note how sampling refers to the way in which the researcher attempts to 'obtain information from a smaller group or subset of the total population in such a way that the knowledge gained is representative of the total population under study'. A sample is therefore chosen on the basis that its characteristics in some way represent the population as a whole. For this to happen, a number of issues need to be considered including from whom data will be acquired, the minimum and maximum sample size and the criteria for sampling. It has already been established from the feasibility study that the sample will comprise experienced teachers however this is only one of the criteria for selecting the sample. Additional criteria are discussed below.

Types of sampling: Cohen, Manion and Morrison (*ibid.*, p. 99) split sampling into probability and non-probability sampling and note how probability sampling is an approach that draws randomly from the wider population. Generalisation is possible when using probability sampling because the sample is representative of the wider population, whilst non-probability sampling avoids representing the wider population and seeks instead to represent a particular group. There are a number of approaches to non-probability sampling of which convenience sampling, purposive sampling and theoretical sampling are of particular interest.

Convenience sampling simply involves selecting the cases that are most accessible to the researcher. Walford (2006) has the following to say about convenience sampling: 'there are obvious temptations to accept sites that appear to be readily available rather than work harder to try to achieve access to the most appropriate sites for the research'. Purposive sampling involves

handpicking the cases based on how typical they are (Cohen, Manion and Morrison, 2000, p. 103). An approach to purposive sampling is given by Stake (2006, p. 25) who describes setting up a typology of possible cases. To illustrate his point, he uses the example of a study on museums in which cases are selected based on museum type, city size and educational philosophy. A similar approach could, of course, be adopted in this study in which a typology is developed that might include a teacher's subject, length of time teaching, teaching style or gender. Stake, however, notes that selection by sampling of attributes should not be the highest priority: balance and variety are important, he says, but 'relevance to the quintain [the phenomenon under study] and opportunity to learn are usually of greater importance' (*ibid.*, p. 26).

The priority for sampling, therefore, will be to select cases that maximise the opportunities to learn. This is the approach used by Stake (*ibid*, p. 25) who has no qualms in taking the ones that are 'most accessible, the ones we can spend the most time with'. Put simply, cases will be selected because they represent the phenomenon under study. In this study, there is a real dearth of emergent theory linked to regulation and therefore theoretical sampling would be inappropriate. The likely approach will be to begin with convenience sampling (it would be foolish to reject the cases that are most accessible to the author) and then to move towards purposive sampling. Purposive sampling by specific attributes is an attractive approach as it will serve to strengthen a study's claim of generalisability; certain individuals will be invited to participate as their inclusion will help to broaden the theoretical explanation that emerges. The sampling strategy to be adopted in this study is that of purposive sampling in which each case is handpicked on the basis of its perceived typicality.

The sample: taking into account the points that have been raised above it now becomes possible to describe the sample that will be used. The sample comprises three teachers from a grammar school in Dorset for girls aged eleven to eighteen and two teachers from a prep school in Hampshire for boys aged eight to thirteen. The five teachers were selected on the basis that it was believed that such a sample would offer a richness of different approaches to the regulation of the learning. A realistic target was set of a total of 20 hours of classroom observation time. It was also considered important to observe each teacher teaching the same group of students on the same day and at the same time. For this reason, consecutive classroom observations over a number of weeks were scheduled. It is recognised that the context that limits this research is the actual teachers that make up the sample as well as the number of lessons observations carried out. A better understanding of how teachers regulate the learning process is being sought, as opposed to how a teacher of English, of history or of mathematics may do so. At first sight, the sample would appear to be relatively diverse as far as teaching subject or teaching establishment is concerned. Generalisations from the study's findings will however be possible because each case is representative of the wider population in as far as each one involves an act of teaching, each one is the result of following a prescribed curriculum and each one involves the teaching of adolescents by experienced teachers.

All of the cases are therefore of a specific nature; when considered from a pedagogical perspective each case has a distinct equality.

3.7.4   Reliability and the triangulation of methods

Reliability is the extent to which findings can be replicated, or reproduced, by another researcher (Denzin and Lincoln, 1994). Reliability essentially means that if another researcher decided to carry out the same study he / she would reach the same findings. One way of attempting to safeguard reliability is to triangulate research methods. Triangulation of methods can be described as a process of 'repetitious data gathering and critical review of what is being said' (Stake, 2006, p. 35) in an attempt to minimise misrepresentation and misunderstanding and in so doing to produce as reliable an account as possible of the phenomenon. The arguments in favour of adopting multiple methods appear convincing, however both Silverman (2000, p. 50) and Yin (1994, p. 94) advise caution when considering such an approach as it is likely to require the mastering of a range of data collection and analysis techniques. This study goes some way towards triangulating methods by using observational notes as well as audio recording.

3.7.5   Reflexivity

Reflexivity involves an awareness of the researcher's contribution to the construction of meanings throughout the research process as well as an acknowledgment of the impossibility of remaining 'outside of' the subject matter while the research is being conducted. It is important to acknowledge the possible effects of reflexivity during both the data collection and the data analysis stage of the research. During data collection, it is possible that the participant may well act differently when being observed, a phenomenon experienced by many school inspectors (Yin, 1994, p. 80). Smith and Hardman, however, suggest that reflexivity in an educational setting may not be a major problem: 'the presence of an observer in a classroom nowadays is not an unusual occurrence because of school inspections and performance management assessments' (2003, p. 41). Perhaps more significant is the need to be conscious of researcher subjectivity during the data analysis itself. This will be especially important given that the primary research method will be qualitative content analysis (see Section 3.8.3). As such, the coding process will be made as transparent as possible, with each step described in detail and key decisions justified at every stage. These steps will also help to strengthen the study's internal validity and reliability.

3.8   The proposed methodology

The feasibility study has informed the development of the methodology. This methodology includes the methods, procedures and techniques that will be used to collect and analyse the data. As noted above, this will be a qualitative methodology situated in the interpretive paradigm. However, there remain a number of important research decisions to make, not least the choice of research method(s) and the approach to data analysis. Methods are a 'range of approaches used ... to gather

data which are to be used as a basis for inference and interpretation, for explanation and prediction' (Cohen, Manion and Morrison, 2000, p. 44). Again, the most important consideration when choosing which methods to adopt remains their fitness for purpose, that is to say whether they are able to yield the right kind of data to answer the research questions. What is needed in this study is a method that is able to comprehensively describe the whole class discussion activity as well as identify the regulatory features within this structure.

3.8.1 Audio recording and observational field notes

The teacher – student discourse that takes place during the classroom observations will be audio recorded and subsequently transcribed (a list of transcription conventions are given in Appendix 9). In doing so, it must be accepted that, as Miles and Huberman (1994, p. 51) point out, the process of transcription is 'fraught with slippage'. There will clearly be an element of researcher subjectively in transcribing into text the original audio recordings; the act of transcription is inescapably selective. The unit of analysis is the whole class discussion activity within which a large amount of verbal communication may reasonably be expected. In addition, it is also important to consider non-verbal information that may be collected. As Stake (2006, p. 27) affirms, 'sometimes the most direct answers come from observing the activity'. Transcriptions will therefore be supplemented by observational field notes that focus on the actions of the teacher and are likely to include running descriptions of events, ideas and provisional explanations, personal impressions and feelings (Gillham, 2000, p. 54).

It is worth justifying here the decision that has been taken not to interview participants. First, it is believed that data collected through audio recording supplemented with observational notes will be robust in terms of both quality and quantity. Second, the research focuses on what teachers actually do to regulate the learning process; it does not focus on what teachers intended to do, their reasons for acting the way they did, or what they think about what they are doing. It is believed that the words of the participants will speak for themselves; the author is an accomplished teacher with many years of experience and as such is unlikely to be faced with insurmountable barriers to identifying examples of regulation. Where there is doubt, member checking will take place. Finally, it is possible that some teachers will find it difficult to verbalise what they do in the classroom.

3.8.2 Approach to transcription

An approach to transcription that is similar to the one taken by Torrance and Pryor (1986) will be adopted. These researchers note the following:

> Transcripts of the interaction were produced featuring both the words of the actors and a description of the classroom context and the actor's behaviour (stage directions) ... an

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analytic commentary was then added to the transcription to provide an interpretative account of what was happening, why and with what possible consequences.

(Torrance and Pryor, 1998, p. 6)

The excerpt over page (Figure 4), again from Torrance and Pryor, demonstrates how a completed transcript may appear. In this example, Torrance and Pryor have divided the transcript into two, with the left hand column containing the transcribed dialogue and the right hand column containing the researchers' observations of the actions of the participants as well as an analytic commentary. It is interesting to note how Torrance and Pryor (1998, p. 6) emphasise that they are not claiming 'complete objectivity' for the text that appears in either column.

T is sitting on a chair facing the children. She has a number of sheets of yellow A4 paper on her lap which she is counting. She has already given two sheets each to Carrie and Robert. The three children are sitting cross-legged on the floor looking up at T.	
10:22	
T I'm just going to ask you whether you can tell me anything about the pieces of paper -	This appears to be an open question, which could elicit a number of descriptions of these pieces of paper, were the pupils sufficiently 'primed' to the teacher's agenda. However, they seem rather non-plussed by the question – what can you say about a piece of paper, other than it is a piece of paper.
T hands two sheets of paper to Gillie. Carrie and Robert are shuffling through theirs.	
T have a look – touch them – look at them what they're like in your hands	
T has picked up a piece of paper in her own hands and is slowly moving it up and down.	
T what are those pieces of paper like?	Although her words suggest that the question is still open, the bodily action appears to be cueing a specific response: the alternate motion is that used conventionally when miming a pair of scales, implying that the weight of the two pieces of paper should be compared.

Figure 4   Example of a completed transcript including researcher's observations (Torrance and Pryor, 1998, pp. 53 – 54)

3.8.3   Qualitative content analysis

Transcription data will be processed and encoded using NVivo software and data will be analysed using a research method known as qualitative content analysis. Hsieh and Shannon (2005, p. 1278) define qualitative content analysis as 'a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or

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patterns'. The key to this definition, with its use of the phrase 'subjective interpretation' is that the content analysis to be carried out will be qualitative rather than quantitative and as such words rather than figures will be used to generate and represent the findings. Hsieh and Shannon (*ibid.*, p. 1278) highlight the way qualitative content analysis can be used to examine language intensely 'for the purpose of classifying large amounts of text into an efficient number of categories that represent similar meanings'. The advantage of carrying out a qualitative content analysis is that, as Zhang and Wildemuth (2009, p. 1) point out, it becomes possible to 'explore the meanings of underlying physical messages'. This is something that would be impossible if a quantitative content analysis were to be carried out.

Whilst a quantitative approach to content analysis would be deductive in nature and based on existing theory, its qualitative equivalent will adopt an inductive approach that is empirically grounded in the data. This is not to say that qualitative content analysis cannot also be deductive and theory testing. Hsieh and Shannon, for example, outline three different approaches to qualitative data analysis that are based upon the extent to which they involve inductive or deductive reasoning. These are conventional, directed and summative content analysis. Conventional content analysis is 'generally used with a study design whose aim is to describe a phenomenon' (Hsieh and Shannon, 2005, p. 1279). This approach involves the inductive coding of data in which themes and ultimately theory emerge. Directed content analysis is more concerned with validating and / or extending existing theory. Summative content analysis begins by counting the frequency of words or phrases in a text and in so doing explores the usage or certain words in a text.

3.8.4   Developing a general analytic strategy

Yin (1994, p. 102) notes how data analysis depends greatly on the researcher's style of rigorous thinking and talks in favour of establishing a 'general analytic strategy'. It is clearly important to develop a general analytic strategy that will be used to carry out a qualitative content analysis. A common approach to coding suggested by Miles and Huberman (1994, p. 58) is to create a provisional start list of codes, an approach which is clearly linked to Hsieh and Shannon's directed content analysis. A deductive approach such as this would, however, be unsuitable for this study given the incompleteness of the theory of regulation. Instead, a more inductive approach is needed where codes will emerge as the data is analysed, effectively the approach that Hsieh and Shannon refer to as conventional content analysis.

This approach to coding is known as 'analytic induction', a term first used by Znaniecki in 1934. In analytic induction, the social system under study provides classifications, rather than these being imposed upon the social system (Znaniecki, 1934, p. 264). What this means in practice is that categories are not defined in advance of the research but emerge as the analysis unfolds. Analytic induction was used by Mehan (1979) in his study of teacher – student interaction in the classroom.

Mehan transcribed the data 'in order to preserve data in as close to its original form as possible' (*ibid.*, p. 19). He then analysed a small data set from which a provisional hypothetical framework emerges. The framework is then compared with additional data and continues to be modified until the researcher has developed a set of recursive rules that offer a comprehensive description of the phenomenon. Mehan points out that whilst other analytic schemes explain any residual or anomalous cases by the inclusion of additional variables, analytic induction makes room for any exceptions by modifying the scheme until all of the data has been treated. A similar approach was adopted by Sinclair and Coulthard (1975, p. 24) who note how their descriptive system had to be 'modified to cope with problems thrown up by the data'. The result is that the emergent theory is more empirically grounded in the data (even if the researcher is not actually following grounded theory method per se).

In reality an approach that draws from both conventional and directed content analysis will be adopted because, in an attempt to confront threats to the internal validity of this study, the research literature will also be drawn upon as a means of validation. Coding and literature validation will therefore take the form of an iterative process that involves a combination of both deductive and inductive reasoning. The systematic approach to coding that is adopted in this study is described in detail in Chapter 4 in order to establish a clear chain of evidence (Yin, 1994).

3.8.5   Moving from descriptive to interpretive coding

Miles and Huberman have the following to say about coding:

> Codes are tags or labels for assigning units of meaning to the descriptive or inferential information compiled during a study. Codes usually are attached to 'chunks' of varying size – words, phrases, sentences, or whole paragraphs, connected or unconnected to a specific setting.

(Miles & Huberman, 1994, p. 56)

The first code that will be attached to each transcript will be the one that identifies the unit of analysis (in this case the whole class discussion activity). The decision was taken to transcribe each lesson in its entirety because it was thought that presenting the materials upon which the analysis was carried out would allow readers to consider alternative interpretations; this is an attempt to validate the data. Once the unit of analysis has been identified, descriptive coding will follow. Descriptive codes involve 'attributing a class of phenomena to a segment of text' (Miles and Huberman, 1994. p. 57). This type of code will be used to describe comprehensively the structure of the whole class discussion activity, a process that will involve 'making complicated things understandable by reducing them to their component parts' (Bernard in Miles and Huberman, 1994, p. 90). Descriptive

coding will then begin to give way to more interpretive coding which will involve identifying the segments of text (which is to say the mechanisms used by teachers) that serve a regulatory purpose. It is from this second stage of more interpretive coding that a theory of micro regulation will begin to emerge.

3.9   Summary

The purpose of this chapter has been to discuss and justify the key decisions that need to be taken when developing the research design. The ontological and epistemological dimension has been considered and a rationale has been put forward for carrying out qualitative research that sits within the interpretivist paradigm. Ethical issues have been identified and their likely impact on this study has been discussed and various approached to sampling have also been examined. Quality in research has been considered, in particular the issues of validity and reliability and the steps that can be taken to address these. Carrying out a feasibility study has led to a number of modifications of the research design. The research design will involve audio recording and then transcribing interaction in the classroom, together with the researcher's own handwritten observations. A qualitative content analysis will be carried out using an approach known as analytic induction. The analysis will begin with descriptive coding designed to identify the structure of the whole class discussion activities and this will then give way to more interpretive coding which will identify the regulatory aspects of the structure. The following chapter describes the implementation of the research design.

Chapter 4　Results and analysis

4.1　Introduction

This chapter describes the steps that were taken to answer the main research question 'What is the nature of the teacher-led regulation that takes place during whole class discussion?' and the following subsidiary research questions:

1. What mechanisms are put in place by teachers during whole class discussion to regulate student learning?
2. In what way does the regulation of learning interact with other elements of whole class discussion?
3. To what extent is the regulation of learning a continuous feature of whole class discussion?
4. What are the perceived strengths and weaknesses of the regulation that takes place during whole class discussion?

Data analysis was guided by further secondary research questions that emerged inductively as the analysis unfolded. The entire process is described here in detail in an effort to present to the reader what Yin (1994, p. 34) refers to as a 'chain of evidence'. The approach used for the collection of data for the main study is discussed, and the task of transcribing over 100,000 words of teacher – student discourse is reported on. A rationale for identifying the unit of analysis is offered. Identification of the unit of analysis is effectively the first step towards data reduction notwithstanding, as Miles and Huberman highlight (1994, p. 55), the fact that the process of data collection is itself highly selective. This initial step resulted in the analysable text being halved to approximately 51,000 words. A rationale is also given for the rejection of five completed transcriptions. As Mehan (1979, p. 29) points out, whilst interaction in the classroom has a unitary character, the purpose of data analysis is to 'make the unitary discrete by exposing its seams and dividing the whole into parts'. Dividing the unit of analysis into its component parts (i.e. the practice of coding the transcriptions) was achieved by carrying out a qualitative content analysis using a process of analytic induction in which the categories that emerged were grounded in the data. Where the data analysis was informed and validated by the research literature, this is made clear.

In order to achieve a comprehensive treatment of the entire data set, it was considered necessary first to describe the structure of whole class discussion activities and only then to identify the regulation that was present within that structure. In this way, there were effectively two stages to the coding process, an initial descriptive stage and a subsequent interpretive stage that identified the processes of regulation. The iterative process of data analysis and validation in the literature involved drawing upon studies carried out by Sinclair and Coulthard (1975), Mehan (1979) and Mercer (1995). The first two of these studies investigated classroom interaction with a particular

emphasis on the linguistic aspects and functions of teacher – student discourse. A recurring pattern was located that involved three moves. Sinclair and Coulthard (1975, p. 21) describe this pattern in terms of IRF sequences which comprise an initiation by the teacher (I), a response from the pupil (R) and feedback (F) to the pupil's response from the teacher. Mehan (1979) identified a similar pattern that he termed initiation-response-evaluation (IRF). Mercer (1995, p. 25) examined teachers' guidance strategies, in particular how teachers 'elicit relevant knowledge from students' and how they then 'respond to things that students say'. These three studies are then linked to Black and Wiliam's (2009, p. 9) definition of formative assessment which involves eliciting, interpreting and using evidence of student achievement. Data analysis therefore proceeded on the basis that if there were two sides to classroom discourse (the 'eliciting' and the 'using') then it was also likely that there were two sides to regulation.

The descriptive stage of data analysis began with the first set of analysis-guiding questions 'What mechanisms are put in place by teachers during whole class discussion to elicit evidence of student understanding?' and 'What mechanisms are put in place by teachers during whole class discussion to use evidence of student understanding to move learning forward?' Early analysis of the data immediately revealed that teachers made use of two moves (i.e. mechanisms), a questioning move to elicit evidence of student understanding, and a subsequent feedback move intended to move learning forward. From this observation, the two analysis-guiding questions above were adapted to become 'What *questioning* mechanisms are put in place by teachers during whole class discussion to elicit evidence of student understanding?' and 'What *feedback* mechanisms are put in place by teachers during whole class discussion to use evidence of student understanding to move learning forward?'

In an attempt to understand the teachers' questioning move, both the regulation and the formative assessment literature were revisited. This literature did not prove helpful, however, as it did not focus in sufficient detail on the dynamic nature of classroom discourse. Beyond the literature on regulation and formative assessment, much has been written about the use of teacher questioning and this literature was drawn upon to identify the use of open / closed questioning as a starting point for coding. A rationale is offered for coding teachers' questions as either open or closed as opposed to higher or lower-order. Difficulties associated with reliably coding a question as either open or closed were overcome by examining closely the context of the question, or as Mercer puts it, the 'histories and futures' of classroom conversations (1995, p. 25). An important distinction is made between the grammatical property of a question (i.e. whether a question is open or closed) and its functional property (i.e. the intended purpose of the question). In addition to the two grammatical properties of *open* and *closed*, three functional properties were identified: *initiate*, *modify* and *probe*. It is important to point out that the codes *modify* and *probe* are empirically grounded in the data as these codes emerged inductively as the analysis progressed; the result was a modification to the analytic scheme. Combining the grammatical and functional properties of teacher questioning

resulted in the identification of six mechanisms that are used by teachers to elicit evidence of student understanding.

To understand the feedback move and validate the data analysis, the regulation and formative assessment literature was examined but again it appeared to pay scant attention to the dynamic nature of interaction in the classroom. It therefore became necessary to broaden the perspective and to consider the more general research on classroom discourse. The work of Mercer (1995) was drawn upon as a starting point from which to understanding teacher feedback. Mercer identified the following ways in which teachers respond to what students say. According to Mercer, teachers *confirm*, *repeat*, *reject*, *reformulate* and *elaborate* on what students say. It became necessary to adapt Mercer's model by the dissolution of *repeat* into *confirm* and by the addition of two further mechanisms: *peer-prompt* and *answer*. The challenges associated with reliably coding for *reformulate* and *elaborate* are also discussed. Teacher feedback is therefore comprised of six mechanisms the purpose of which is to use evidence of student understanding to move learning forward.

Having identified the various mechanisms that make up the questioning and feedback moves it became important to look at how these mechanisms are organised given that they rarely occurred alone. This stage of the coding is oriented with the help of the second set of analysis-guiding questions 'How are the mechanisms that make up the questioning move organised during whole class discussion?' and 'How are the mechanisms that make up the feedback move organised during whole class discussion?' Finally, it was found that teachers' questioning moves were almost invariably mirrored by one or more feedback move. As such, it became necessary to look at the two moves together. This part of the data analysis was driven by asking 'How are the questioning and feedback moves used together to elicit and use evidence of student understanding?' The combined structure of questioning and feedback moves is described in terms of three-part and extended question-response-feedback (QRF) cycles. These cycles comprehensively describe the structure of the whole class discussion activity.

Once the structure of the whole class discussion activity had been comprehensively described, it became necessary to look specifically at the regulatory aspects of teacher questioning and feedback within this structure. This is the second more interpretive stage of data analysis, and one that allows for the development of a theory of micro regulation that was distinct from a more general theory of teaching and learning. A final set of analysis-guiding questions was used to orient this interpretive stage 'To what extent is teacher questioning regulatory in as far as it is contingent upon the response of the student?' and 'To what extent is teacher feedback regulatory in as far as it is contingent upon the response of the student?' This interpretive phase of data analysis resulted in the understanding that regulatory questioning comprised the mechanisms *open-modify*, *closed-modify*, *open-probe* and

closed-probe (to the exclusianion of *open-initiate* and *closed-initiate*) whilst regulatory feedback comprised the mechnisms *confirm*, *reject*, *reformulate*, *peer-prompt* and *answer* (to the exclusion of *elaborate*).

In answering the four sets of guiding questions that have been set out here, it becomes possible to answer the main and the subsidiary research questions. Doing so achieves the aim of this study which is to bring a better understanding of the theory of interactive regulation by examining how learning is regulated by the teacher at a fine-grained micro level during whole class discussion. The remainder of this chapter will now describe the steps that were taken in the collection of the data, its preparation and subsequent analysis.

4.2   Data capture and preparation for analysis

Permission to carry out the school-based research was sought by letter from the Headteachers of the two schools involved (Appendix 6). As previously noted in Chapter 3, prior to carrying out the observations, each teacher was asked to read a Participant Information Sheet (Appendix 7) and required to sign a Participant Consent Form. In total 18 classroom observations were carried out between November 2010 and March 2011 in two schools one located in Dorset, the other in Hampshire. The Dorset school was visited on three separate occasions and on each occasion one observation was carried out with each of the three participant teachers. The Hampshire school was visited on five occasions, with one teacher being observed on each of these five occasions and the other, due to illness, on four occasions. It is important to note here that the same group of students was observed at the same time on each occasion as this will strengthen this study's claim of generalisability.

The teacher – student discourse that took place in each classroom was recorded using a good quality digital sound recorder. As noted above, due to the difficulty of successfully capturing and transcribing one to one and small group interaction, the focus of the study was on teacher-led whole class discussion. The researcher's presence in the classroom was on a strictly non-participant basis. The 18 classroom observations amounted to approximately 15 hours of audio recording. Mehan (1979, p. 16) notes how 'many researchers collect one or two short segments of interaction and analyse them in great detail' however such an approach was not followed here. In this study, all 18 of the classroom observations were transcribed in full in order to preserve the material upon which the analysis was subsequently conducted and to make room for alternative interpretations by the reader (*ibid.*, p. 19). Although it should be recognised that transcription is 'inescapably selective' (Miles and Huberman, 1994, p. 56) and that data loss is therefore inevitable, every effort was made to ensure that the transcriptions were a faithful representation of what was actually said in the classroom.

Mercer (2005, p. 10) suggests that 'transcription choices should be determined by the research questions being addressed and the claims which will be made on the basis of the analysis'. Following this advice, it was not considered necessary to include certain details such as the exact length of pauses of the speakers, nor was it considered necessary to attempt to record the speakers' intonation. A full list of the conventions used in the transcriptions is given in Appendix 9. The names of students have been changed to preserve their anonymity, and each individual utterance has been numbered for ease of reference. As an initial safety net, verbatim note taking by the researcher was undertaken in the early stages of the observations but this was subsequently discarded as it became clear that the quality of the recordings was sufficient to allow for relatively trouble-free transcription. What did continue throughout the course of the observations was unstructured and open-ended note taking that focused on contextual details such as teacher pauses, or the students' reluctance or inability to answer questions. These 'stage directions' as Torrance and Pryor (1998) call them are included in the transcriptions (in italics between round brackets) and proved invaluable during the data analysis particularly in respect of the length of pauses between exchanges. The completed transcriptions were sent by email together with a covering letter to each of the five participants as part of a process that Stake (2006, p. 37) refers to as member checking. Each teacher was given the opportunity to respond to the transcriptions and comment on their level of accuracy and correct any possible misrepresentation by the researcher (see Appendix 8). Similar to Stake's own experiences, none of the participants in this study chose to modify the transcriptions in any way.

Completed transcriptions of the 18 classroom observations amounted to just over 100,000 words of text. These 100,000 words are effectively the results of this study. Each classroom observation was allocated a simple code for ease of recognition. For example, BE8_1 was the code given to the first observation. This code signifies the fact that this was the first classroom observation (1) of Year 8 (8) English (E) at the Bournemouth school (B). Following this format, WM8_2 refers to the second observation of Year 8 mathematics at the Winchester school, WE7_4 to the fourth observation of Year 7 English at Winchester etc. Appendix 10 contains a full transcription of the very first classroom observation that was carried out (BE8_1). The process of preparing the 18 classroom observations for analysis was a time-consuming one, however the end result was a substantial data set with which it was possible to carry out a rigorous process of data analysis. The following sections describe in detail the data analysis that took place, beginning with the initial steps that were taken in identifying the unit of analysis.

4.3   Data analysis: the first stage of data reduction

The results of this study are the 18 transcriptions that were produced from the classroom observations that took place. Once the transcriptions were complete data analysis could begin. Any attempt to reduce the data is analytic and as such the data analysis process effectively began with the identification of the unit of analysis. The unit of analysis in this study is defined as a 'whole class discussion activity that has a clear beginning and end, and in which all students are required to play

an active verbal spoken in order to learn, practice, apply, evaluate or in some other way respond to curricular content'. Although it was possible to clearly define the unit of analysis, its identification and delineation from over 100,000 words of transcribed text proved difficult. Other researchers would appear to have experienced similar difficulties. Mehan (1979, p. 29), for example, recognises that 'the boundaries between events are not discreet', whilst Scarth and Hammersley experienced difficulties in identifying both when a task occurred and in distinguishing one task from another: tasks, they say, are 'not clearly demarcated and labelled in the world' (1986, p. 71). For Torrance and Pryor (1998, p. 4) the unit of analysis became what they called the 'assessment event'. The event that these authors describe, however, was a planned decision on the part of the teacher to carry out an assessment and as such was easily identified and clearly delineated.

On scrutinising the instructional phase (i.e. the phase that occurred between the opening and closing phases) of each transcribed classroom observation it became clear that teachers used certain unambiguous sign-posting techniques to signify to students where one activity ended and another one began. In BE8_1, for example, signposting is used to signal the start of the activity with the following comment:

2   T   So the first question will be 'what's the difference between speaking and writing' OK.

In BH11_1b, the teacher signposts the beginning of a new activity with:

87   T   Right, today we're going to look at, because that was my fun recap activity, the nineteen oh five revolution.

In BH12_3a, the teacher has allowed time for the students to discuss between themselves and then signals the start of a classroom discussion as follows:

27   T   OK, I would say by the lull in the conversation that we've finished. Got something to say? Who would like to start us off then please? What impact does the provenance, or might the provenance have on what the source says? Yes.

Finally, in WM8_4a the teacher begins by saying:

1   T   Now we're going to do a quick bit of revision today, a very quick piece of revision. So, the three boys that I worked with yesterday will already know the answers hopefully because we spent half an hour on this. So, the response is putting your hand up, you guys in the front just turn around so you're not craning your neck. OK, this is all to do with?

Examining the signposting techniques that teachers used to signify the transition from one activity to another made it possible to identify the point at which each unit of analysis began. The same approach was also used to delineate where the unit of analysis ended. The teacher in BH11_1b for example signals the end of the whole class discussion activity and the beginning of a new activity with the words:

109   T   '…right, what we're going to do on this piece of A3 paper, you are going to create a colourful mind map of the causes of the nine oh five revolution…'

In WM8_4a, the end of the whole class discussion is signalled with:

200   T   'now, I think that you concentration levels have been very good, I'm now going to ask you to concentrate for one more minute where I tell you what I want you to do'

Finally, the teacher in BH12_3a concludes in the following way:

132   T   'OK what we're going to do is actually go back to the work that we were doing on Chadwick on this sheet, I imagine that you haven't finished that have you?'

Scarth and Hammersley (1986, p. 71) underline the need for 'the specification of a set of rules by which to decide when a task has occurred, and when to distinguish one task from another'. In this study, such a set of rules is reflected in the teachers' sign-posting strategies evident in each of the transcriptions. By following these rules, it was possible to identify 20 units of analysis from the 18 classroom observations that took place. This effectively halved the transcribed text from 101,000 to some 51,000 words. In some transcriptions, more than one unit of analysis was identified such as in BE8_1 where three separate whole class discussion activities took place. As a result, it became necessary to modify the initial codes. The three units of analysis in BE8_1 therefore became BE8_1a, BE8_1b and BE8_1c. Appendix 10 contains a complete transcription of BE8_1, the first classroom observation to take place. Three units of analysis have been identified and these have

been shaded in yellow to aid recognition. In WM8_2 only one whole class discussion activity took place, however to ensure a standard approach towards the nomenclature of the units of analysis WM8_2 became WM8_2a. Although transcribed in full, it was necessary to reject in their entirety five of the classroom observations (BE8_2, BH1_2, WE7_3, WE7_4 and WM8_5) as they did not involve whole class discussion. With hindsight, of course, these classroom observations would not have been transcribed and a very time-consuming task would have been avoided. Once the 20 units of analysis had been identified, it became possible to begin the first, descriptive stage of data analysis.

4.4 Establishing a starting point: two possible sides to regulation

Section 2.8 above introduced the main and subsidiary research questions and it was made clear in Section 3.6.4 that the study will now focus on the whole class discussion activity with the result that the main research question is modified and becomes 'What is the nature of the teacher-led regulation that takes place during whole class discussion?' In order to lay claim to a comprehensive description of the phenomenon that is micro regulation, it becomes necessary first to describe the structure of whole class discussion and second to identify the nature of the regulation within that structure. Although the whole class discussion activity will be the focus and therefore the unit of analysis in this study, a clear starting point from which to begin descriptive coding has yet to be identified. A possible starting point comes from studies carried out by Sinclair and Coulthard (1975), Mehan (1979) and Mercer (1995). The first two of these studies investigated the interaction that takes place in the classroom with a particular emphasis on the linguistic aspects and functions of teacher – student discourse. Both studies located a recurring pattern involving three moves. Sinclair and Coulthard (1975, p. 21) suggest that the structure of discourse can be described in terms of what they call IRF sequences which comprise an 'initiation by the teacher, followed by a response from the pupil, followed by feedback to the pupil's response from the teacher'. Mehan (1979, p. 28) notes how the instructional phase of a lesson 'is composed primarily of elicitation sequences' and identified patterns which he termed initiation-response-evaluation (IRE). Mercer (1995, p. 25) looked at the 'ways that teachers talk when they are trying to guide the construction of knowledge by their students'. Mercer identified three strategies that teachers use, the first two of which are relevant to this study: first, teachers elicit relevant knowledge from students and, second, they respond to things that students say. Here, then, is evidence to suggest that the structure of teacher – student discourse may be described in terms of sequences that involve teachers initiating, students responding, and teachers then evaluating the response (i.e. offering feedback).

The formative assessment literature offers a similar three-part model of teacher – student discourse. Black and Wiliam (2009, p. 9) for example note how 'practice in a classroom is formative to the extent that evidence about student achievement is elicited, interpreted, and used'. The evidence of student achievement may be thought of in terms of 'moments of contingency' which Wiliam (2007) defines as 'points in the instructional sequence when instruction can proceed in different directions according to the responses of the student'. As noted above, it becomes necessary to describe first

the structure of whole class discussion before attempting to identify the regulation within that structure. In order to understand micro regulation it would therefore appear necessary to examine how teachers both elicit and use evidence of student understanding. In the literature, the concept of using evidence to move learning forward in the form of feedback has been treated in some depth however up to this point what has been missing from the discussion of both formative assessment and of regulation is how teachers initially elicit evidence of student understanding. It was Perrenoud, of course, who pointed out that feedback is only one element of a wider process of regulation (1998, p. 86). Add to this the suggestion from Webb (2009) that feedback is 'part of a larger set of pedagogical processes in which the teacher regulated the learning' and the need to look at both sides of the process becomes clear. There would therefore appear to be two sides to the regulation of learning, the side that is associated with eliciting evidence of student understanding and the side that is associated with the use of this understanding to move learning forward. The starting point for the data analysis therefore originates from both the formative assessment literature and from the literature on teacher – student discourse. The next section describes the early stage of descriptive data analysis that involved identifying how teachers elicit and use evidence of student understanding.

4.5 Eliciting evidence of student understanding: investigating teacher questioning

The first set of analysis-guiding questions begins by asking 'What mechanisms are put in place by teachers during whole class discussion to elicit evidence of student understanding?' At the very earliest stage of data analysis, it became clear that the main way that teachers elicit evidence of student understanding is to ask questions. This observation is confirmed in the literature. Hodgen and Webb (2008, p. 74), for example, observe that teachers 'spend a great deal of time in class asking questions'. These authors refer to what they call 'responsive questioning' which they suggest is a complex process that involves responding to students 'in the moment' (*ibid.*, p. 86). The use of terms such as 'responsive' and 'in the moment' clearly links to micro regulation even if these authors do not explicitly use the term. It was therefore decided to focus the initial descriptive stage of data analysis on teacher questioning. To orient this stage of data analysis the above analysis-guiding question is adapted and becomes 'What questioning mechanisms are put in place by teachers during whole class discussion to elicit evidence of student understanding?' This question serves to examine the structure of teacher questioning.

Whilst it was clear that teachers used questioning to elicit evidence, it was also apparent that this was happening in a number of different ways. As such, it became necessary to develop a method of classifying the questions that teachers were asking. In an effort to provide a starting point from which to begin to understand teacher questioning the literature on both the regulation of learning and formative assessment was re-examined. An obvious starting point was Perrenoud (1998) whose views were considered in Chapter 2. Perrenoud, however, offers no specific detail regarding how learning may be regulated at a fine-grained micro level. Turning to the formative assessment

literature, it was clear that both Hattie and Timperley (2007) and Tunstall and Gipps (1996b) chose to focus uniquely on the feedback part of the process. Cowie and Bell (1999) proposed a three-part model of formative assessment which involved teachers noticing, recognising and responding. Their concept of noticing is perhaps closest to eliciting evidence, however these authors do not explore in any detail how this part of the process actually takes place. Torrance and Pryor (2001, p. 628) do refer to teacher questioning, in particular their use of 'helping' questions that are used to 'elicit understanding and guide progress' and which 'invite students to reflect on their own thinking' however yet again no extra detail is given as to how this is achieved. It became clear that sufficiently detailed models for how teachers use questioning to elicit evidence of student understanding were lacking in both the regulation and formative assessment literature; research in these areas did not appear to focus in sufficient detail on the dynamic nature of classroom discourse and teacher questioning.

When the focus is moved beyond the formative assessment and regulation literature it becomes clear that much has been written in the more general literature about the use of teacher questioning. Wilen (1991, p. 8) for example argues that the two main purposes of teacher questions are to 'determine student understanding of basic facts associated with specific content and to have students apply facts using critical and creative thinking skills'. Brown and Wragg (1993, p. 5) note the most common reason for questioning as reported by teachers themselves was for the purpose of 'encouraging thought, understanding of ideas, phenomena, procedures and values'. Wilen and Brown's comments, as well as Wragg's comments, fit with the notion of using questions to elicit evidence of student understanding.

Bloom (1956) classifies teachers' questions according to the level of thinking they are likely to stimulate in the student. The result is Bloom's taxonomy that classifies thinking into six levels with an ascending order of sophistication: (1) knowledge, (2) comprehension, (3) application, (4) analysis, (5) synthesis, and (6) evaluation. Bloom's taxonomy assumes that the cognitive level of the question is determined by the response requested by the teacher. Taking a question at the lowest level, knowledge, Bloom writes:

> The major behaviour tested in knowledge is whether or not the student can remember and either cite or recognize accurate statements in response to particular questions. Although somewhat more than rote memory is required for knowledge, the form of the question and the level of precision and exactness required should not be too different from the way in which the knowledge was originally learned.
>
> (Bloom, 1956, p. 78)

The knowledge level can be contrasted with the synthesis level that features at a much higher point in the cognitive domain. To illustrate this, Bloom writes:

> It is probable that tasks involving synthesis provide a wider kind of experience than those involving mainly acquisition of ideas…Such activities should foster productive thinking…Because such experiences involve the relating of ideas, methods, values, etc., they probably foster interrelation of outcomes better than experiences which do not require genuine problem solving.

> (Bloom, 1956, p. 167)

It was clear from the literature that many of the studies that draw on Bloom's taxonomy have tended to simplify its six levels into two much broader categories: higher-order questions and lower-order questions. Morgan and Saxton (1991), for example, define higher-order questions as those which ask for 'analysis, synthesis or evaluation', whilst lower-order questions are those which ask for 'knowledge, comprehension and application'. Cotton (1989) takes a similar approach, noting that higher-order questions are those that require the student to 'mentally manipulate bits of information previously learned to create an answer or to support an answer with logically reasoned evidence'. Conversely, lower-order questions are those which 'ask the student merely to recall verbatim or in his / her own words material previously read or taught by the teacher' (*ibid.*, 1989). Cotton further notes that higher-order questions are often referred to as 'open' and lower-order referred to as 'closed'. Morgan and Saxton (1991, p. 63) define the open question as one which 'suggests that the teacher does not have one particular answer in mind but is inviting students to consider and advance many possibilities'. They define a closed question as 'one which asks for the short, right answer or one which may be answered with a "yes" or a "no"' (*ibid.*, p. 63). As such, answers to open questions are likely to be longer than answers to closed questions. This study chose to code teacher questioning along open / closed lines because it was considered a more reliable approach to classification. Morgan and Saxton's definition of open and closed question was used as a starting point from which to begin the coding for teacher questioning.

4.5.1   Reliably coding questions as open / closed: examining the context

The task of reliably coding teacher questioning as open or closed was not straightforward and does of course raise the issue of researcher subjectivity that has been discussed previously. The challenges that arose are best illustrated with the following three examples. The first is taken from BH11_1a in which the teacher asks the following question:

| 34 | T | OK, why are the liberal party, why are the liberals the least threat, Jane? |

Even after returning to Morgan and Saxton's definition of open and closed questions, it remains unclear whether the students are being invited to advance a number of possibilities (in which case the question is open) or whether they are being asked to supply the 'short, right answer' (in which case it is closed). A similar difficulty arises in BH11_3b when the teacher asks:

177   T   So what is the most important reason for the revolution of nineteen seventeen? Are people just hungry, fed up with terrible working conditions? What do we think?

By asking 'what do we think?' it would appear that the teacher does not have one particular answer in mind and if this were the case, the question would be coded as open. However, there may of course be only one correct answer to this question, in which case it is coded as closed. In BH12_3a, the teacher asks:

53   T   What general statement might you make about this source then?

Again, what needs to be understood in order to reliably code this question is whether there is only one general statement and the students are effectively being asked to recall factual information, or whether they are being asked to mentally manipulate information. Clearly, if researcher subjectivity is to be minimised the difficulties associated with coding questions must be overcome; a firm rationale with which to classify questions as either open or closed is essential. Again, the literature was drawn upon in an effort to establish whether other researchers had experienced similar problems and how they have overcome them. Working with a fellow researcher appeared to be a common approach. Harris and Williams (2008), for example, were able to achieve inter-rata reliability of 92% for the coding of questions as either closed or open, however such an approach was not an option given that the author was working alone. Wilen (1991) reports training researchers in the classification of questions, however his approach is unlikely to satisfy Yang who criticises the entire practice of classifying questions as positivistic:

The premise that the meaning or effect of the question can be generalised independently of the epistemic subject is founded on objectivism…positivists exclusively use concepts which can be classified as the same category by anyone and from any point of view

(Yang, 2006)

Of course, it remained essential to develop a method of reliably coding questions as either open or closed and as such, Yang's criticism of positivism had to be put to one side. Mehan proposes an

alternative approach that involves examining what precedes a students' response. He notes that 'student responses and giving praise are not random occurrences in the classroom. They are tied together in sequences of interaction … it is important to know what that teacher did immediately before' (Mehan, 1979, p. 12). Tackling the issue from the other direction, Smith and Hardman (2003) argue in favour of examining what follows the students' response. These researchers coded questions 'in terms of the teacher's reaction to the pupils' answer: only if the teacher will accept more than one answer to the question would it be judged as open' (*ibid.*, p. 397). Mercer (1995, p. 25), putting it with great simplicity notes, how 'classroom conversations have histories and futures'. Mercer also suggests 'that we need to look at who is speaking to whom, and what else has been said and done by those people' (*ibid.*, p. 31). Regardless of whether it is important to look at what comes before or what comes after a students' response (or, of course, both) what is clear here is the need to examine the context in which the questions are asked. This becomes clear in the following extract from BH11_1a:

11	T	…So which of those three parties, political parties, which were the biggest threat to the Tsar?
		(No answer is immediately forthcoming)
12	T	If you want to have a little look at your notes from last time. Which is the biggest threat to the Tsar? Anna.
13	Anna	The Socialist Revolutionaries.
14	T	The Socialist Revolutionaries says Anna.

In this extract, the question in line 11, when devoid of its context, could be coded as either closed or open. However when in line 12 the teacher prompts the student to refer to her notes it becomes clear that the question is in fact closed; knowledge not analysis is being required of the student. A similar situation is seen in this extract from WE7_2a:

37	T	Remember the apostrophe, because that's going to important this. Do you want to have a shout at that? What does that mean Max?
38	P	Er…that, nobody goes in there.
39	T	Nobody goes in there. Miles?
40	P	Middle of nowhere.
41	T	Middle of nowhere.
42	P	Nowhere where someone wants to go but has to go to save or fight for people.

43	T	I'm not going to keep repeating these, these are magic.
44	P	Is it where all the action is.
45	T	Where all the action is.

The teacher has written 'No Man's Land' on the whiteboard and in line 37, after having drawn the students' attention to the apostrophe, asks the students what they understand by the phrase. The teacher's initial question appears to be closed; to an outsider the phrase 'No Man's Land' may reasonably be considered to have a standard meaning. However, by accepting and giving credit for a number of different student (in lines 38, 40, 42 and 44), it becomes clear that the teacher is not asking what the term means in an objective sense, but is asking the students what it means *to them*. To return once more to Morgan and Saxton, the students are being invited to 'advance many possibilities' (1991, p. 63). The teacher's question in this example is coded as open. The method used here of coding questions as open or closed is similar to that adopted in other studies; when the context is taken into account the practice of coding questions becomes more reliable. Whilst coding for open and closed questions may be simpler than using Bloom's taxonomy, it is far from simplistic; many challenges remain and in overcoming these challenges, it becomes necessary to study the context of the situation closely.

4.5.2   The structure of questioning: *initiate, modify* and *probe*

Before the coding for open and closed questions was complete, a further dimension of understanding began to emerge. It became clear that far more was going on besides simply the type (i.e. open or closed) of question being asked. It was noticed that when a teachers' question either failed to elicit a response from the students or when it did not elicit the expected response, the teacher would often adapt the original question. For example, teachers would sometimes follow an open question with a closed question as demonstrated by the following extract from BH11_1b:

99	T	Ellie, any others?
100	Ellie	(Silence)
101	T	What else was going on? We've got demonstrations, poverty, there were also beginning with 's'?
102	P	Crowd control.
103	T	Well there was crowd control, the soldiers were used for crowd control. Leah? Beginning with 's'.
104	Leah	Why are we doing this?
105	T	Strikes.

In line 99, the teacher begins by asking an open question, however as the student is unable to respond the teacher follows up this initial question with a closed question in line 101. Still not managing to elicit the expected answer, the teacher again asks another, but slightly different, closed question in line 103. As the data analysis progressed, it became clear that the practice of adapting the type of question according to the response of the students was a common one. Turning again to the literature, it was evident that there was much research to support this observation. Brown and Wragg (1993, p. 20) for example report how teachers follow up their original question by 'rephrasing the question in different, perhaps simpler words that relate more to the pupils' knowledge and experience'. Having observed in the data that teachers often adapt their questioning according to the students' response (and having found validation for this in the literature) it became necessary to attach a code that would enable the original question and the follow-up question to be distinguished from one another. Initially the code *reformulate.q* was used to describe the follow-up question, however this became confused with *reformulate* which is a code used to describe a feedback mechanism (see Section 6.7.2). In order to keep the labelling of the codes as straightforward as possible (whist at the same time recognising, as Miles and Huberman do, that it is 'not the words themselves but their meaning that matters' (1994, p. 56)) the original question was assigned the code *initiate* and the follow up question was assigned the code *modify*. At this point, it becomes necessary to offer a definition of the codes (i.e. the mechanisms) *initiate* and *modify*. *Initiate* may be defined as the leading question that a teacher asks before either modifying or probing, or giving feedback. Brown and Wragg's definition above is used to define *modify* which becomes a question that is rephrased by the teacher in simpler words that relate more to the students' knowledge and experience.

Coding questions according to whether they are open or closed may be considered a distinction along grammatical lines, whilst coding questions as *initiate* and *modify* is a distinction along functional lines, that is to say in relation to the intended purpose (or function) of the question. Each question, then, was considered to have both a grammatical property and a functional property. When the grammatical properties of a question are combined with its functional properties, the result is four possible code configurations: *open-initiate*, *closed-initiate*, *open-modify* and *closed-modify*. In the extract above, the question in line 99 would be coded as *open-initiate* and the question in line 101 as *closed-modify*. Whilst the identification of *modify* was a significant step forward in understanding teachers' questioning, it also resulted in the re-coding of the entire data set along grammatical / functional lines. Here, then, is evidence of the process of analytic induction in action; the addition of *modify* resulted in the modification of the analytic scheme, effectively grounding the analysis empirically.

Before completing this re-analysis, yet another level of understanding was beginning to emerge which again led to modification of the analytic scheme. Whilst initially all questions were coded as either *initiate* or *modify*, it became clear that at times teachers asked questions that could not be

assigned to either of these two functional properties; these questions did not initiate a student response, nor were they an attempt to modify a response due to students' misunderstanding. This is demonstrated with the following extract from BH12_3a:

29	T	Very nice, does anyone want to expand on that, did anyone have the same kind of idea, it was an official document but developed that in a slightly different way, yes.
30	P	That he was only a local resident, he wasn't someone with a high degree.
31	T	OK, what do you mean?
32	P	Er he wasn't an expert.
33	T	Yeah, lovely, so therefore?
34	P	Therefore he didn't have, he might not have had as much knowledge about the about the sewerage?
35	T	OK, OK,

In line 29, the teacher begins by asking a question coded as *open-initiate* and then in line 31 the teacher follows this up by asking the student to give a reason for her answer. Then, in line 34, the student is required to support her response by adding extra detail. It would be wrong to code these follow up questions as *modify* as this is clearly not the functional purpose that they serve. Yet again, the literature proved valuable in helping to differentiate between what now appeared to be three different functional properties. Morgan and Saxton (1991, p. 92) note how certain questions are designed to 'help students think out answers more thoroughly, to encourage quantity and quality of participation, to require students to be more accurate and specific'. Wilen (1991, p. 21) also notes how a teacher can 'probe with a follow up question to encourage the student to restate or classify, elaborate, expand or support the response'. For coding purposes, the code *probe* was assigned to questions with the functional property as defined by Wilen. *Probe* therefore followed *initiate* but in a completely different way to *modify*; whilst *modify* is used to make questioning more accessible to students, *probe* is used to extend and challenge the students' thought. This study adopts the above definition from Morgan and Saxton to describe the mechanism that is *probe*. A *probe* is therefore a question that is intended to 'help students think out answers more thoroughly, encourage quantity and quality of participation, or require students to be more accurate and specific'. It is important to emphasise that both *modify* and *probe* follow, and can only exist in relation to, *initiate*. Just as had been the case for the addition of *modify*, the identification of *probe* made it necessary to re-code the entire data set. Again, here is evidence of analytic induction in action. This task is observable in the following NVivo screen shot taken from WM8_4a (Figure 5). The left hand section of the screen shows the transcribed dialogue, whilst the coloured strips in the right hand section relate to the sections of dialogue that were coded. From these strips it is clear that each move by the teacher (in

the form of a question) has been coded twice, first as *open* or *closed* and then as an *initiate*, *modify* or *probe*; the coding is empirically grounded with the result that it has become necessary to modify the analytic scheme.
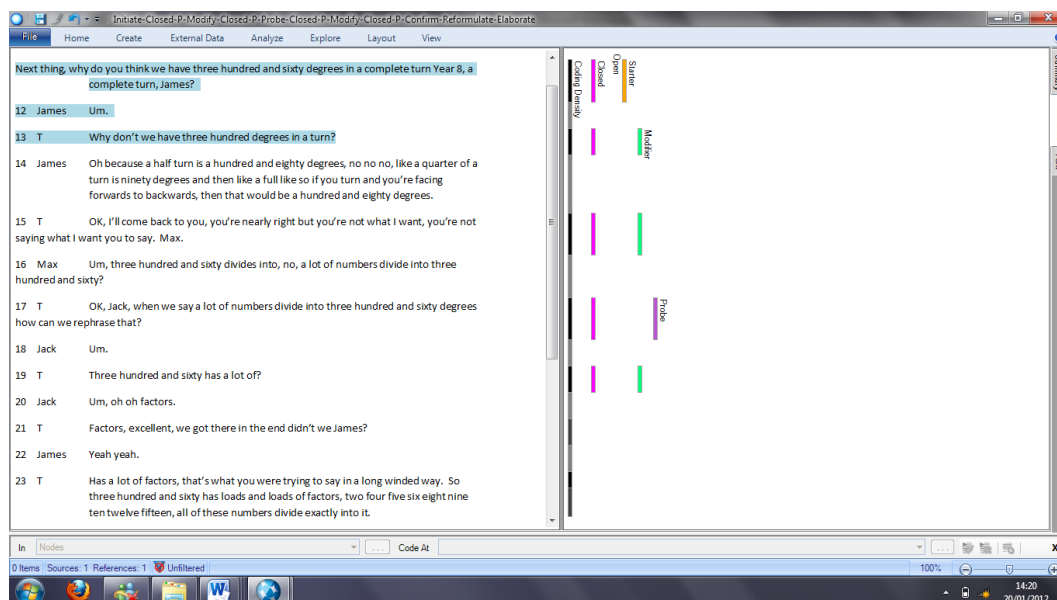
Figure 5   **NVivo screenshot of the coding of teacher questioning**

In summary, combining the two grammatical properties identified (*open* and *closed*) with the three functional properties identified (*initiate*, *modify* and *probe*) resulted in the following six codes that may be used to describe the questioning mechanisms that teachers use to elicit evidence of student understanding: *open-initiate*, *closed-initiate*, *open-modify*, *closed-modify*, *open-probe* and *closed-probe*. This section has examined the ways in which teachers use questioning to elicit evidence of student understanding. The following section looks at how this evidence is then used by teachers to move learning forward.

4.6   Using evidence of student understanding: investigating teacher feedback

This section looks at how teachers use evidence of student understanding to move learning forward. This aspect of the study is operationalised with the second of the first set of analysis-guiding questions that begins by asking 'What mechanisms are put in place by teachers during whole class discussion to use evidence of student understanding to move learning forward?' A suitable model from the formative assessment literature was sought in order to provide a starting point or lens through which to begin to understand how teachers used evidence of student learning to move learning forward. Hattie and Timperley's (2007) model of feedback was re-examined but was found to be unsuitable for a number of reasons. First, although feedback at the task level (with its focus on the correctness of work) is linked to moving learning forward, there is clearly not enough detail here

to be used as the basis of codes. Process level feedback, as the name indicates, is more concerned with how to perform a task than with the actual learning that results, whilst feedback at the self-regulation level is focused more on the internal processes of the student than the external actions of the teacher. Finally, feedback at the self (or personal) level does not directly affect the students' learning. Hattie and Timperley's model was considered unsuitable both because it lacks the necessary detail and also because it focuses on the more static nature of written interaction between teacher and individual student (as opposed to the dynamic nature of classroom discourse). Tunstall and Gipps' (1996a) model was revisited but again it was not deemed suitable. These authors identified four types of feedback along an evaluative – descriptive continuum: rewarding / punishing, approving / disapproving, specifying attainment / specifying improvements, and constructing achievement / constructing the way forward. This model was rejected for two reasons: first, only the two final types of feedback (specifying attainment and specifying improvements) dealt with cognitive processes and second, as Tunstall and Gipps themselves note, it was 'not within the scope of the study to analyse each teacher's feedback in depth' (1996a, p. 402). Given that in this study an in-depth analysis of teachers' feedback mechanisms is exactly what is needed, it became necessary to reject Tunstall and Gipps' model.

Whilst contributing much of importance to the developing theory of formative assessment, neither the Hattie and Timperley model nor the Tunstall and Gipps model were sufficiently detailed to serve as a lens through which to understand how teachers use evidence of student understanding; neither model paid adequate attention to the fine-grained nature of classroom discourse. As such, it became necessary to widen the perspective and look beyond the literature on formative assessment. This was seen as both a necessary and a positive step, linking as it does this research on the regulation of learning with other theoretical writing. Sharrock and Anderson (1982, p. 80) suggest that 'to understand teaching, we must understand talking' so for this reason attention was turned towards studies focussing on classroom discourse in an effort to establish whether such research might provide a suitable lens.

The decision to move beyond the formative assessment literature led to the discovery of work by Mercer. Mercer studied how 'talk is used to shape representations of reality and interpretations of experience' (1995, p. 2). Mercer collected data of classroom discourse through video-recordings (supplemented by researcher's field notes) and then transcribed these recordings. In subsequent analysis of the transcriptions, Mercer identified five ways in which teachers respond to the things that students say: confirmations, repetitions, rejections, elaborations and reformulations (*ibid.*, p. 34). With a similar methodology to the one adopted in this study, and with a focus on how teachers respond to what students say in the classroom, the work of Mercer was considered a suitable starting point from which to begin to understand the mechanisms that teachers use to respond to what students say. The analysis-guiding question at the beginning of this section was modified and

becomes 'What feedback mechanisms are put in place by teachers during whole class discussion to use evidence of student understanding to move learning forward?'

4.6.1   Structure of feedback: *confirm, reject* and *repeat*

The five techniques teachers use to respond to students as identified by Mercer were adopted as a basis for the provisional codes. Little difficulty was experienced with coding for the ways in which teachers rejected and confirmed what students said. *Reject* was used in standard ways. For example, in BH11_2a the teacher rejects with 'not quite', in WM8_1b 'yep, ah, ah, it's not actually' acts as a rejection, whilst in WM8_1b the teacher rejects with a simple 'no'. *Confirm* also posed few coding difficulties, with the following being typical: in BE8_1a the teacher confirms with 'OK, good', in BE8_1b with 'absolutely spot on', in BH12_3a with 'OK absolutely true' and in WE7_1a with 'good, brilliant'. *Repeat* was a little less straightforward as it appeared that there was an overlap between repetitions and confirmations. This is illustrated with the following extract from BH11_1b:

103	T	Well there was crowd control, the soldiers were used for crowd control. Leah? Beginning with 's'.
104	Leah	Strikes.
105	T	Strikes, workers on strike which would obviously link to? (Silence from Ps) Beginning with 'p'.
106	P	Poverty.
107	T	Poverty, and the last one, can anyone remember what the last one was?

In lines 105 and 107, the teacher repeats the student's response ('poverty', 'strikes'), however, when the function of the repetition is considered, it becomes clear that in repeating the students' response, the teacher is effectively using this response to move learning forward. Whilst responding with 'poverty' and 'strikes' is clearly a repetition of what the student has said, the function of this mechanism is actually to confirm and therefore must be coded as such. Teachers were also observed confirming and repeating in the same sentence. In WM8_1b, for example, the teacher follows up on the student response by saying 'Ah, solve, I like that one, solve, fantastic' (line 206). Where this was observed the repetition was again amalgamated into the confirmation; in effect the teacher action of repeating a students' response became a form of confirmation. Up to this point, the structure of the feedback move may be described in terms of the two mechanisms *confirm* and *reject*.

4.6.2   The structure of feedback: *reformulate* and *elaborate*

Mercer conceptualises the way teachers respond to students in terms of reformulations and elaborations. Reformulations occur when a teacher 'paraphrases a pupil's remark, so as to offer the class a revised, tidied up version of what was said which fits better with the point that the teacher wishes to make' (1995, p. 32). Elaborations happen when when a teacher 'picks up on a cryptic statement made by the pupil and expands and / or explains its significance to the rest of the class' (*ibid.*, p. 32). Whilst it is possible to define clearly the mechanisms *reformulate* and *elaborate*, their identification proved challenging. When teachers used both *reformulate* and *elaborate* in the same turn of phrase, for example, difficulty arose in establishing the exact point at which one mechanism (typically *reformulate*) ended and the other (typically *elaborate*) began. This is demonstrated in the following extract taken from BH11_2a:

199	T	Leah do you remember what appeasement was?
200	Leah	(Silence)
…		
206	Mandy	Was it when Britain and France didn't really want to do anything to stop Hitler because, um, (*) to do what he wanted, they thought that that would be OK but then it just led to him taking more and more risks and then getting worse.
207	T	Splendid. So it's the policy pursued by Britain and France towards Hitler to avoid conflict in order to prevent the war. But as you rightly say, it just encourages Hitler to take more risks and take more land **and** you could argue that it is a cause of World War Two, because Hitler takes more risks and in the end we have to stop giving in to him, and we have to take a stand which we do over Poland in nineteen thirty nine.

In this extract, the teacher confirms with 'splendid', reformulates with 'so it's the policy pursued by Britain and France towards Hitler ... take more land' and finally elaborates with 'you could argue that it is a cause of World War Two … Poland in nineteen thirty nine'. The separation for coding purposes between reformulation and elaboration is between '…take more land…' and '…you could argue…' (highlighted above in bold type). At first glance this would appear to be an arbitrary division and not exactly in keeping with the nature of classroom interaction which, as Mehan (1979, p. 29) notes, has a 'unitary character'. However, as Mehan goes on to say 'the purpose of analysis is to make the unitary discrete by exposing its seams and dividing the whole into parts' (*ibid.*, p. 29). Whilst for coding purposes the whole must be divided into parts, the qualitative nature of this study means that the exact delineation of each mechanism is of less importance than its identification.

Differentiating between *reformulate* and *elaborate* leads to an additional challenge concerned with identifying the point at which the feedback ends and instruction begins. In analysing the data, a blurred distinction began to arise between teacher feedback (*reject*, *confirm*, *reformulate*, *elaborate* etc.) and subsequent instruction. The work of Kulhavy proves useful here as it was he, of course, who noted how 'feedback complexity increases until the process itself takes on the forms of new instruction, rather than informing the student solely about correctness' (1977, p. 212). In fact, the difficulties initially experienced in clearly distinguishing between the various mechanisms that make up the feedback move, as well as in identifying where feedback ended and instruction began, were not so much difficulties but more the result of mistakenly thinking along separate feedback / instruction lines. In the extract above the teacher confirms, reformulates and elaborates and it is the identification and organisation of these three mechanisms that is of primary importance, as opposed to establishing the exact point at which one ends and the other begins (or even the precise length of each).

4.6.3   The structure of feedback: *peer-prompt* and *answer*

At this stage in the data analysis, the feedback move can be said to comprise four mechanisms: *confirm*, *reject*, *elaborate* and *reformulate*. In addition to these four mechanisms, the analysis of the data also identified two further mechanisms that make up the feedback move. These mechanisms appeared much less frequently, however they represent an important part of the analysis process as their inclusion resulted in the further modification of the original start list of codes. Whilst Mercer notes that supplying the answer to a question is something that teachers appear to be 'at great pains to avoid' (1995, p. 26) this was observed (albeit rarely) on a number of occasions. In BE8_1a, for example, the teacher supplies students with the term 'slang' ('I'll give you that word and we'll come back to it a bit later, it's 'slang', yeah?'). In BH11_2a, the teacher provides the date when Adolf Hitler came to power ('thirty-three'). In WM8_1b, the teacher supplies the answer to a mathematics problem ('Fourteen I think you'll find it is'). Whatever the perceived merits of teachers providing students with the answers to their own questions (and this is discussed in Chapter 5), nonetheless this remains one approach that teachers used to keep learning on track. This approach, coded as *answer*, joins the other four mechanisms that make up the feedback move.

It was also noticed that on a very small number of occasions the teacher would invite one student to explain something to another. When this happened, these students were effectively being encouraged to act as 'instructional resources for one another' a technique which features in Black and Wiliam's (2009, p. 8) model of formative assessment. In WM8_3a, for example, the teacher responds to the student with 'how did you get a hundred and thirty-five? Explain to everyone else how you got a hundred and thirty-five'. In considering how teachers encourage students to acts as instructional resources for each other, the focus is shifted from the teacher and onto the student; it effectively becomes the student's role to regulate the learning of his / her peer. Whilst this study does not deal with the feedback that the students were subsequently able to offer to their peers, the

fact that teacher were seen to direct the students to offer this feedback must be taken into account as there can be no doubt that such an approach is designed to move learning forward.

This mechanism is coded as *peer-prompt* and its identification brings the total number of mechanisms that make up the feedback move to six. The identification of these six mechanisms draws to a close the descriptive stage of the coding, a stage that has been driven by the data whilst at the same time grounded in, and validated by, the literature. The second stage of data analysis involves a shift from purely descriptive to more interpretive coding through the identification of those mechanisms that serve a regulatory purpose. This interpretive stage involves identifying the patterns that emerge in the sequencing of teachers' questioning and feedback mechanisms.

To conclude this section, Figure 6 shows an NVivo screenshot of the same extract of teacher – student discourse from WM8_4a as the one in Figure 5 above. What can be noticed here is the addition of the coding strips for the feedback move. In this sequence, there is evidence of *confirm*, *elaborate* and *reformulate*. Here, then, is evidence of further development of the analytic scheme that includes the mechanisms that make up the feedback move.
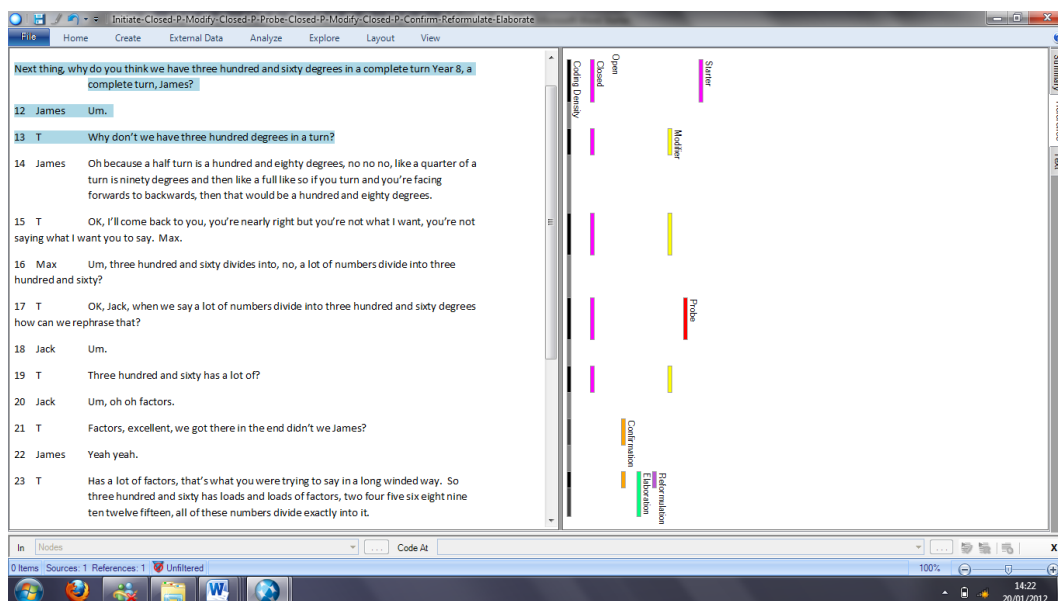
Figure 6   **NVivo screenshot of the coding of teacher feedback**

This section draws to a close the first, descriptive stage of data analysis that has begun to describe the whole class discussion activity in terms of both a questioning and a feedback move. The moves themselves have a structure. The structure of the questioning moves comprises six mechanisms: *closed-initiate*, *open-initiate*, *closed-modify*, *open-modify*, *closed-probe* and *open-probe*. The feedback move also comprises six mechanisms: *confirm, reject, reformulate, elaborate, answer* and

peer-prompt. The purpose of the following section is to attempt to understand how the mechanisms that make up the questioning and feedback moves are organised, and in so doing bring a better understanding of the process of micro regulation.

4.7   Identifying sequences of questioning and feedback

The second stage of data analysis involved the identification of pattern codes which, as Miles and Huberman explain, are 'explanatory or inferential codes, ones that identify an emergent theme, configuration or explanation' (1994, p. 69). Whilst the coding for teacher questioning and feedback was being carried out, it emerged that the mechanisms were rarely used by teachers independently of one another. Often two or more questioning mechanisms were used together (for example a teacher might *initiate* with an open question and then *modify* with a closed question) and likewise two or more feedback mechanisms were frequently observed together (for example *confirm* followed by *elaborate*). As such, it became important to investigate how the mechanisms that make up the questioning and feedback moves are organised. In order to achieve this, the data were analysed in three stages: the first stage involved identifying the patterns relating to how the teacher questioning move was organised, the second stage involved the same for the teacher feedback move, and the third involved establishing how both the questioning and feedback moves are used together. These three stages are now described in the order that the data analysis took place.

4.7.1   Understanding the organisation of the questioning move

To understand the questioning move it became necessary to look for patterns in the way the mechanisms were organised. In doing so, an answer to the first of the second set of analysis-guiding questions 'How are the mechanisms that make up the questioning move organised during whole class discussion?' emerges. To recap, the questioning move was made up of six mechanisms: *closed-initiate*, *open-initiate*, *closed-modify*, *open-modify*, *closed-probe* and *open-probe*. Using the following sequence from BH11_2a, it is possible to demonstrate how this works in practice:

115	T	So, four A, to get four out of four we need? Leah?
116	Leah	Um, to describe the, er, oh wait sorry, no no, no don't worry, say what his aims were, just say...
117	T	How many points do we need to get four?
118	Leah	Well you can either say four or you can say two and explain them.

In line 115, the teacher begins with *closed-initiate*, in line 116 the student's answer is not forthcoming so in line 117 the teacher follows up with *closed-modify*. The teacher's questioning in this sequence

would be coded as *closed-initiate-s-closed-modify*, where the 's' in the above pattern code refers to the student's verbal or non-verbal response (it is beyond the scope of this study to code the students' response in more detail). The following extract from BH11_1a shows an example of a teacher using *initiate*, *modify* and *probe*:

11 T   …So which of those three parties, political parties, which were the biggest threat to the Tsar?

(No answer is immediately forthcoming)

12 T   If you want to have a little look at your notes from last time. Which is the biggest threat to the Tsar? Anna.

13 Anna   The Socialist Revolutionaries.

14 T   The Socialist Revolutionaries says Anna. Why?

15 Anna   Because they had violent acts (*).

In this sequence, the teacher begins with *closed-initiate* (line 11), follows this up with *closed-modify* (line 12) and then uses *closed-probe* (line 14). The combined organisation of these mechanisms would be described with the following code as *closed-initiate-s-closed-modify-s-closed-probe*. In order to be able to lay claim to a comprehensive analysis of the entire data set, every mechanism that was identified in the first stage was pattern coded in this way.

4.7.2 Understanding the organisation of the feedback move

Similar to the approach that was followed when examining the sequencing of teacher questioning, it was also necessary to establish how teacher feedback was organised. The second question of the second set of analysis-guiding questions helped to orient this stage of analysis 'How are the mechanisms that make up the feedback move organised during whole class discussion?' Some teachers, for example, confirmed and then immediately elaborated and where this was observed, the two codes would be combined to form: *confirm-elaborate*. Teachers were also observed using three feedback mechanisms in the same turn of phrase as is evident in the following extract from BH11_1a:

35 Jane   Um, they're the middle classes, (*) meetings and discussions.

36 T   Good, what's their aim that's different to the other two?

37 Jane   They want a civil rights movement.

| 38 | T | Yeah they want Russia to be more democratic, they don't actually want to overthrow and kill him, no, whereas the other two, that's what they'd like to do. |

Line 38 is of primary interest in this extract. The teacher confirms with 'yeah', then reformulates the student's response made in line 37 with 'they want Russia to be more democratic' and then proceeds to elaborate 'they don't actually want to overthrow and kill him, no, whereas the other two, that's what they'd like to do'. The organisation of the mechanisms in this example would be coded as *confirm-reformulate-elaborate*. Again, similar to the questioning move, all of the mechanisms that made up the feedback move were pattern coded in this way.

4.7.3   Understanding both the questioning and the feedback moves

Once the organisation of the mechanisms that make up the questioning and feedback moves had been identified, it began to emerge that a questioning move was almost invariably mirrored by a corresponding feedback move. This stage was oriented with the help of the following analysis-guiding question 'How are the mechanisms that make up the questioning and feedback moves used together to elicit and use evidence of student understanding?' The questioning and feedback moves appeared to take on a cyclical nature of the type: Question – Response – Feedback – Question – Response – Feedback etc. It appeared possible to describe the structure of whole class discussion in terms of these QRF (Question – Response – Feedback) cycles.

In a similar way to establishing the delimitation of the units of analysis, it was important to be able to reliably and validly differentiate one cycle from another. To do this a clear definition of what constituted a cycle was needed. Much cited in the literature is the work of Sinclair and Coulthard (1975, p. 18) who studied the linguistic aspects and functions of teacher – student discourse. These authors note how 'a cycle begins with a structuring or soliciting move and contains one or more responding and reacting moves and continues until the next structuring or soliciting move which initiates a new cycle'. This study adapts this definition to describe a cycle. As such, a cycle begins with an initiating question and may continue with one or more modifying or probing questions until one or more feedback mechanisms are used after which point a new cycle begins.

The screenshot in Figure 7 is once again of WM8_4a but this time in addition to the coding strips for the questioning and feedback mechanisms it is also possible to observe the blue coding strip that denotes a cycle. It can be seen in this cycle that the teacher begins with *closed-initiate*, follows up twice with *closed-modify*, uses *closed-probe* and again *closed-modify* before providing feedback in the form of *confirm*, *reformulate* and *elaborate*. As can be seen from the coding stripes on the right

of the screenshot, this cycle is coded as *initiate-closed-s-modify-closed-s-probe-closed-s-modify-closed-s-confirm-reformulate-elaborate*.
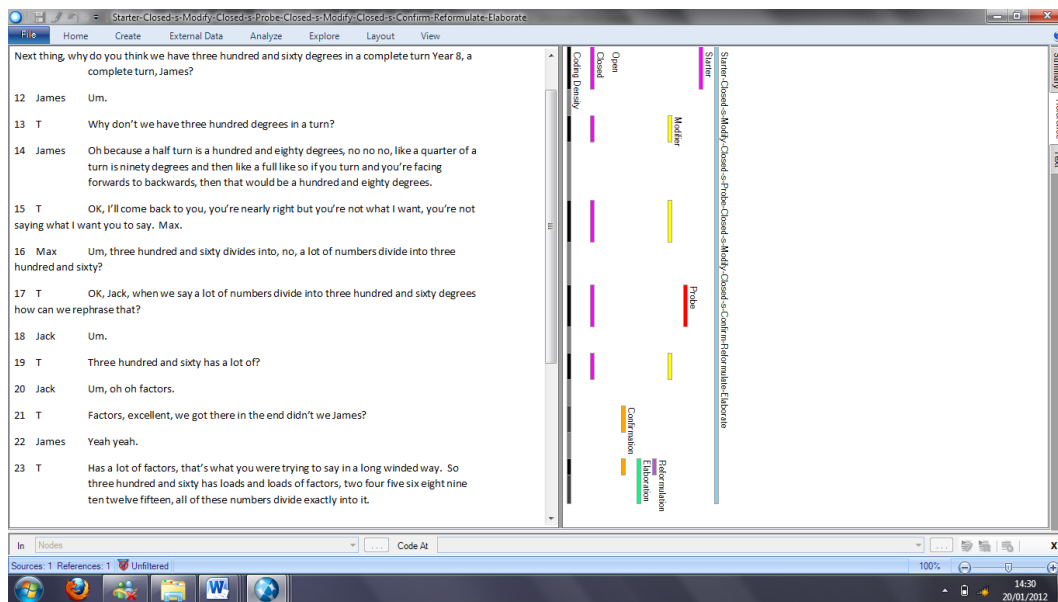
Figure 7   **NVivo screenshot of the coding of cycles**

Identification of the cycles (which is to say combined sequences of questioning and feedback) effectively draws to a close this first stage of descriptive data analysis. A comprehensive description of the whole class discussion activity has now been made possible. What now remains to be carried out is the identification of the regulatory aspects of the questioning and feedback moves that are evident in the QRF cycles.

4.8   Identifying the regulatory aspects of questioning and feedback

The first data analysis stage comprehensively describes the nature of the teacher – student discourse that takes place during whole class discussion. This second more interpretive stage puts the focus on the regulation that takes place during the whole class discussion activities. Questioning and feedback have been identified as the way in which teachers elicit and use evidence of student understanding. Up to this point, the analysis has involved identifying the various mechanisms that make up the questioning and feedback moves. The way these mechanisms are organised has then been established and finally an understanding has developed of how the sequences themselves combine to form cycles. From this a detailed picture of the structure of whole class discussion has emerged. It would appear, however, that not all questioning and feedback mechanisms used by teachers serve a regulatory purpose in as far as they are used to keep learning on track (i.e. ensure it takes place as intended). In order to establish which features of teacher questioning and feedback are regulatory, it became necessary to consider the notion of contingency that was first introduced in

Section 2.4 above. Van de Pol, Volman and Beishuizen (2010, p. 275) suggest that a teacher acts contingently when he / she 'adapts the support in one way or another to the students' whilst Cullen (2000, p. 125) talks about the 'general quality the teacher exhibits of listening and responding meaningfully, and with genuine interest, to the content of what the student is saying'. In the context of this study, whether teacher questioning and feedback is regulatory is determined by considering the extent to which the teacher meaningfully adapts support to address students' error and approximation in an attempt to ensure that learning is kept on track. This excludes teachers' use of what Waring (2008) refers to as positive assessment terms such as 'OK' and 'right'; the notion of a meaningful response is therefore central. This is important to the developing theory of micro regulation as it helps to distinguish it from a more general theory of teaching and learning. A final set of analysis-guiding questions was used to orient this later, interpretive stage of data analysis. These questions asked 'To what extent is teacher questioning regulatory in as far as it is contingent upon the response of the student?' and 'To what extent is teacher feedback regulatory in as far as it it is contingent upon the response of the student?'

Tackling the questioning first, it appeared that out of the three mechanisms that make up the questioning move – *initiate*, *modify* and *probe* – only *modify* and *probe* could be said to have a regulatory effect. *Initiate*, by definition, appears at the very beginning of each cycle and therefore is not contingent upon the response of the student. On the other hand, both *modify* and *probe* are regulatory as they serve to keep learning on track by addressing student error and approximation. This can be made clear with the help of two examples. In the sequence below from WM8_2a, the student's response occurs in line 95, a response that clearly shows the difficulty the student is experiencing in answering the teacher's question. This triggers a contingent response from the teacher who attends to these difficulties by adapting the question (*modify*) in line 96.

94	T	What do you think I've got to do to get the answer to three fifths times seven tenths?
95	P	Er, you can...
96	T	Can I cross cancel?

The sequence over the page from WE7_1a shows how the teacher regulates student learning with a *probe*.

226	T	What's evidence?
227	P	Prove something.
228	T	When you prove something what am I going to be using this evidence for?
229	P	Balance.
230	T	Balance, brilliant.

In line 226, the teacher begins by asking the student what is meant by the word 'evidence'. The student answers in line 227 and in doing so triggers a contingent response from the teacher. The contingent response from the teacher is a *probe* in line 228 that serves to get the student to think out his answer more thoroughly. As such it is clear that this mechanism has a regulatory effect.

In both of the two sequences above, the teachers' responses are regulatory; both involve the teachers in meaningfully adapting their support in order to address either the students' error (as was seen in WM8_2a) or the student's approximation (evident in WE7_1a). Both *modify* and *probe* can therefore be considered to have a regulatory effect on student learning, whilst *initiate* does not. This point can be further elucidated with the screen shot in Figure 8 that has been taken from BE8_1a.
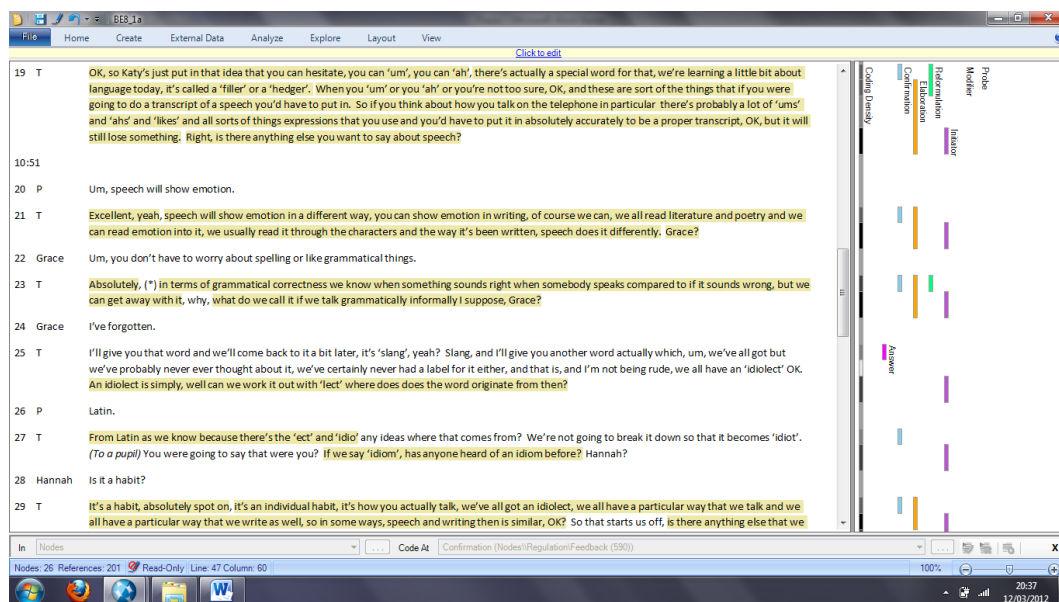
Figure 8   **NVivo screenshot of the non-regulatory effect of initiate**

In line 19, the teacher completes the cycle with *confirm*, *reformulate* and *elaborate* and then begins a new cycle with *initiate*. Here it is clear how the teacher uses *initiate* immediately after *elaborate*. As

such, the mechanism *initiate* is not regulatory as it is not contingent upon the student's response. Regulatory questioning, then, comprises the mechanisms *modify* and *probe*.

In addition to examining the regulatory effects of questioning, it was also necessary to look at the regulatory effects of feedback. Again, the key was to consider to what extent the mechanisms that made up the feedback move are contingent upon the response of the student. It was clear that the mechanisms *confirm*, *reject*, *peer-prompt* and *answer* are regulatory as these mechanisms were often triggered by, and therefore contingent upon, the student's response. The mechanism *reformulate* also serves a regulatory purpose as this mechanism involved the teacher responding contingently by offering a tidied up version of what a student had previously said. On the other hand *elaborate* was not considered regulatory as this mechanism was never directly contingent upon the student's response. Here it is worth returning briefly to Kulhavy (1977, p. 211) who suggested that as the complexity of feedback increases it actually takes on the form of new instruction. Conceptually, the mechanism *elaborate* appears to be situated at the very limits of feedback, verging in fact on further instruction as opposed to being directly contingent upon the response of the student. Regulatory feedback, therefore, comprises the mechanisms *confirm*, *reject*, *reformulate*, *peer-prompt* and *answer*.

This second interpretive stage of data analysis resulted in a concept of micro regulation that excluded both the questioning that was located at the beginning of each cycle (the mechanism *initiate*) as well as the action of picking up on what a student says in order to expand on or explain it to other students (the mechanism *elaborate*). With the identification of regulatory questioning and regulatory feedback it now becomes possible to begin to answer the main research question 'What is the nature of the teacher-led regulation that takes place during whole class discussion?' and the four subsidiary research questions. The outcome, discussed in the next chapter, is a better understanding of the regulation of the learning process as mediated by the teacher during whole class discussion.

4.9   Summary

This chapter has described how classroom observation data were collected, transcribed and analysed in order to answer the main research question and the four additional subsidiary research questions. Four sets of analysis-guiding questions have also emerged during data analysis which has been described in detail in order to be able to demonstrate what Yin refers to as a clear 'chain of evidence (1994, p. 34). It was considered important that the analysis be both empirically grounded in the data as well as validated and informed by the literature. At every step of the process, the author has remained 'open to what the site has to say' (Miles and Huberman, 1994, p. 62) rather than relying on a set of predefined codes. At the same time, the literature has been drawn upon to

provide a lens through which the data may be analysed and to avoid some of the common pitfalls associated with coding, in particular that of circularity.

Data analysis took place in two stages. The first descriptive stage identified two teacher moves, a questioning move that was used by teachers to elicit evidence of student understanding and a feedback move the purpose of which was to use this evidence to move learning forward. The structure of the questioning move has been described in terms of its grammatical and functional properties. Two types of grammatical property were identified (*open* and *closed*) and three types of functional property were identified (*initiate*, *modify* and *probe*). When the grammatical and functional properties of the questioning move are combined the result is six different mechanisms: *open-initiate*, *closed-initiate*, *open-modify*, *closed-modify*, *open-probe* and *closed-probe*. The structure of the feedback move may be described in terms of the following six mechanisms: *confirm*, *reject*, *reformulate*, *elaborate*, *peer-prompt* and *answer*. The second stage of the descriptive coding process then proceeded to examine how the mechanisms that made up the questioning and feedback moves were organised. This resulted in the identification of sequences of questioning and feedback. Finally these questioning and feedback sequences were combined, the result of which was the identification of QRF (Question – Response – Feedback) cycles.

The descriptive stage of data analysis then gave way to the interpretive stage in which the regulatory aspects of teacher questioning and feedback were identified. Not all of the mechanisms identified above served a regulatory purpose. Regulatory questioning was limited to four mechanisms: *open-modify*, *closed-modify*, *open-probe* and *closed-probe*. Regulatory feedback was limited to five mechanisms: *confirm*, *reject*, *reformulate*, *peer-prompt* and *answer*. This stage of data analysis made it possible to begin to develop a theory of micro regulation that was distinct from a more general theory of teaching and learning. The following chapter presents and discusses the findings that have emerged. Here the mechanisms that teachers use to regulate the learning process are identified, a conceptual model is proposed that describes the whole class discussion activity and the regulation that takes place therein, a definition of micro regulation is offered and, finally, the effectiveness of the regulation in terms of its strengths and weaknesses is considered.

Chapter 5   Findings and discussion

5.1   Introduction

The previous chapter described in detail the data analysis and in doing so established a clear chain of evidence upon which it is possible to judge the internal validity of the study and to allow for replication by another researcher. This chapter presents the findings that have emerged through the inductive analysis of 18 units of analysis amounting to over 100,000 words of transcribed teacher – student discourse. The aim of this research is to bring a better understanding of the theory of interactive regulation by examining how learning is regulated by the teacher at a fine-grained micro level. To operationalise this aim, the main research question asks 'What is the nature of the teacher-led regulation that takes place during whole class discussion?' In order to present and discuss the findings as clearly as possible, this chapter has been split into a number of sections. The purpose of Section 5.2 is to describe comprehensively the structure of whole class discussion. This is an important first step as it makes it possible to subsequently identify the mechanisms teachers use to regulate the learning process at a fine-grained micro level and how this regulation interacts with other elements of the instructional activity. Section 5.3 validates the structure of whole class discussion activities against the existing literature and makes a claim regarding how it has been possible to extend the theory contained within the said literature. Section 5.4 presents the findings that begin to develop the theory of micro regulation: regulatory mechanisms are identified and a model is proposed that widens the current understanding of regulation beyond feedback alone, conceptualising it as an embedded and continuous feature of the instructional activity. This section also offers a definition of micro regulation. To conclude this chapter, Section 5.5 examines the perceived strengths and weaknesses that are present in the way the regulatory mechanisms are used to ensure learning is kept on track.

5.2   Describing the structure of whole class discussion

Before identifying the mechanisms that are specifically concerned with micro regulation, it was first necessary to describe the structure of the teacher – student discourse that takes place during whole class discussion. This was an important first step as without a detailed description of practice it would not be possible to understand how regulation interacts with other elements of the instructional activity. To describe the structure of discussion activities this study uses a rank scale similar to that adopted by Sinclair and Coulthard (1975). In a rank scale, the structure of each rank above the lowest (which has no structure) is expressed in terms of the units in the rank immediately below. Sinclair and Coulthard used a scale with five ranks comprising (from highest to lowest): lesson, transaction, exchange, move, and act. In this study, a five rank scale was used to describe the structure of whole class discussion comprising activity (the unit of analysis), cycle, move, mechanism and class. The rank 'transaction' used by Sinclair and Coulthard is similar to the rank 'activity' used in this study, the rank 'exchange' is similar to 'cycle', the rank 'move' is effectively the same, and the rank 'act' is similar to the rank 'mechanism'. Unlike Sinclair and Coulthard's study in which the lesson was the unit of analysis, this study does not need a rank above 'activity' as the activity is the

unit of analysis. At the lowest end of the scale, this study uses the rank 'class' to describe different types of the mechanism *modify*.

5.2.1   The identification of Question-Response-Feedback (QRF) cycles

The structure of teacher – student discourse during whole class discussion (i.e. the unit with the highest rank – activity) was found to involve a cyclical process comprising one or more questioning moves by the teacher, a response by the student and a feedback move by the teacher. This combination of question, response and feedback can be said to form a QRF cycle. A cycle begins with a question designed to initiate a response and may continue with a question that modifies or probes the original question (or both) until one or more feedback moves are used after which point a new cycle begins. From the data set, 272 complete QRF cycles were identified with at least one cycle being present in each unit of analysis (see Appendix 12 for a full breakdown of QRF cycles).

5.2.2   Three-part QRF cycles

Data analysis revealed that half of the 272 cycles identified were what may be termed 'three-part'. In a three-part QRF cycle, the teacher elicits evidence of student understanding with either *closed-initiate* or *open-initiate*, the student responds and the teacher then immediately uses this evidence of student understanding by employing one or more of the mechanisms that make up the feedback move. Sequence 1 shows an example of a three-part cycle.

Line	Question	Response	Feedback
261	T Four x equals fifteen … can anyone tell me what sum I do on the calculator?		
262		P Fifteen divided by four.	
263			T Thank you very much

Sequence 1   Three-part QRF cycle with a single feedback mechanism

In this sequence from WM8_1b, the teacher elicits evidence of student understanding with *closed-initiate*, the student responds and the teacher then uses this evidence to move the learning forward with the single mechanism *confirm*. This cycle comprises a single questioning mechanism and a single feedback mechanism. Some three-part cycles comprised more than one feedback mechanism as shown in Sequence 2 from BE8_3a:

Line	Question	Response	Feedback
113	T What is the point of trying to interview characters from the text?		
114		P Try and understand what the characters like mean when they're doing things.	
115			T Right, so we've got to try and see if we can get into the character, into an engagement with the text as well, and what we've got to remember ultimately although you're going to be representing these characters…

Sequence 2   Three-part QRF cycle with multiple feedback mechanisms

In this sequence, the teacher elicits evidence of student understanding in line 113 with *open-initiate*, the student responds in line 114 and then in line 115 the teacher *confirms*, *reformulates* and finally *elaborates*, and in so doing uses evidence of the student's understanding to keep learning on track. Although in this sequence the feedback move is comprised of three separate mechanisms, it remains a three-part cycle because the student only responds once before a new cycle begins.

At this point, it becomes possible to propose the conceptual model shown in Figure 9 in an attempt to describe this three-part question-response-feedback (QRF) process.

Whole class discussion activity
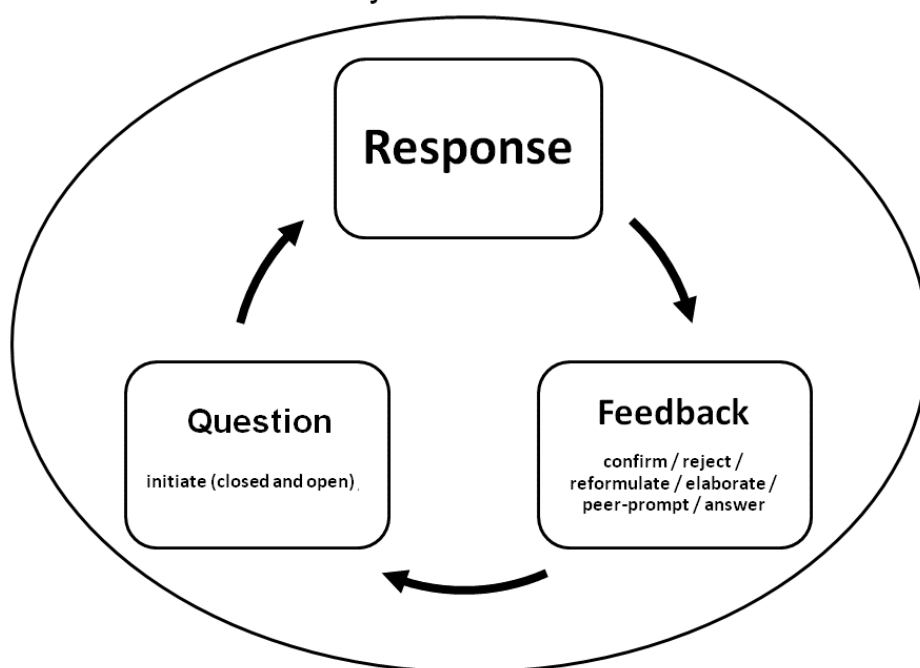
Figure 9   Conceptual model of the three-part QRF cycle

This model illustrates what Miles and Huberman (1994, p. 90) refer to as 'series of connected propositions that specify a number of components and the relationships among them'. Effectively what is presented in Figure 9 is a theory in which the structure of whole class discussion is conceptualised as a sequence of three-part and extended QRF cycles.

5.2.3   Extended QRF cycles

Data analysis revealed that half of the QRF cycles were what may be termed 'extended'. In an extended cycle the teacher first elicits evidence of student understanding in the usual way (with either *closed-initiate* or *open-initiate*), the student responds but then, instead of giving feedback to move the learning forward, the teacher extends the questioning. Two clear reasons were found for teachers extending their questioning. First, students frequently did not answer at all, answered incorrectly or only partially and when this happened, the teacher would often modify his / her questioning. Second, teachers would frequently extend their questioning by asking probing questions that required students to expand or support their response. The following sequences (both from WE7_a) show how the teacher first modifies his questioning and second how he probes.

Line	Question	Response	Feedback
44	T Now come back to that word, and give me a rhyme *(the teacher points to the word 'remember').*		
45		Ps *(No answer))*	
46	T Remember, remember…complete the rhyme.		
47		Ps The fifth of November.	
48			T The fifth of November

Sequence 3   Extended QRF cycle with a modifying question

Line	Question	Response	Feedback
91	T What does that suggest to you about what's happened in terms of how wars are fought...?		
92		P It's more strategic.	
93	T More strategic, that's a fabulous word, what do you mean by that?		
94		P …not rushing into battle… behind the scenes.	
95			T Fantastic

Sequence 4   Extended QRF cycle with a probing question

In Sequence 3, the teacher begins with *closed-initiate* in line 44 however, because a reply from the students is not forthcoming, the teacher then modifies his original question in line 46 by giving the first part of a well- known rhyme that the students are then expected to complete. The teacher finally *confirms* with a repetition and so completes the cycle. In Sequence 4, the teacher asks the student

to support his response by explaining what he means by the word 'strategic' before confirming in line 95.

It was also found that teachers tended to withhold all feedback until they had either modified or probed; in this way, feedback always happened at the end of each cycle. Teachers were seen to *reject* and then *modify*, or *confirm* and then *probe* (as the teacher appears to do in Sequence 4 with 'that's a fabulous word') however this was not frequently observed. It was certainly the case, as Mehan suggests, that 'the teacher continued questioning the students without evaluation until a correct reply appeared' (1979, p. 57).

One tenth of all cycles identified involved three or more questioning mechanisms followed by feedback. These were not easy cycles to analyse. Mehan refers to the way in which 'analytic induction changes the analytic scheme to account for exceptions to the provisional framework' (*ibid.*, p. 21). As such, it was essential that the developing model be able to accommodate these residual cases. Sequence 5 from BE7_2a offers an example of an extended cycle in which the teacher both modifies and probes. In this extended cycle, the teacher begins with *closed-initiate* in line 140, probes in lines 142 and 144 but then, because in line 145 the student has clearly not understood the question, the teacher modifies in line 146 by emphasising the word 'alight'. The student is still unable to answer and so in line 148 the teacher modifies again by substituting 'alight' for 'what's always burning?' after which the student is then able to answer correctly. In this extended cycle, the teacher continued questioning (using all three of the mechanisms that make up the questioning move – *initiate*, *modify* and *probe*) without offering any feedback until the student was finally able to answer correctly.

It is perhaps not surprising that the way in which the questioning and feedback mechanisms are organised in Sequence 5 is unique. Approximately a third of all cycles identified had a unique structure in as far as the combination of the mechanisms that make up the questioning and feedback moves was observed only once in the entire data set. Sinclair and Coulthard (1975, p. 22) also note how they 'identified a large number of exchange types with unique structures'. Although these cycles proved a little more challenging to analyse, it remained important to acknowledge their existence in the teacher – student discourse in order to be able to claim a comprehensive analysis of the entire data set.

Line	Question	Response	Feedback
140	T Champs Elysées. What's at the end of it?		
141		P Ah, the Arc de Triomphe.	
142	T What's underneath the Arc de Triomphe?		
143		P The Tomb of the Unknown Soldier.	
144	T And what's always alight?		
145		P Sorry sir?	
146	T What's always *alight* on the grave?		
147		P What do you mean?	
148	T Light. What's always, what's always burning?		
149		P Oh, a candle.	
150			T There's a candle there isn't there.

Sequence 5   Extended QRF cycle with modifying and probing questions

With the addition of modifiers and probes, it becomes necessary to adapt the model shown in Figure 9. The adapted conceptual model presented in Figure 10 with its two-way arrow (coloured red) signifies the way in which the process can be seen to move back and forth between the questioning and response moves before any feedback is offered.

Whole class discussion activity
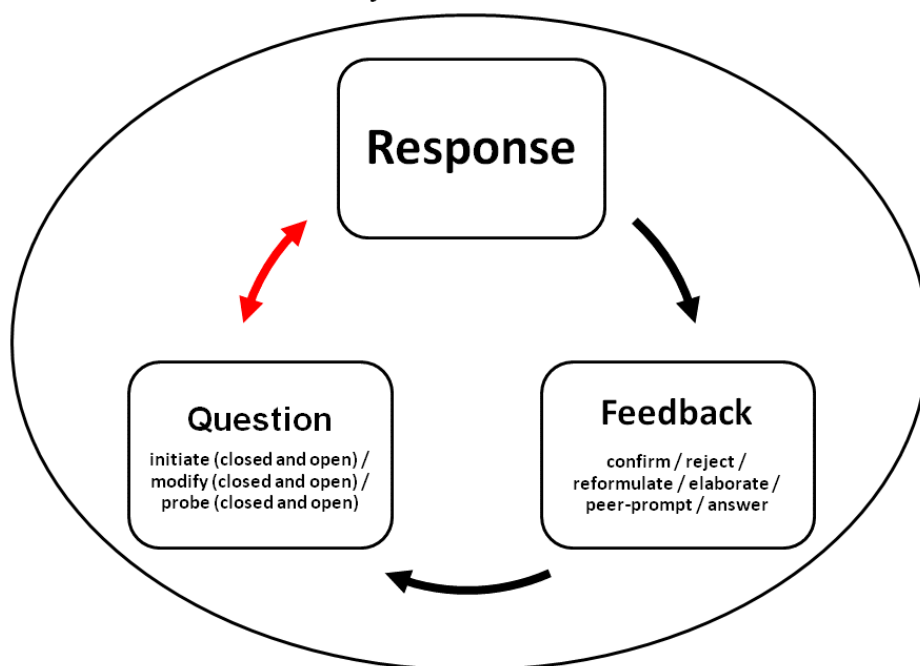
Figure 10   Conceptual model of the three-part and extended QRF cycle

5.2.4   Summary of the questioning move and its mechanisms

During whole class discussion, teachers spend much time eliciting evidence of student understanding with a questioning move and then using this evidence to move learning forward with a feedback move. Both the questioning move and the feedback move were found to have a structure that may be described in terms of mechanisms. The questioning move was observed in all 18 units of analysis, with 617 questions being identified and analysed. Initially the questioning move was described in terms of two mechanisms, the closed question and the open question. Describing questioning in this way is to do so according to a question's grammatical properties, however further analysis revealed that it was also important to consider the functional properties of questioning (i.e. what the teacher is trying to accomplish by asking a certain question). This observation is supported by Mehan (1979, p. 41) who notes how 'the meaning of instructional acts … was not conveyed by their grammatical form alone'. Three functional properties were identified: *initiate*, *modify* and *probe* (see Section 4.5.2 for a definition of each).

It became clear that to understand how teachers regulate the learning process at a fine-grained micro level, it was necessary to consider each question in terms of both its grammatical and its functional property. The result was the following six mechanisms that describe the *questioning* move: *closed-initiate*, *open-initiate*, *closed-modify*, *open-modify, closed-probe* and *open-probe*. *Initiate* accounted for 59% of all questions analysed (63% of which were coded as closed questions

and 37% as open), *modify* accounted for 17% of questions (91% were closed and 9% open), and *probe* accounted for 24% of questions (59% closed and 41% open).

5.2.5   Summary of the feedback move and its mechanisms

Like the questioning move, the feedback move was observed in all 18 units of analysis. This move was observed 552 times. The feedback move was found to comprise six mechanisms: *confirm*, *reject*, *reformulate*, *elaborate*, *answer* and *peer-prompt*. *Confirm*, by far the most common mechanism, was present in all 18 units of analysis and accounted for 59% of all feedback mechanisms. *Reject* accounted for 6% of all mechanisms and was observed in 11 units of analysis. *Reformulate* was found in every unit of analysis and accounted for 15% of the mechanisms. *Elaborate* accounted for 24% of mechanisms and was again found in every unit of analysis. *Answer* accounted for 2% of mechanisms and was observed in 9 units of analysis. Finally, *peer-prompt* was observed on two occasions.

5.3   Validating the structure of whole class discussion activities

It is important to attempt to offer some validation of the structure of the whole class discussion activity as it is from this structure that the nature of the regulation will be derived. Validation is most evident in the work of the American researchers John Sinclair and Malcolm Coulthard (1975) and the British researcher Hugh Mehan (1979). These researchers investigated classroom interaction focusing in particular on the linguistic aspects and functions of teacher / student discourse. Both studies have a number of methodological similarities with the current study. These include taking teacher-led lessons as their unit of analysis, collecting data through video recording and carrying out a content analysis following the principles of analytic induction (rather than a theory-testing deductive approach).

5.3.1   Validation and extension of the questioning move

Initiation is the first move identified by Sinclair and Coulthard (1975) as well as by Mehan (1979) and the one that most closely resembles the questioning move in this study. Sinclair and Coulthard (1975, p. 40) break down the initiating move into three acts: elicitation, directive and informative (the term 'act' is the equivalent of the term 'mechanism' that is used in this study). The function of elicitation is to request a linguistic response (realised by a question), the function of directive is to request a non-linguistic response (realised by an imperative) and the function of informative is to provide information (realised by a statement). The elicitation act is of most relevance to this study as it is at this point that evidence of student understanding is elicited by the teacher. However, beyond identifying the elicitation act as being realised by a question, Sinclair and Coulthard do not offer any extra detail regarding how exactly this is accomplished.

Mehan (1979, p. 36) also breaks down the initiation move into elicitation, directive and informative. Whilst Sinclair and Coulthard adopt a grammatical approach when examining the elicitation sequences, Mehan takes a more functional approach noting how 'the teacher elicits information from students; she does not ask them questions' (1979, p. 36). Unlike Sinclair and Coulthard, Mehan does elucidate upon the elicitation act by splitting it into four parts: 'choice' elicitations call upon the student to agree or disagree, 'product' elicitations invite a factual response, 'process' elicitations invite an opinion, and finally 'meta-process' elicitations encourage meta-cognition. In order to identify the nature of the micro regulation (as opposed to the more holistic organisation of the lesson as these studies have done) this study must consider both the functional and the grammatical aspects of the way in which information is elicited from students. This is evident in the identification of the six mechanisms that make up the questioning move.

5.3.2   Validation and extension of the feedback move

In the whole class discussion activity a follow up move has been identified that teachers use in an effort to ensure learning takes place as intended. This move was labelled feedback and was found to comprise the six mechanisms that were described in Section 5.2.5. Like the present study, Sinclair and Coulthard also label this follow up move 'feedback', and go on to identify a number of acts. The mechanism labelled *confirm* in this study is similar (if not the same) as the act that Sinclair and Coulthard label *evaluate*; as Sinclair and Coulthard note, students 'need to know whether they are performing adequately' therefore evaluate is of 'vital importance' (1975, p. 37). The act Sinclair and Coulthard term *comment* serves to 'exemplify, expand, justify and provide additional information' and is clearly similar to the mechanisms *reformulate* and *elaborate* in this study. Sinclair and Coulthard do not consider either of the mechanisms *answer* and *peer-prompt.* Whilst there are obvious similarities in the language that this study and the two cited here use to describe the teachers' follow up move, the differences are perhaps more significant. The use of both the grammatical and functional properties of the questioning move together with the identification of six mechanisms that make up the feedback move serve to offer a more comprehensive description of the phase of the instructional phase of the lesson than that offered by either Sinclair and Coulthard or Mehan.

5.3.3   Validation and extension of three-part and extended QRF cycles

Both the Sinclair and Coulthard study and the Mehan study identified typical classroom exchanges as being composed of three parts. Sinclair and Coulthard (1975, p. 21) refer to these as IRF exchanges involving 'an initiation by the teacher, followed by a response from the pupil, followed by feedback to the pupil's response from the teacher'. Mehan (1979, p. 28) refers to such exchanges as initiation-reply-evaluation or IRE sequences. Mehan points out that 'once an instructional sequence has been initiated, interaction continues until the symmetry between initiation and reply acts is obtained' (*ibid.*, p. 52). This symmetry between initiation and reply acts is either obtained immediately or, if such symmetry is not forthcoming, 'the initiator employs a number of strategies

until the expected reply does appear' (*ibid.*, p. 52). For Mehan, strategies for obtaining the expected reply include prompting, repeating, and simplifying (*ibid.*, p. 55). Without explicitly naming these extended sequences as 'three-part', Sinclair and Coulthard (1975, p. 51) do refer to the way teachers frequently use a 'series of elicit exchanges to move the class step-by-step to a conclusion'. In particular, Sinclair and Coulthard identify the act *clue* which functions to provide 'additional information which helps the pupil to answer the elicitation' (*ibid.*, p. 55). The prompting, repeating and simplifying identified by Mehan, and the clue identified by Sinclair and Coulthard are similar to, and therefore provide validation for, the mechanism *modify* identified in this study.

Both of the studies cited here appear to concentrate on their equivalent of the mechanism *modify* which was used either to obtain the 'expected reply' (Mehan, 1979, p. 55) or to 'help the pupil to answer the elicitation' (Sinclair and Coulthard, 1975, p. 41). This study, however, has found that it was not always the teachers' sole concern to obtain the expected reply; in fact, teachers were often observed obtaining the expected reply but then choosing to extend the cycle by probing further the students' understanding. Validation of the mechanism *probe* (in as far as it serves to ensure that the cycle remains open) is found in neither the Sinclair and Coulthard study nor the Mehan study. It can justifiably be argued that to some extent the current study extends the understanding that has been developed in these earlier studies.

5.4   Research questions answered: developing the theory of micro regulation

The structure of the whole class discussion activity has been comprehensively described and validated by the literature. It now becomes possible to present the findings of the study that will answer the main and subsidiary research questions. To recap, the main research question asked 'What is the nature of the teacher-led regulation that takes place during whole class discussion?' and this main research question was further operationalised with four subsidiary research questions:

1. What mechanisms are put in place by teachers during whole class discussion to regulate student learning?
2. In what way does the regulation of learning interact with other elements of whole class discussion?
3. To what extent is the regulation of learning a continuous feature of whole class discussion?
4. What are the perceived strengths and weaknesses of the regulation that takes place during whole class discussion?

The following section identifies the mechanisms that are used to regulate learning and in so doing takes the first tentative steps towards developing a theory of micro regulation.

5.4.1   Identifying the mechanisms that teachers use in micro regulation

The first subsidiary research question asked 'What mechanisms are put in place by teachers during whole class discussion to regulate student learning?' By describing the process of data analysis in detail (Chapter 4), the mechanisms that teachers use during whole class discussion to regulate student learning at a fine-grained micro level have been identified and the first subsidiary research question has effectively been answered. There is therefore no need to reiterate at great length here what has already been noted elsewhere (see for example Section 4.9) however it does remain important to present a summary. Of the three mechanisms that make up the questioning move, *modify* and *probe* serve a regulatory purpose because these are the only mechanisms that are contingent upon the response of the student. These two mechanisms represent what may be termed 'regulatory questioning'. Questions that initiate a cycle are, by definition, located at the very beginning of each cycle and as such, they serve no direct regulatory purpose. Identifying the regulatory aspects of the feedback move is a little less straightforward. Of the six feedback mechanisms identified, *confirm*, *reformulate*, *reject*, *answer* and *peer-prompt* serve a regulatory purpose given that the use of these mechanisms are contingent upon the students' response. Of course, this study also identified the mechanism *elaborate,* however this mechanism cannot be said to serve a regulatory purpose. There exists a thin line between feedback and direct instruction and it is the mechanism *elaborate* that can be said to bridge this gap; not entirely feedback nor entirely direct instruction, the mechanism *elaborate* effectively acts as an important link between the two.

5.4.2   How micro regulation interacts with other elements of the instructional activity

The second subsidiary research question asked 'In what way does the regulation of learning interact with other elements of whole class discussion?' It is clear that regulation takes place at not one but two points in the instructional activity: at the point of feedback but also at the point of questioning. Historically, research into formative assessment has tended to focus on the role of feedback. Nowhere is this clearer than in Black and Wiliam's (1998) substantial review which Perrenoud (1998, p. 85) criticises as choosing the 'lowest common denominator, in other words the practice of feedback'. Perrenoud (1998) and Webb (2009) however suggest that feedback was only one part of the wider process that is regulation. The conceptual model presented in Figure 11 below shows how micro regulation is present both at the point at which understanding is elicited from students (in as far as it is a part of the questioning move) and at the point at which this understanding is used to move learning forward (a part of the feedback move). This is an important finding because it presents a concept of micro regulation that is enlarged beyond feedback; regulating learning on a fine-grained micro level clearly forms a very significant part of what teachers do during whole class discussion.

It is also clear that micro regulation is both fully embedded in, and at the same time is an identifiable part of, the instructional activity. It is worth contrasting this restricted concept of micro regulation with that of formative assessment which has continued to expand to the point where, as Perrenoud (1991b, p. 14) argues, one part has come to represent the whole. It was Tunstall and Gipps (1996b,

p. 194), of course, who pointed out the extent to which teaching and learning activities are being reconceptualised along (formative) assessment lines, whilst Marshall and Drummond's (2006) concept of the spirit of formative assessment seemed to confirm the truth in this. What this concept of micro regulation does is serve to 'avoid identifying all actions of the teacher with permanent regulation' (Perrenoud, 1998, p. 88).

5.4.3   The extent to which micro regulation is continuous

The third subsidiary research question asked 'To what extent is the regulation of learning a continuous feature of whole class discussion?' It has been shown how whole class discussion is comprised entirely of QRF cycles, with two types of cycle being identified, the three-part cycle and the extended cycle. The 272 QRF cycles that this study has identified are split almost exactly in half between these two types. In the three-part cycle, micro regulation occurs at the point of feedback, whilst in the extended cycle it occurs both at the point of feedback and at the point of questioning; three-part cycles involve regulatory feedback whilst extended cycles involve regulatory feedback *and* regulatory questioning. It is therefore clear that micro regulation is a continuous element of the whole class discussion activity, and this is made clear in the conceptual model presented in Figure 11.

In order to understand the importance of this claim of the continuous nature of micro regulation, it becomes necessary for the discussion to bring in once again formative assessment and the literature that was discussed in Chapter 1. Perrenoud (1991b, p. 8) highlights the way in which there has developed a 'classic distinction' between a time for instruction and a time for formative assessment. Why, Perrenoud asks, disassociate two consecutive pedagogical moments? (*ibid.*, p. 8). It is perhaps the way in which the concept of formative assessment has developed that has led to this separation. The examples in the literature review of the separation that has developed between formative assessment and instruction are numerous and can be seen particularly in Black and Wiliam's (1998) review that was discussed in Chapter 1. In their review, Black and Wiliam cite a number of studies that appear to show the separateness of formative assessment and instruction. These include a study by Fuchs and Fuchs (1986) where 'assessment activities with frequencies of between 2 and 5 times per week' took place (*op. cit.* p. 5) and a study by Bangert-Drowns (1991) who examined the effects of review tests that took place 'at the end of a block of teaching' (*op. cit.* p. 51). It is worth also recalling here the work of Hattie and Timperley who note how initially teachers 'need to undertake effective instruction' (2007, p. 100) and that feedback is what happens 'typically after instruction' (2007, p. 102).

Perrenoud (1991b, p. 9), however, suggests that regulation is not a specific moment during teaching but a permanent component; error and approximation, he says, are the rule and as a result, the teacher constantly needs to adjust his or her aim in order to keep learning on track. The findings of

this study support this argument in as far as micro regulation is indeed a permanent and continuous component of whole class discussion. Of course, the notion of continuity or permanence is also to found in the formative assessment literature. For the teachers in Torrance and Pryor's study, for example, the communication of learning goals and success criteria to the students came to be seen as a 'continuing dynamic and interactive process' (2001, p. 622). Grant and Torbin (1989, p. 9) note how one teacher was 'constantly interacting with students', an observation which fits well with the concept of regulation as continuous. Teachers capturing Marshall and Drummond's (2006, p. 137) notion of the spirit of formative assessment where 'exchanges between pupils and between teacher and pupil are all understood in terms of refinements of the central aim' is strongly suggestive of the continuous presence of regulation. However, the problem with the way in which formative assessment is conceptualised in these studies is that there has been a complete reconceptualisation of teaching and learning along assessment lines. It is for this very reason that in Chapter 1 formative assessment was more tightly conceptualised as involving specifically the 'next steps in instruction' (Black and Wiliam, 2009). Formative assessment became one form, amongst others, of interactive regulation, such a move effectively clearing the way for this study into the nature of the fine-grained micro regulation. The implications for micro regulation, in as far as it has been found to be a continuous feature of whole class discussion, are discussed in the final concluding chapter.

5.4.4   A definition of micro regulation

Allal and Lopez (2005, p. 245) suggest that interactive regulation 'contributes to the progression of student learning by providing feedback and guidance that stimulate student involvement at each step of instruction'. This study has sought to bring a better understanding of one particular feature of interactive regulation, namely the fine-grained regulation that takes place in real-time during the instructional activity. The concept of micro regulation has been enlarged to embrace not only regulatory feedback but also regulatory aspects of teachers' questioning. At the same time, it is a concept that is restricted in as far as micro regulation remains only one element, albeit a significant one, of the instructional activity. The extent to which micro regulation is a continuous element of the whole class discussion activity has also been discussed. What can now be offered is a definition of micro regulation that is firmly grounded in the research that has been carried out here. The following definition is proposed:

> "Teacher-led micro regulation involves immediately responding to what students say and do during an instructional activity through the continuous adjustment of both questioning and feedback mechanisms in an effort to ensure that learning is kept on track".

This definition contains a number of key features all of which are the result of this research. First, given that this study has concentrated on what the teacher does to regulate the learning process, the definition must be restricted to 'teacher-led micro regulation'. Second, the notion that this type of

regulation takes place 'during an instructional activity' is important. This is not regulation that takes place in the form of a post-test, but regulation that takes place 'in the moment'. Third, the definition refers to the notion of 'continuous adjustment' that has been one of the key findings of the study. Fourth is the notion that the concept of regulation has been enlarged to include both questioning and feedback, as opposed to being restricted, as is often the case, to feedback alone. The final feature of the definition ('in an effort to ensure that learning is kept on track') is also significant. Perrenoud (1998:87) warns how 'even the most advanced theoretical models … are not yet adequate to account … for the mental processes of a pupil in a classroom situation and the exact use he or she makes of feedback'. This notion of the student as a black box and the impasse this entails leads inevitably to an emphasis in the above definition on the *effort* on the part of the teacher rather than the actual *result* of these efforts. This study has concentrated on what the teacher does to regulate the learning process not whether or not the teacher's efforts are successful; the eventual result of such regulation must remain for future work.

5.4.5   A proposed model of micro regulation

It now becomes possible to propose a model of micro regulation. It is important to emphasise that what is being proposed here is a model of the micro regulation that takes place during whole class discussion. Whilst in Figures 9 and 10 the structure of whole class discussion activities was described, in Figure 11 the model of the three-part and extended cycles is adapted to highlight which mechanisms serve a regulatory purpose.

The model in Figure 11 has been adapted to emphasise regulatory questioning and regulatory feedback (shown in red). What can now be seen is that in a three-part QRF cycle that has a structure comprising Question – Response – Feedback, micro regulation takes place only at the point of the feedback move because the mechanism *initiate* is not regulatory. However, in an extended QRF cycle that has a structure of Question – Response – Question – Response – feedback, the regulation takes place at both the questioning and the feedback move. Furthermore, this model incorporates the two levels of management that were first described by Perrenoud, the first involving the 'setting up of situations which favour the interactive regulation of learning processes' (the situation here is the whole class discussion activity) and the second involving the 'interactive regulation of these situations' (1998, p. 92).

Whole class discussion activity
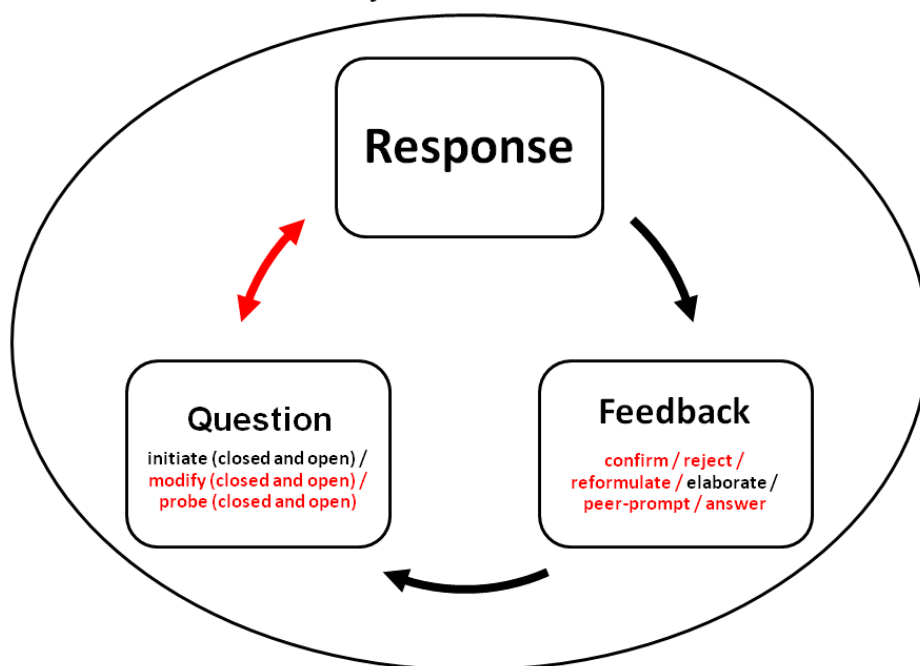
Figure 11   Conceptual model of the regulation of learning showing three-part and extended QRF cycles

5.5   Examining the strengths and weaknesses of regulation

The fourth and final subsidiary research question asked 'What are the perceived strengths and weaknesses of the regulation that takes place during whole class discussion?' This section takes a detailed look at how the various regulatory mechanisms that have been identified are used by teachers to keep learning on track. As such, the findings that have emerged in answer to this research question will be of pragmatic value, allowing teachers to examine, even improve, their own practice in the classroom. The following section is split into three sub-sections: the use of feedback, the use of modifiers and the use of probes.

5.5.1   How feedback is used to regulate the learning process

This study found that some form of feedback was present in every one of the 272 three-part and extended QRF cycles identified, from the use of the single mechanism *confirm* to the use of multiple mechanisms. A total of 23 different feedback structures were identified and these can be found in Appendix 12. Regulatory feedback involved teachers in confirming, rejecting, reformulating, providing answers (to their own questions) and prompting peer regulation to take place. Feedback was therefore found to be an essential regulatory element of the whole class discussion activity. Feedback is necessary because in its absence the student remains ignorant as to the value of his or her response. Sinclair and Coulthard (1975, p. 51) point out how 'usually when we ask a question we don't know the answer; almost invariably the teacher does know the answer and children get

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quite annoyed if he doesn't'. It can be argued, therefore, that for the student feedback is not just necessary but is even an expected element of interaction with the teacher. In this study, as in the study by Sinclair and Coulthard (1975), it remained unclear to what extent the mechanisms that make up regulatory feedback are an effect of teacher style. It remains possible however to make the following observations involving individual and sequences of feedback mechanisms:

The weak regulatory influence of the mechanism *confirm:* feedback that simply evaluates a student response as correct was a common occurrence. In just under a fifth of all of the cycles identified, the mechanism *confirm*, was observed alone (for example see Sequence 1). This characterises the QRF cycle in its most rudimentary form, with a single mechanism to elicit evidence of understanding, a response from the student and a single mechanism to use the evidence of student understanding to keep learning on track after which point a new cycle is initiated. Teachers are clearly continuing to evaluate much of what their students say in terms of whether their response is correct or incorrect. It was of course Kulhavy who referred to feedback as involving 'any of the numerous procedures that are used to tell a learner if an instructional response is right or wrong' (1977, p. 211). It is clear, however, that if teachers are to apply a stronger regulatory influence then they will need to move beyond simply confirming the correctness of a students' response.

The mechanisms *confirm – reformulate***:** it appeared particularly important for teachers to tidy up (i.e. reformulate) what students say. *Reformulate* was observed in a fifth of all of the QRF cycles (both three-part and extended). Teachers would often begin by confirming, then offer a tidied up version of the student's response and finally proceed to elaborate and in so move into further instruction. This feedback structure is seen in the sequence opposite from BH11_1a:

Line	Question	Response	Feedback
7	T Russia was an autocracy, can anybody tell me what an autocracy was? Mandy?		
8		Mandy Is that where it's just one person who makes all the decisions?	
9			T Good, it's like a dictatorship but because he was part of the royal family it's called an autocracy. You all know that Russia was an empire in those days, OK, so it ruled over lots of different countries.

Sequence 6   The structure: *confirm – reformulate – elaborate*

In line 9 the teacher confirms ('Good'), reformulates the students' response ('it's like a dictatorship but because he was part of the royal family it's called an autocracy') and then proceeds to elaborate ('You all know that Russia was an empire in those days…'). This feedback structure is comprised of two regulatory feedback mechanisms (*confirm* and *reformulate*) and one non-regulatory feedback mechanism (*elaborate*). It was found that *reformulate* was more common after an open question than a closed question. This is likely to be due to the nature of open questions which allow for a much wider range of student responses which then need to be tidied up for them to be of use to other students. The use of *confirm* followed by *reformulate* reflects an effort on the part of the teacher to move beyond the basic three-part QRF cycle.

The mechanism *reject*: this mechanism was found to be the only one of the five regulatory feedback mechanisms that was frequently embedded within the regulatory questioning mechanisms. Teachers rejected on 23 separate occasions but, crucially, unlike the other regulatory feedback mechanisms, rejections never occurred alone. It was found that the vast majority of rejections followed a closed question; the very nature of open questions meant that a flat rejection was inappropriate and in fact this was observed only once throughout the entire data set. On two rare occasions teachers rejected a student's response and then proceeded to provide the answer. On three occasions teachers rejected, allowed the student to respond and then immediately either confirmed or continued to probe. This can be seen in the following sequence from WM8_3a.

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Line	Question	Response	Feedback
3	T OK, there is one key word that you need to think about when you define an angle, one key word, what is it?		
4		P Area.	
5			T No.
6		P Degree.	
7			T No.
8		P Measurement.	
9			T No.
10		P Corner.	
11			T No
12		P Turn.	
13			T Thank you James. The key word is 'turn' so if you put an answer like how much it turns around a point at least you've got the word 'turn' in.

Sequence 7   The structure: *reject – confirm – elaborate*

In Sequence 7, the teacher rejects in lines 5, 7, 9 and 11 before confirming and then elaborating in line 13. Arguably of more significance is the finding that teachers were more likely to use the rejection as a springboard from which to modify their questioning. This was found to be the case in over half of the structures that were found to contain rejections. This may be seen in Sequence 8 which is taken from WM8_1b.

Line	Question	Response	Feedback
218	T …Jack explain the difference between an equation and expression.		
219		P ...an equation...	
220			T Yep, ah, it's not.
221		P Sir it's an example.	
222	T It's an equation, and then an expression is two a. (modify)		
223		Ps ***	
224	T Ah, ah, don't say no, he might be right. Jack, an equation has what? A what? (*modify*)		
225		P An answer.	
226	T An answer and an...? (*modify*)		
227		P An equals sign.	
228	T And an expression?		
229		P Doesn't.	
230			T So a plus b is an expression (*reformulate*)

Sequence 8   The structure: *reject – modify*

In this sequence, the teacher rejects in line 220 but then proceeds to modify in lines 222, 224 and 226. As such, the teacher's rejection (which does offer some form of feedback even if it is only minimal) is embedded in the regulatory questioning mechanisms.

The mechanism *answer*: on two rare occasions, teachers were observed providing the answers to their own questions. This is something that, as Mercer points out, teachers appear to be 'at great pains to avoid' (1995, p. 26). Teachers were only ever observed giving an answer after having

initially asked a closed question and half of the answers were given after the teacher had attempted to modify the question. It would appear that when a teacher does give an answer, this tends to follow what may be termed a poorly worded question (see Section 5.5.2 below). This is clear in the following sequence from BE8_1a:

Line	Question	Response	Feedback
23	T … what do we call it if we talk grammatically informally I suppose, Grace?		
24		Grace I've forgotten.	
25			T I'll give you that word and we'll come back to it a bit later, it's 'slang', yeah?

Sequence 9   A poorly worded question followed by *reject*

This question is poorly worded. The teacher uses the term 'grammatically informally' as a way of eliciting 'slang' as an answer but in this case the student is clearly unable to answer. Rather than modifying her questioning, the teacher chooses instead to provide the student with the answer. Although the regulatory influence of the mechanism *answer* is clearly weak, it does not feature heavily during the whole class discussion activity.

The mechanism *peer-prompt*: like the mechanism *answer*, *peer-prompt* was observed on only two occasions. In WM8_1b the teacher asks 'Luke could you explain to Jack the difference, Nick could you explain to Fergus the difference', whilst in WM8_3a the teacher asks 'How did you get a hundred and thirty-five? Explain to everyone else how you got a hundred and thirty-five'. It is clear that the whole class discussion is not the ideal place from which to encourage students to act as instructional resources for one another. Whilst the potential regulatory influence of the peer-prompt mechanism may be strong, in the case of whole class discussion, it remains underused, perhaps because in such activities the locus of control remains in the hands of the teacher. Peer regulation is an obvious departure from a whole class discussion situation and is something that teachers appear rather reluctant to encourage.

A weak regulatory influence: this section has examined the micro regulation that takes place within the three-part QRF cycle only at the point of the feedback move. It is clear that the regulatory influence of feedback alone is at its weakest when teachers proceed with the single mechanism

confirm before initiating a new cycle. The mechanism *reformulate* may be seen as a clearer attempt on the part of the teacher to ensure that learning is kept on track as it benefits not only the student who originally answered the teacher's question but other students as well. This approach may be compared with the micro regulation that takes place both at the point of the feedback move and at the point of the questioning move. What follows is an examination of the micro regulation that occurs when the QRF cycle is extended, a common occurrence accounting for half of all cycles that were identified.

5.5.2   How modifiers are used to regulate the learning process

Due to the complex and varied structure of some of the extended cycles that were identified, the findings reported and examples given in this section and the next are based on the first regulatory mechanism in each cycle. What this means in practice is that where a teacher opens the questioning with *initiate*, uses *modify* and then proceeds to *probe*, only the *initiate* and *modify* are discussed. Likewise, where the teacher opens with *initiate*, *probes* and then for example *probes* again, only the first *probe* in this cycle is considered. This approach is justified on the grounds that the vast majority (over 80%) of those cycles where both regulatory questioning and regulatory feedback is present involved only one regulatory questioning mechanism (i.e. either *modify* or *probe*) followed by feedback.

Modifiers involve 'rephrasing the question in different, perhaps simpler words that relate more to the pupils' knowledge and experience' (Brown and Wragg, 1993, p. 20). As such, it is clear that modifiers attend to the difficulties experienced by students throughout the learning process; teachers modify their questioning due to a lack of understanding on the part of the student. Of the 135 extended cycles that were identified, 41% involved *initiate* followed by *modify*. Of these, 61% involved *closed-initiate* followed by *closed-modify*, 31% involved *open-initiate* followed by a *closed-modify* and the remaining 8% involved open-initiate followed by *open-modify*. It was found that the vast majority (92%) of modifiers are closed questions which is perhaps not surprising given that the very reason teachers modify their questioning is to enable the student to understand more readily the question and subsequently answer more accurately.

Five different types (or classes) of *closed-modify* were identified: *cloze*, *choice*, *emphasis*, *substitute* and *visual*. *Modify* often took the form of a cloze mechanism in which an extra word or words was given by the teacher and the student is effectively required to fill in a gap. How this works in practice can be seen in the following sequence from BE8_1a:

Line	Question	Response
11	T …what do we call it when we try to turn speech into writing, we call it a?	
		(No answer is forthcoming from the students)
12	T You've used it. Have a little look. (**) down to the origins of the word. If I say 'script'.	
13		P Transcript.

Sequence 10   The *cloze* class of the mechanism *modify*

In this sequence, when an answer is unforthcoming, the teacher modifies in line 12 by offering the word 'script'. In doing so, the teacher turns the question into a cloze question. A similar mechanism is used in BH11_2a where the teacher modifies the question by providing the first letter of the word ('Beginning with 'r', re?'). In WM8_4a, the teacher modifies by placing particular emphasis on the last word of his question which at the same time is part of the answer ('OK let's make sure we get our language right that what I've drawn up there is an *irregular…?*') In each of these examples, the teacher modifies with a closed question that offers the student some extra detail.

It was found that sometimes the teacher would modify his/her questioning by giving the student a *choice* of possible answers. This happened in WM8_4a when the teacher asks 'Is seven a factor of three hundred and sixty?' and in WM8_2a when the teacher asks 'Can I cross cancel?' In both of these examples, the teacher reduces the range of possible answers that are available to the student. It was also found that teachers modified by placing greater *emphasis* on certain parts of the question. This was observed in WE7_2a where the teacher repeats his question placing emphasis on the word 'alight' ('what's always *alight* on the grave?'). Teachers were observed asking modified questions that *substituted* one word for another. In WM8_1a for example, the teacher begins by asking the student to 'expand the bracket' but then following confusion modifies this to 'multiply out the bracket'. In this case, the teacher even tells the student that he has modified the question: 'so I'm using a different word to help you'. Finally, to aid understanding a *visual* modification may also take place where the teacher modifies his or her question by writing it on the board as was done in WM8_1a (line 180).

Weaknesses in teacher questioning: it is clear from the above examples that teachers have at their disposal a wide repertoire of mechanisms with which to attend to the difficulties experienced by

students during their learning. However, there are also a number of weaknesses in the way teachers attempt to keep learning on track by modifying their questioning. As such, it is arguable that the difficulties students' appeared to experience in answering questions may at times actually be caused by the teacher. Weaknesses in teachers' questioning that led to the use of modifiers include the poorly worded question, the guessing game and the premature modifier, all of which are now discussed.

The poorly worded question: at times it was clear that students were unable to answer a teacher's question not because they lacked the necessary knowledge or understanding but because the original question was itself poorly worded. This can be seen in Sequence 11 (opposite) from WM8_4a. In this sequence, the teacher wants the students to demonstrate that they have understood how to show visually that a pentagon is regular. The cycle begins in line 36 with a *closed-initiate* but the student does not pick up that he is being expected to 'use geometry' and answers with numbers. *Closed-initiate* is then followed by two examples of *closed-modify* (in lines 40 and 42) before the student understands how he is being expected to answer (i.e. visually using geometry). In this example the teacher's original question is too deeply coded in mathematical terminology for the student to be able to successfully answer.

The guessing game: at certain times teacher – student discourse appeared protracted beyond what was perhaps necessary. This is evident in an extended cycle from BH11_2a where the teacher attempts to help the students to recall the signing of the Munich Agreement, an example of British appeasement during the World War II (due to its length this sequence may be found in Appendix 11). When the teacher's initiating question does not produce the answer he is seeking, he modifies the question by providing some extra detail ('in nineteen thirty eight, a bit of paper, peace in our time'). This is met with silence from the students and the teacher modifies again ('Neville Chamberlain British Prime Minister') but still no answer is forthcoming. The teacher modifies yet again using a cloze mechanism ('the area begins with 's' and the agreement begins with 'm') and this time a student is able to provide at least one part of the answer ('Sudetenland'). To elicit the name of the agreement the teacher again modifies his question ('the agreement which is signed by Chamberlain and Hitler … is called the 'What Agreement'? Beginning with 'm', city in Germany). Finally, a student supplies the answer ('Munich') which the teacher then confirms. This is clearly a rather convoluted way of eliciting the correct answer. It was Mercer (1995, p. 26) who pointed out how 'providing the answer is one thing that it seems teachers are often at great pains to avoid'. A similar situation was experienced by Torrance and Pryor (1998, p. 52) who describe a situation in which the teacher 'attempts to cue and elicit correct responses through a convoluted series of questions and mimes'. As these authors point out, the teacher does not engage in direct instruction when perhaps she should. The guessing game was therefore seen to be a clear weakness in the questioning mechanisms used by some teachers.

Line	Question	Response	Feedback
36	T Pentagon, OK, how then Luke could, using geometry, I make that regular?		
37		Luke Well you could divide three hundred and sixty by five.	
38			T No, you're one step ahead of me.
39		Luke Oh.	
40	T I'll ask the same question to you, how could I make that into a regular pentagon?		
41		Luke Oh, um, make all the sides the same.	
42	T And how do I show that?		
43		Luke By a line in the (* parts).	
44			T So we all recognise that as soon as I do that it becomes a regular pentagon…

Sequence 11   The poorly worded question

The premature modifier: it was found that on some occasions teachers would modify their initiating question without leaving sufficient time for students to respond. This can be observed in the following two sequences taken from BE8_1b and BH11_2a respectively:

Line	Question	Response
87	T Now what did you think about that Alex? Did you think that that was informal or did you think that that was actually inappropriate for the text?'	
88		P The Prime Minister's not like (**) so getting hurt.

Sequence 12 The premature modifier (1)

Line	Question	Response
174	T Can you think of anything else that Hitler does, anywhere that he moves his troops to, anything that he does before nineteen thirty-eight?'	
175		Eleanor Um, he moves his troops to Alsace

Sequence 13 The premature modifier (2)

In BE8_1b, the teacher asks 'now what did you think about that Alex?' but then, without giving the student time to answer the question, immediately modifies his original *open-initiate* with a closed choice: 'did you think that that was informal or did you think that that was actually inappropriate for the text?' In BH11_2a, the teacher begins with *open-initiate* 'can you think of anything else that Hitler does?' but then almost immediately modified this with a closed question: 'anywhere that he moves his troops to, anything that he does before nineteen thirty-eight?' Both of the modifiers in the above sequences were closed and both arguably were premature in as far as the teachers did not leave enough time for the students to formulate their answer before modifying their questions.

It was found that premature modifiers are far more common when the questioning begins with an open question than they are when it begins with a closed question. Whilst just over 10% of closed initiators that were modified were subsequently modified with a premature closed question, over 50% of the open initiators that were then modified were done so with a premature closed modifier. It would appear, therefore, that teachers are beginning with an open question but are far too quickly modifying this with a closed question, effectively closing down the options available to the student. Interestingly, Wright and Nuthall (1970) found that students of teachers who asked several questions

without a pause performed less well than students of teachers who asked questions one at a time and over a longer period. It would be fair, therefore, as an observation that relates directly to practice that teachers need to be more aware of the tendency to all too quickly fall back on the closed question as a means of keeping learning on track. Working on developing a technique such as wait-time which 'produces measurable increases in learning' (Wiliam, 2007, p. 24) would perhaps help teachers to overcome this weakness.

A stronger regulatory influence: teachers attempt to keep learning on track by modifying their questioning. It is clear that extending the QRF cycle with modifiers represents an attempt on the part of the teacher to exert a stronger regulatory influence that that which exists in the three-part QRF cycle. What remains unclear, however, is the extent to which this micro regulation is driven by a genuine lack of understanding on the part of the student or whether it is the result of a weakness in teacher questioning. There can be no doubt however that the potential of the modifier to keep learning on track is greatly reduced by the poorly worded question, the guessing game and the premature modifier.

5.5.3   How probes are used to regulate the learning process

Probes are questions that are designed to 'help students think out answers more thoroughly, to encourage quantity and quality of participation, to require students to be more accurate and specific' (Morgan and Saxton, 1991, p. 92). It is argued by some that the use of probing questions should be a part of every teacher's questioning repertoire. Hardman, for example, suggests that teachers should be offered training in transforming the familiar IRF sequence into 'purposeful productive dialogue' (2008, p. 146). Unlike modifiers, which tackle students' difficulties, probing questions address the student's need for increased participation and engagement at a higher cognitive level. It is through probing questions that teachers will be helped to break out of the 'recitation script' (Hardman, 2008, p. 133).

Of the 272 cycles that were identified, 29% involved the teacher in following up initiating questions with probes. This frequency of probing questions is much higher than that identified by Hardman (2008, p. 143) who found that 11% of the questioning exchanges involved probes in which 'the teacher stayed with the same students to ask further questions to encourage sustained and extended dialogue'. From this data, it is arguable that experienced teachers are more able to sustain the dialogue they have with their students with the use of probing questions. Extended QRF cycles (of which 135 were identified) were more likely to be extended with the use of probes than with the use of modifiers (59% compared with 41%). Looking more closely at the type of probing questions that teachers ask (in terms of their grammatical function), it was found that teachers were not significantly more likely to regulate learning with *closed-probe* than with *open-probe* (60% compared to 40%). These figures give a closed to open ratio for probes of 1.5:1. This figure is significant as it

suggests that when probing, the open question becomes a more common feature of the teachers' questioning strategies. Teachers were eight times more likely to follow *closed-initiate* with *closed-probe* than they were to follow it with *open-probe*. The following sequence from BH11_2a demonstrates how the teacher starts with *closed-initiate* and then follows up with *closed-probe*.

Line	Question	Response
1	T …can anybody tell me who was the ruler of Russia in nineteen hundred?	
2		Ss The Tsar.
3	T Can anybody tell me? Gisele?	
4		Gisele Tsar Nicolas.
5	T Nicolas the what?	
6		Gisele Second
7	T Second, good.	

Sequence 14   *Closed-initiate* followed by *closed-probe*

In this sequence, the *closed-probe* comes in Line 5 where the teacher asks Gisele to qualify her response. It would therefore appear that when a cycle is instigated with a closed question a *closed-probe* is far more likely to follow than an *open-probe*. The inverse also appears to be true: teachers were more than three times as likely to follow an *open-initiate* with an *open-probe* as they were with a *closed-probe*. This can be seen in the sequence opposite from BH12_3a:

Line	Question	Response
29	T does anyone want to expand on that, did anyone have the same kind of idea, it was an official document but developed that in a slightly different way, yes.	
30		P That he was only a local resident, he wasn't someone with a high degree.
31	T OK, what do you mean?	
32		P Er he wasn't a expert.
33	T Yeah, lovely, so therefore?	
34		P Therefore he didn't have, he might not have had as much knowledge about the about the sewerage?
35	T OK, OK,	

Sequence 15 *Open-initiate* followed by *open-probe*

In this sequence, the teacher probes twice in lines 31 and 33. In line 31 the student is asked to restate her response in a different way, whilst in line 33 she is asked by the teacher to expand on it.

Hardman (2008, p. 135) has pointed out the way in which research has focused on the use of open questions 'in an attempt to open up classroom discourse and encourage greater participation'. At the same time he highlights what he calls the 'overwhelming reliance of teachers on closed factual questions' (2008, p. 135). This study has found that the way in which a teacher regulates learning (through the use of closed or open probing questions) is to some extent dependent on how they originally instigated the questioning; open initiators tend to be followed by open probes whilst closed initiators tend to be followed by closed probes. Although this is a study of *how* learning is regulated and not of the perceived or actual gains for student learning of the regulation, it would be an opportunity missed if this correlation were not highlighted here. The significance that this finding has for teacher questioning is clear: when a QRF cycle is initiated with an open question, subsequent regulation in the form of probing questions is also likely to be in the form of an open question.

A strong regulatory influence: there can be no doubt that the strongest regulatory influence appears in the extended QRF cycle and comes from the probing question. These questions attend

to the needs of the students as they arise during the whole class discussion activity. These questions also serve to open up classroom discourse, encouraging participation and engagement at a higher cognitive level.

5.6   Summary

This chapter has presented the findings that have emerged from this study of micro regulation. The structure of the whole class discussion activity has been described comprehensively in terms of three-part and extended question-response-feedback (QRF) cycles and this structure has been validated by the literature. This study has identified the many and varied ways in which regulatory feedback and questioning are used in an attempt to ensure that learning is kept on track. Micro regulation has been found to form a very significant part of what a teacher does during the whole class discussion activity. A concept of micro regulation is proposed in which it takes place both at the point at which understanding is elicited form the student and at the point at which this understanding is used to move learning forward. Furthermore, it has been found that micro regulation is an embedded and continuous feature of the whole class discussion activity. A conceptual model and definition of micro regulation have also been proposed.

This study has also found that the strength of the micro regulation that takes place during whole class discussion activities varies greatly. As has been identified, whole class discussion activities are comprised of a series of three-part and extended cycles. It is clear that in the three-part cycle micro regulation remains weak, restricted in the main to the mechanisms *confirm* and *reformulate*. There is a stronger regulatory influence in the extended QRF cycle with the use of modifiers, however it is also clear that there are a number of weaknesses in teacher questioning including the guessing game, the poorly worded question and the premature modifier. Strongest of all is the regulatory influence exerted in extended QRF cycles that involve the use of probing questions that have the effect of opening up the discourse, encouraging participation and thinking at a higher cognitive level. Significantly, it was found that the way in which teachers regulate learning with probing questions depends to some extent on how they initially instigated the questioning. Teachers who initiate questioning with open questions were found to be far more likely to probe with open questions than with close questions.

These, then, are the main findings that have emerged from this study, the main aim of which has been to bring a better understanding of the theory of interactive regulation by examining how learning is regulated by the teacher at a fine-grained micro level. The concluding chapter of this study discusses more fully the key implications for future research and practice that have emerged from the way in which micro regulation is now conceptualised.

Chapter 6   Conclusion

6.1   Introduction

The aim of this study has been to bring a better understanding of the theory of interactive regulation by examining how learning is regulated by the teacher at a fine-grained micro level. In so doing, this study posits a theory of the construct 'micro regulation'. This study has identified the nature of the regulation that takes place during what is perhaps the most ubiquitous of all teaching and learning activities, the whole class discussion. The main research question asked 'What is the nature of the teacher-led regulation that takes place during whole class discussion?' To answer this question, twenty classroom observations were carried out involving five teachers in two schools. Teacher – student discourse was audio recorded and transcribed, resulting in a data set of over 100,000 words. From this data set, the whole class discussion activity as the focus for the analysis was identified. Eighteen different patterns, called units, were subsequently identified and then analysed in detail using qualitative content analysis. The research literature was also drawn upon with the result that the findings are both grounded in the data and validated by the literature. The findings that have emerged here are therefore the product of a rigorous and systematic research process.

There are six main sections to this concluding chapter. Section 6.2 summarises the main findings of the study. Here the study's main and subsidiary research questions are answered. This involved distinguishing regulatory from non-regulatory mechanisms, examining how micro regulation interacts with other elements of the instructional activity in particular the extent to which it is a continuous feature and considering how the regulatory mechanisms are used by teachers to keep student learning on track. This section concludes by proposing that the regulatory questioning component of micro regulation may be understood in terms of two functions, a deconstructive function and a constructive function. Section 6.3 outlines the methodological strengths and limitations of the study. Section 6.4 reflects upon the direction that future research might take and also considers implications for practice. This section looks at the variation of, and potential for, micro regulation across the different subjects and the nature of the micro regulation that may be present in instructional activities that do not involve whole class discussion. It also considers the nature of micro regulation when student participation is actively encouraged and, perhaps most significantly, this section considers the way in which teachers appear to adjust contingently the cognitive complexity of their questioning. The suggestion is made that future research should focus less on regulatory feedback (which is often simply evaluative) and more on regulatory questioning conceptualised in terms of a constructive and a deconstructive function. A practical tool with which teachers may be able to examine critically their own practice is also proposed. Section 6.5 steps back to consider the main arguments in more detail. Here an attempt is made to bridge the gap between micro regulation and the two others dimensions of interactive regulation, namely formative assessment and self-regulated learning. Formative assessment and micro regulation are distinguished from one another and their potentially different functions regarding their role in learning are considered. The way in which the evidence that is elicited by teachers may constrain or facilitate

self-regulated learning is also considered. Finally Section 6.6 reflects briefly upon the impact that carrying out this study has had on the author's own continuing professional development.

6.2 Summary of the findings: the construct of micro regulation

This work identified patterns in teachers' contingent responses that emerged through the analysis of the teacher – student interaction that took place during whole class discussion. Reflecting upon these enabled the development of the construct of micro regulation. What follows is a summary of the findings organised around the main and subsidiary research questions that this study addressed. The main research question was operationalised through four subsidiary research questions that addressed the issues that were highlighted during the review of the literature. These questions asked:

1. What mechanisms are put in place by teachers during whole class discussion to regulate student learning?
2. In what way does the regulation of learning interact with other elements of whole class discussion?
3. To what extent is the regulation of learning a continuous feature of whole class discussion?
4. What are the perceived strengths and weaknesses of the regulation that takes place during whole class discussion?

Identifying the micro regulation: the first subsidiary research question asked 'What mechanisms are put in place by teachers during whole class discussion to regulate student learning?' To answer this question, it became important to distinguish regulatory mechanisms from non-regulatory mechanisms. This was done in order to 'avoid identifying all actions of the teacher with permanent regulation' (Perrenoud, 1998, p. 88). The notion of contingency was explored and the work of Cullen (2000) and Van de Pol, Volman and Beishuizen (2010) was drawn upon to provide a clearer understanding of the extent to which teachers were involved in regulating learning. Micro regulation is associated with the way in which teachers meaningfully adapted their support to address students' error and approximation. The extent to which the teacher's response was directly contingent upon the response of the student became the main criteria for the presence or absence of micro regulation.

This study proposes that the construct of micro regulation may be divided into regulatory questioning and regulatory feedback. Regulatory questioning was found to involve the use of modifiers and probes, whilst regulatory feedback was found to involve teachers in confirming, rejecting, reformulating, providing answers to their own questions and finally by prompting students to help one

another to solve a problem. These are the mechanisms that teachers use to regulate student learning during whole class discussion on a fine-grained micro level. Identifying these mechanisms makes it possible to begin to answer Perrenoud's call for research to 'conceptualise and observe … the process of regulation at work in classroom situations' (Perrenoud, 1998, p. 99). The initial identification of these regulatory mechanisms makes it possible to establish how they are used to regulate learning and in so doing bring a better understanding of the processes at work. This is important because it was identified in the literature review that, whilst there exists a number of categorisations of the ways in which learning may be regulated, the research tended to focus on mechanisms rather than processes.

From mechanisms to process: having identified the mechanisms that serve a regulatory function, the second subsidiary research question then asked 'In what way does the regulation of learning interact with other elements of whole class discussion?' In answering this question, an understanding of the process of micro regulation begins to emerge. It was found that whole class discussion can be comprehensively described in terms of QRF cycles. QRF cycles comprise a questioning move from the teacher, a response move from the student and a further feedback move from the teacher. In total, 272 QRF cycles were identified across the entire data set. Of these 272 QRF cycles, half were found to be what may be termed 'three-part' in as far as evidence of understanding is elicited from the student (in the form of a question), the student responds and the teacher immediately follows up this response (in the form of feedback). In addition to three-part cycles, what may be termed 'extended' cycles were also identified. In an extended cycle, the teacher elicits evidence of student understanding, the student responds but, instead of offering feedback and therefore completing the cycle, the teacher extends the cycle by eliciting further evidence. Cycles were extended either because students did not answer at all, answered incorrectly or only partially (in which case the teacher modified the question), or because the teacher chose to give students the opportunity to expand on or support their response (in which case probing questions were used). Teachers' use of modifying and probing questions is discussed in more detail below.

The notion of continuous adjustment: each cycle was found to comprise at least one regulatory mechanism but often many more, from the simplest three-part QRF cycle comprising a single confirmation to far more complex extended QRF cycles comprising both regulatory questioning (modifiers and probes) and a combination of regulatory feedback. It is clear that micro regulation is a continuous feature of whole class discussion. This observation addresses the third subsidiary research question. Figure 12 illustrates the way in which micro regulation takes place both at the point at which evidence of student understanding is elicited in the form of the questioning move *and* at the point at which this understanding is used to move learning forward in the form of the feedback move. This is significant because the result is an enlarged concept of micro regulation that moves beyond solely considering the feedback response.

Whole class discussion activity
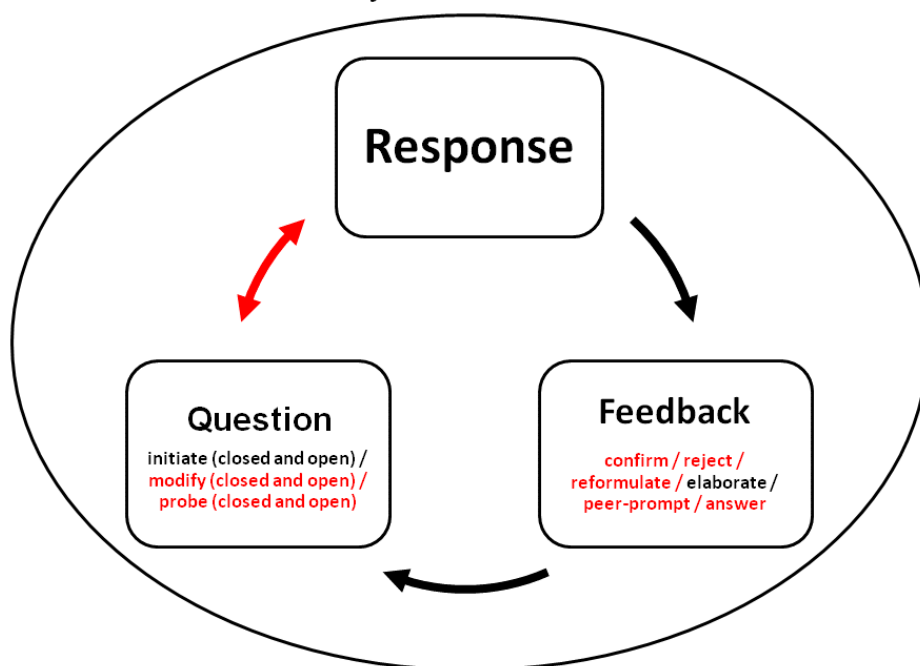
Figure 12   Conceptual model of micro regulation

Micro regulation is therefore a significant part of what a teacher does, being at the same time fully embedded in, yet an identifiable part of, whole class discussion. It was, of course, Perrenoud (1991b, p. 9) who suggested that regulation is not a specific moment during teaching but a permanent component: error and approximation are the rule not the exception and as a result, the teacher constantly needs to adjust his or her aim in order to keep learning on track. Taking into account the notion of an enlarged concept of micro regulation that comprises both questioning and feedback, as well as the notion of continuous adjustment, it is possible to propose the following definition of micro regulation:

> Teacher-led micro regulation involves immediately responding to what students say and do during an instructional activity through the continuous adjustment of both questioning and feedback mechanisms in an effort to ensure that learning is kept on track.

Strengths and weaknesses of micro regulation: it became clear that the way in which the mechanisms were used by teachers' varied greatly. It was found that micro regulation remains weak when it takes place only at the point of the feedback move during the three-part QRF cycle. This is the familiar pattern of teacher-student interaction, referred to by Hardman (2008, p. 133) as the 'recitation script' and which is comprised of 'closed teacher questions, brief student answers and minimal feedback which requires students to report someone else's thinking rather than think for

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themselves' (2008, p. 133). Such a pattern may be said to facilitate teacher control of the discourse and constrain students' learning opportunities (Nunan, 1987; Cazden, 1988; Wells, 1993) whilst excessive use of such patterns may actually restrict communication between teacher and students (Barnes, 1992). Half of the cycles identified were of the three-part QRF format and could therefore be said to conform to the recitation script.

This study found, however, that it was not always the teachers' sole concern to obtain the expected student response as Mehan (1979) suggests is often the case; teachers did indeed manage to incorporate strategies that allowed them to break out of the recitation script. A stronger regulatory influence appears to exist in the form of the extended QRF cycle where teachers modified their questioning in order to ensure learning takes place as intended. When teachers modify their questioning, they are involved in 'responding to the students' attempts by providing assistance in a manner that jointly creates a zone of proximal development' (Wells and Arauz, 2006, p. 421). Learning was regulated in this way when teacher questioning failed either to elicit a response from the students at all, or when it did not elicit the expected or 'correct' response. This was achieved through a number of techniques including offering the student a choice of response, providing the first or last part of the response, substituting a complex work for a less complex one and placing emphasis on a particular part of the question. As noted previously, teachers far preferred to modify their questions than provide the answers. However, what remains unclear is the extent to which this micro regulation is driven by a genuine lack of understanding on the part of the student or whether it is the result of a weakness in the questioning and therefore generated by the teacher. Such weaknesses involved teachers' questions that were poorly worded, teachers engaging in what may be termed a 'guessing game' when direct instruction might have been more appropriate and teachers modifying their questions before giving the student sufficient time to respond.

Probing questions that require students to expand or support their responses have, arguably, the strongest influence on student learning, designed as they are to support and guide students through increasingly advanced concepts. Use of such probing questions was observed, for example, by Nathan and Kim (2009) who discovered that teachers increased the elicitation level of their questioning (i.e. probed) when students provided responses that were mathematically accurate. The links between the research carried out by Nathan and Kim and this study are discussed in more detail in Section 6.4 below.

Identifying two functions of regulatory questioning: it would appear possible to describe regulatory questioning in terms of two functions, a deconstructive function and a constructive function. The assistance provided to the student in the form of the modified question serves a deconstructive function in which the question is 'rephrased by the teacher in simpler words that relate more to the students' knowledge and experience' (Brown and Wragg, 1993, p. 20). The

question put to the student is simplified, effectively taken apart, in an effort to ensure that the student is able to understand and subsequently answer. In this way, the teacher's actions serve to keep the students' learning is kept on track. When the QRF cycle is extended with probing questions, the use of such a technique may be said to serve a constructive function in which the teacher provides support to the student to 'think out answers more thoroughly, encourage quantity and quality of participation ... to be more accurate and specific' (Morgan and Saxton (1991, p. 92).

Regulatory questioning, as an element of micro regulation, may therefore be seen as one that involves both a downward direction and an upward direction. Downward in as far as teachers deconstruct or simplify the tasks they put to students in the form of modifying questions and upward in as far as they construct knowledge with probing questions that open up the classroom discourse and encourage participation at a higher cognitive level. This was clearly observed in Sequence 5 (see Section 5.2.3) which describes an extended QRF cycle. In this cycle the teacher uses a combination of deconstructive questioning (the use of modifiers) and constructive questioning (the use of probes), withholding all feedback until the appropriate moment at which the student's response is confirmed. Experienced teachers make use of both constructive and deconstructive regulatory questioning that is intended both to ensure that students' understanding is moved forward and, at the same time, to ensure that students are not left behind.

The notion that has emerged here of the function of micro regulation as being both deconstructive and constructive directly addresses the main research question that this study set out to answer. This question asked 'What is the nature of the teacher-led regulation that takes place during whole class discussion?' The idea that teachers modify their questioning, use questions to probe student understanding or even confirm and reject is clearly not new. What is new is the understanding that has emerged of this continuous process of micro regulation that serves both a constructive and a deconstructive function. This, then, is the essence of micro regulation, which is a continuous process that involves teachers both constructing and deconstructing knowledge in order to keep the learning of all students on the right track. As such, it would appear important to place the focus for future research on the teachers' use of regulatory questioning and its constructive and deconstructive functions. This suggestion is taken up in Section 6.4 below.

6.3   Methodological limitations

This section identifies a number of areas that in retrospect might have been approached differently should the study be repeated as well as those areas that, whilst carefully thought out and implemented, represent limitations nonetheless.

The sampling in this study was purposeful. All five of the teachers that took part were experienced in as far as each had been teaching for ten years or longer. Two teachers were teachers of English, two of history and one of mathematics; all were teachers of either Key Stage 3 or 4. This has been a study of how teachers regulate the learning process, not of how an English teacher, a mathematics teacher or a history teacher might regulate learning, nor indeed has it been a study of how learning is regulated at Key Stage 3 or 4. It must, however, be acknowledged that a wider variety of subjects, teachers and possibly even Key Stages would have given this study a much stronger basis for generalisation.

Approximately three hours were spent with each of the five teachers, a figure that resulted in 15 hours of audio recording. The transcriptions of these recordings amounted to some 100,000 words of text. The initial difficulties that were experienced in identifying the unit of analysis to be used in the study meant that each lesson was transcribed in its entirety. Although comprehensively presenting the materials upon which the analysis took place allows other researchers to consider alternative interpretations (and therefore validate the analysis) this was ultimately an unnecessary and time-consuming task. The direct effect of this was that time was spent needlessly transcribing entire lessons.

In this study a qualitative content analysis using analytic induction (Znaniecki, 1934, p. 264) was carried out on the data. In such an approach categories emerge as the analysis unfolds rather than these categories being predefined. This was considered to be the most appropriate approach to investigating the regulation of learning, the theory of which, as has been noted above, is incomplete. It has to be acknowledged, however, that research is never value free; a researcher will inevitably hold some position (a particular bias, belief or set of cultural values) prior to and throughout the research process. The threat here is that researchers effectively construct their own subjective versions of reality. Attempts have been made to limit this issue of reflexivity by offering a clear chain of evidence (Yin, 1994, p. 34). At every stage in the process a clear rationale is given for the decisions made, terms are clearly defined and where the literature is drawn upon to provide a further level of validation this is noted.

It is also arguable that a detailed analysis of those instances where the students do not respond in the ways expected by teachers would have led to a better understanding of micro regulation. It must therefore be acknowledged that in this study a consideration of the role of the student has been largely absent; the focus has remained firmly on how teachers regulate student learning. Whilst it is evident that 'teacher presentation and direction are the most common form of discourse' (Smith & Hardman, 2003, p. 46) there is no reason to assume that the students' role is entirely passive. Mehan (1979, p. 11) for example points out that 'student action in a classroom is not limited to responding when called upon'. Rather, there are many instances of student-initiated acts where

students take a more active role including (but not limited to) asking the teacher questions and peer assessment. This study, then, should be seen as offering a starting point from which future research into micro regulation might look to build. The notion of student initiative is discussed in more detail below.

Finally, the aim of this study has been to develop a more complete theory of how learning is regulated on a fine-grained micro level. As such, it has not been within the scope of this study to evaluate the impact of the regulation on students' attainment. A number of weaknesses in teacher questioning have been identified as has the perceived strength of regulation, however the effectiveness of attempts by teachers to regulate learning has not been judged. This must remain for future work.

6.4   Opportunities for further research and implications for practice

The construct of micro regulation that has emerged in this study is the result of data that has been gathered from across a range of different subjects and involving a number of different teachers. As such, there now exist a number of routes that future research may take. These include further examination of what appear to be the two functions (constructive and deconstructive) of regulatory questioning. The notion first introduced at the end of Section 6.2 that regulatory questioning serves two separate functions is discussed in more detail below. Developing this concept further will make it possible to gain a better understanding of a number of areas including the extent to which micro regulation differs from subject to subject, the potential for micro regulation that exists in other activities that are set up and regulated by the teacher (i.e. beyond whole class discussion), and the potential for micro regulation in classroom situations in which student participation and initiative are actively encouraged by the teacher. Perhaps most importantly, the final part of this section calls for further research into the way teachers combine their use of deconstructive and constructive questioning in an effort to keep student learning on track.

Understanding the variation of micro regulation by subject: using the conceptual model of micro regulation that is proposed here (see Figure 12) it becomes possible to study the variation of, and potential for, regulation across different subject areas. Whilst some researchers, for example Linda Allal (1988b), argue in favour of a cross-disciplinary approach to regulation, for others the potential for regulation may well be linked to how tight individual subject goals are. Black *et al.* (2003, p. 68) note that 'the more specific the goal, the tighter the regulation'. Wiliam (2007, p. 32) points out the way in which the regulation of learning in Mathematics is tight in which the teacher attempts to 'bring into line' all learners who are not heading towards the particular goal sought by the teacher'. He contrasts this tight regulation with other subjects that require a more investigative approach, such as English in which the teacher may quite reasonably be expected to be involved in steering the conversation as opposed to judging whether students' answers are right or wrong. Wiliam notes how

in such subjects, regulation is looser with the teacher intervening 'only when the trajectory of the learner is radically different from that intended by the teacher' (*ibid*., p. 32). Differences in the way teachers of particular subjects regulate learning on a micro level may well be seen in the distribution of three-part and extended QRF cycles (which in this study was split almost exactly in half). It may not necessarily follow, however, that the notion of 'tighter' regulation (as may be seen in the teaching of mathematics for example) leads to a predominance of three-part QRF cycle or indeed that 'looser' regulation results in a predominance of extended QRF cycles. An important question to ask therefore is whether micro regulation is substantially different across subjects or whether it is more related to individual teaching style.

Moving beyond whole class discussion: this study has been limited in as far as data was only collected from one particular instructional activity, the whole class discussion. As such, it becomes difficult to generalise the study's findings to other instructional activities. Micro regulation during whole class discussion has been found to be a continuous and therefore significant part of what the teacher does, but what remains to be understood is the extent to which the mechanisms and the process of micro regulation seen here (i.e. teachers' use of three-part and extended QRF cycles) exist during other instructional activities. Wells and Arauz (2006) for example suggest that this three-part exchange of teacher question, student response followed by teacher feedback is particularly prevalent in interactions between the teacher and the whole class. It was, of course, Marshall and Drummond who pointed out that the choice of activities 'affects all subsequent interactions' (2006, p. 147). It is therefore likely that there will be certain activities in which the potential for regulation is weak and others in which it is strong. Of particular interest are those activities that the teacher sets up as a result of evidence of student understanding that has been elicited through formative assessment. These activities may be considered to be the result of teacher's formative intentions.

One of the lesson transcriptions that this study rejected in its entirety was BH12_2a (a Year 12 History lesson). BH12_2a was what may be termed a 'feedback lesson' in which the teacher offered students one-to-one feedback on written work that had recently been completed. The teacher had already provided the students with feedback in the form of written comments, but in addition to this had decided that further face-to-face sessions were needed. There is no reason whatsoever to assume, however, that such a feedback lesson takes the form of a teacher monologue pointing out to the student strengths and areas for further development. If such an event does not involve micro regulation's deconstructive and constructive functions (modifying and probing questions, the confirmation, reformulation or elaboration of the students' response), then further valuable learning opportunities may be lost. At the same time, the teacher will still need to work hard to avoid any weaknesses in his or her questioning such as the poorly worded question or the premature modifier. There is arguably something to be gained, therefore, from examining the relationship between the teachers' choice of activity (in particular those that are set up through teachers' formative intentions) and the micro regulation that results.

Facilitating student participation: it was noted above that half of the 272 cycles identified in this study were three-part, comprising a question from the teacher, a response from the student and subsequent feedback from the teacher. These cycles may justifiably be considered as adhering to the pattern of teacher-student interaction which Hardman refers to as the 'recitation script' (2008, p. 133). Van Lier suggests that whilst such an approach may be advantageous from the teachers' perspective (in terms of control over students) it can also lead to 'reduced student participation, less extensive language use, a loss of contingency and severe limitations on the students' employment of initiative and self-determination' (1996, p. 185). Of course, half of the cycles identified were indeed extended and these cycles, by their very nature, do break out of the recitation script. It is clear, however, that doing so is not an end in itself but merely a means towards greater student participation. Wells (1993) for example found that the teacher-directed pattern of interaction enhanced opportunities for learning when teachers chose not to evaluate student responses but chose instead to follow these up by requiring students to expand on their thinking by justifying or clarifying opinions. In a similar vein, Hall (1998) found that just a slight variation to the third part of the standard three-part IRE exchange made a significant difference in student participation in whole group interactions with the teacher.

Moreover, it is necessary to acknowledge a shift from student participation to a situation in which students are given the freedom to control actively the discourse. In favour of this approach van Lier (2008, p. 163), referring to the centrality of the concept of learner agency, suggests that 'learning depends on the initiative of the learner, more so than any inputs that are transmitted to the learner by the teacher'. Garton (2002, p. 48) considers learner initiative as a means of taking control in order to 'direct the interaction in a way that corresponds more closely to the interests and needs of the learners'. Waring (2011, p. 214) suggests that students may take the initiative in a number of ways: 'by stepping in on behalf of another, by responding when no responses are called for, and by using a given opportunity to do more than what is expected or the unexpected'. Waring was interested in how learner initiatives promote learning and how instruction can be organised to maximise learner initiatives. This poses the question: what form does micro regulation takes when student participation is actively encouraged?

A focus on teachers' contingent support: the idea of contingency was first discussed in Section 2.4 and together with the notions of fading and the transfer of responsibility. When taken together all three are characteristics of scaffolding (van de Pol, Volman & Beishuizen, 2010, p. 277). It is worth reiterating here that this is not a study into scaffolding per se, which is more related to the gradual and deliberate withdrawal of adult support in direct relation to a child's increasing mastery of a given task. It was Wang, of course, who stated that scaffolding is not just another word for help but 'a special kind of help that assists learners to move toward new skills, concepts, or levels' (2011, p. 47). In this study, contingency does of course remain a key concept, most noticeably in helping to identify the extent to which teachers' questioning and feedback is regulatory. To achieve this, Cullen's

conceptualisation of contingency as being concerned with the 'general quality the teacher exhibits of listening and responding meaningfully, and with genuine interest, to the content of what the student is saying' was drawn upon (2000, p. 125). Regulatory questioning and feedback was identified by considering the extent to which the teacher meaningfully adapts support to address students' error and approximation in an attempt to ensure that learning is kept on track.

There has been much research carried out recently into whole class scaffolding in general and contingency in particular. For example, Myhill and Warren (2005, p. 55) examined the way in which teachers respond to what they referred to as 'critical moments' which the authors defined as 'those points in a lesson where something a child or teacher says creates a moment of choice or opportunity for the teacher'. The authors found that teachers tended to focus on covering curriculum content as opposed to providing authentic contingent support with the result that the scaffolding acted as a means of control as opposed to facilitating more independent learning. Similar to the findings of Myhill and Warren were those of Van de Pol, Volman, Beishuizen (2011) who also examined patterns of contingent teaching in teacher–student interaction and again found that there was little evidence of contingent teaching. The teachers involved in this study did not appear to adapt the support to students' current understanding, nor did they appear to take steps towards diagnosing the students' understanding.

At the same time, there is also some evidence of teachers providing contingent support to students. By way of a microanalysis of teacher-student interaction, van de Pol and Elbers (2013) investigated patterns of contingency in order to explore how it may affect learning. These authors make two important claims. First, that when initial student understanding is poor contingent support results in increased student understanding and, second, that teachers seldom underestimated students' understanding but often overestimated students' understanding.

Adjusting the cognitive complexity of teacher questioning: central to this study is the notion that teachers increase and decrease the control they exert over the activity depending upon the extent to which students experience difficulties and / or successes in their learning. This was observed in the extended QRF cycles where teachers used combinations of regulatory questioning (probes and modifiers). This also comes across in the work of Chin (2006) who examined the types of questions asked by teachers and the way these questions influence students' cognitive processes. For Chin, the questions asked by teachers served as rungs on a 'conceptual ladder', 'enabling students to gradually ascend to higher levels of knowledge and understanding' (*ibid.*, p. 191).

The notion of adapting the support based on the response of the students also features in a study by Nathan and Kim (2009). These authors investigated how student participation is regulated by teachers and the impact that this regulation has on the students' mathematical reasoning. Nathan

and Kim identified teachers' use of elicitations, including questions and other provocative statements, and coded these in terms of both elicitation type and cognitive complexity. Nathan and Kim drew on the work of Mehan (1979) in order to to categorise the cognitive complexity of each elicitation with four levels of choice, product, process and metaprocess being used (see Figure 3). These authors found that teachers tended to reduce the level of cognitive complexity when students responded inaccurately or incorrectly and increase the level when students' responses were mathematically accurate. As the authors note, 'there is evidence that the teacher adjusts his elicitations in a manner that appears to be responsive to students' statements' (*ibid.*, p. 103). Interestingly, in one excerpt Nathan and Kim describe the way in which a teacher adjusts the level of the elicitations from higher order to lower order and then from lower order back to higher order. In the example cited, there is clear evidence of both a downward and an upwards shift in the cognitive level of elicitations. First, there is a downwards shift from product to choice (to use Mehan's terminology) in the cognitive level of the elicitation when students struggle to recall previously learnt information. Second there is an upwards shift from product to meta-process following correct mathematical responses. Finally there is another downwards shift from meta-process to product after a partly correct student response. In Nathan and Kim's example, the teacher withholds all regulatory feedback until he completes the cycle with a confirmation ('Okay').

There are clear comparisons to be drawn between the studies cited here and the two functions of regulatory questioning – constructive and deconstructive – that were first highlighted in Section 6.2 above. These similarities are perhaps best demonstrated by referring to an extended QRF cycle that was observed in WM8_3a. The teacher begins this cycle with a closed question, probes, modifies, probes again and then modifies one final time after which point a student is invited to act as an instructional resource for the rest of the group. In a way similar to Nathan and Kim's example, regulatory feedback is withheld until the end of the cycle after which point the teacher confirms and reformulates. Not surprisingly, the structure of this cycle is unique in as far as the pattern was observed only once in the entire data set. More important, however, is the observation that this cycle provides a clear example of the two-way contingent support that teachers provide to students in an attempt to keep their learning on track.

Given that teachers tend to withhold all regulatory feedback whilst they keep learning on track with constructive and deconstructive micro regulation, it is clear where the focus for future research should lie. A future focus should be less on regulatory feedback, which is often simply evaluative, and more on regulatory questioning. Future research might therefore look at the cognitive level of teacher questioning and the emerging patterns of constructive and deconstructive micro regulation. The pattern that emerges in the cycle referred to above, for example, is represented graphically in Figure 13.
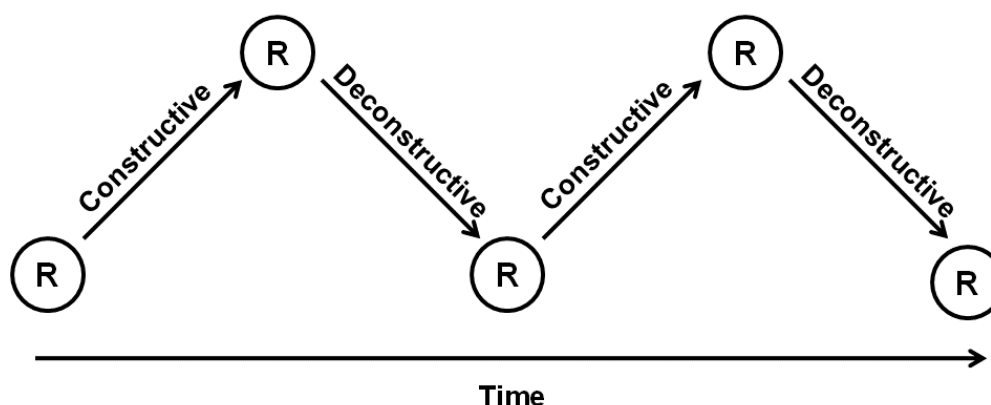
Figure 13   Pattern of constructive and deconstructive micro regulation

In Figure 13, 'R' represents the student response whilst the directional arrows represent the upwards and downwards shift of constructive and deconstructive micro regulation respectively. It is clear from this graphical representation that this extended cycle comprises a combination of upwards and downwards shifts in the cognitive complexity of the teacher's questioning; the teacher is clearly engaged in both probing and modifying the questioning in an effort to ensure that student learning is kept on track. Of course, this remains a rather rudimentary way of representing micro regulation. A more advanced conceptual model might for example attempt to incorporate the four levels of elicitation as identified by Mehan (1979), or indeed the six levels identified in Bloom's taxonomy (1956). If a predominance of downward movement (in the form of deconstructive questioning) are observed then future research might also consider consider the weaknesses in teacher questioning such as the 'premature modifier' or the 'guessing game' that were identified in this study (see Section 5.5.2). Rudimentary though this conceptualisation of the two functions of regulatory questioning may be, it nonetheless presents a number of possibilities for examining critically the practice of teachers.

A tool for improving practice: in the extended QRF cycle referred to above (taken from WM8_3a) the teacher initiates a cycle and then alternates between constructive and deconstructive regulatory questioning before completing the cycle by providing regulatory feedback. It is clear how this teacher adjusts the cognitive complexity of his questioning in a way that is contingent upon the response of the student; there are both upward and downward shifts in this cycle in an effort to ensure that the students' understanding is moved forward and that no students are left behind. An attempt was subsequently made in Figure 13 to represent visually the combination of constructive and deconstructive regulatory questioning as observed in this sequence. This was done with the use of directional arrows. It now becomes possible to build upon this concept in a way that may have an impact on both the design of initial teacher training courses and on-going professional development. Specifically, a tool may be developed that could help teachers to evaluate critically their own practice. The Regulatory Questioning Matrix (Figure 14) is a simple tool that helps teachers to

visualise the way they regulate student learning on a fine-grained micro level. In doing so, teachers are able to analyse, reflect upon and ultimately improve their practice.
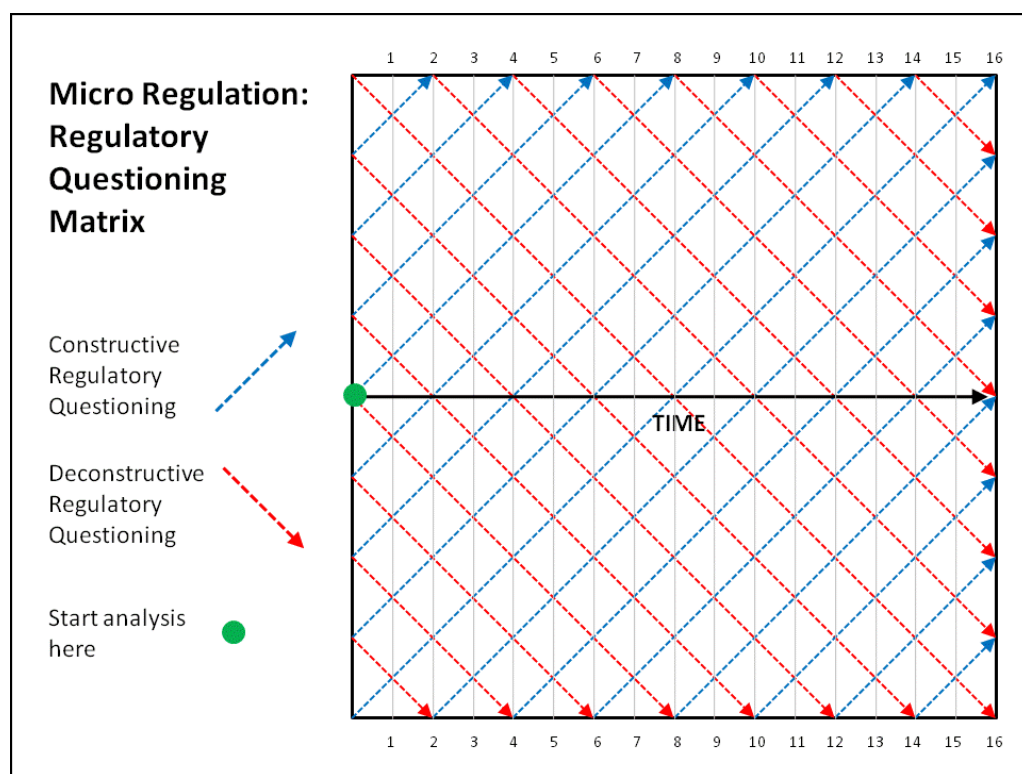
Figure 14   Regulatory Questioning Matrix

Each grid, or Matrix, is designed to accommodate one extended QRF cycle. Briefly, the Matrix works in the following way. First, the analysis begins at the green dot from the moment the QRF cycle is extended. The dashes are filled in depending on the type of regulatory questioning identified. If the regulatory questioning is constructive (the existence of probing questions) the upwards blue dash is filled in, likewise if deconstructive regulatory questioning is identified (modifiers) the downwards dash is filled in. As soon as the teacher employs regulatory feedback the cycle ends and the analysis is complete. The vertical grey lines have been numbered to make it possible to identify easily how many moves are made in the extended QRF cycle.

To some extent, the Matrix goes beyond the original focus of this thesis, which was to bring a better understanding of how learning is regulated by the teacher at a fine-grained micro level. The Matrix represents an extension of the author's current thinking and as such is subject to future development and research. However, it is worthwhile touching briefly here on how it might impact upon the practice of teachers. First, teachers may be able to use the Matrix to identify the extent to which their practice adheres to what has been termed the 'recitation script'. The absence of extended QRF cycles might suggest that teachers are making too much use of closed questions requiring brief

student responses. Such an observation might encourage teachers to consider the extent to which the opportunities students have for actively participating in whole class discussion may be being constrained. The Matrix might also help teachers to identify the extent to which they adjust contingently the cognitive complexity of their questioning in response to whether students respond inaccurately or incorrectly. For example, do teachers increase the cognitive complexity of their questioning when students' responses are accurate and do they decrease the cognitive complexity of questions when students' responses are incorrect or only partially correct? This, in turn, may help teachers to identify whether there is a predominance of constructive or deconstructive questioning, as well as consider whether there are any weaknesses in their questioning. Finally, using the Matrix to analyse QRF cycles over the course of several lessons may also help teachers to examine the extent to which their practice is developing. Ultimately, this tool may help teachers to consider how they are ensuring the learning of *all* students is kept on track.

6.5   Bridging the gap between the three dimensions of interactive regulation

The purpose of this penultimate section is to step back and consider some of the main arguments in more detail, in particular the relationship micro regulation has to other dimensions of interactive regulation. In the introduction to this study, three types of regulation as identified by Allal (1988a) were discussed. These three types – proactive, interactive and retroactive – make up the broad theoretical framework of the regulation of learning. The focus for this study was on interactive regulation which Allal and Lopez (2005, p. 245) conceptualise as contributing to the 'progression of student learning by providing feedback and guidance that stimulate student involvement at each step of instruction'. Interactive regulation is effectively concerned with the techniques that are employed by both teachers and students to facilitate the visual navigation through instructional activities. As was made clear in the introduction, this study considers formative assessment and self-regulated learning (together with micro regulation) dimensions of interactive regulation. What follows is a discussion of how the author, as a result of the study that has been carried out here, now believes these three dimensions may fit together.

Distinguishing micro regulation from formative assessment: it was, of course, formative assessment, and particularly the difficulty in conceptualising it, that served as a starting point for this study. In the introduction, the following definition of formative assessment posited by Dylan Wiliam was drawn upon:

> An assessment functions formatively to the extent that evidence about student achievement is elicited, interpreted, and used by teachers, learners, or their peers, to make decisions about the next steps in instruction that are likely to be better, or better founded, than the decisions they would made in the absence of that evidence.

(Wiliam, 2011, p. 43)

Formative assessment may happen at different points in the teaching and learning process. In an earlier paper, Wiliam (2006) identified three types of formative assessment: long-, medium- and short-cycle. Long-cycle takes place across school terms even school years and has a length from four weeks upwards, medium-cycle takes place across teaching units and has a length of between one to four weeks, and short-cycle takes place within and between lessons with a length of five seconds to two days. Formative assessment involves the use of evidence of student understanding to adapt *subsequent* teaching and learning; the central tenet of Wiliam's definition is that assessments function formatively when the evidence that they have elicited is used to make better decisions about the next steps in instruction.

A tight conceptualisation of formative assessment was necessary as this opened the way for research to be carried out into a further dimension of interactive regulation, one that might be considered a precursor to formative assessment. This particular dimension of interactive regulation, what here has been termed micro regulation, functions prior to and below the level of formative assessment. One outcome of this study was the following definition of micro regulation:

> Teacher-led micro regulation involves immediately responding to what students say and do during an instructional activity through the continuous adjustment of both questioning and feedback mechanisms in an effort to ensure that learning is kept on track.

From this definition, it is clear that micro regulation involves responding to students on a more immediate, real-time level. As Wiliam above suggests, the short cycle of formative assessment may function from five seconds upwards, however the cycle of micro regulation is even more immediate than this. The distinction between formative assessment and micro regulation therefore lies in the timing of the teachers' response: formative assessment involves the use of evidence of student understanding to adapt *subsequent* teaching and learning, whilst micro regulation involves the immediate use of evidence to keep student learning on track.

Although there is a clear difference between the two concepts in terms of timing, there also appears to exist a two-way relationship between micro regulation and formative assessment. First, evidence of student understanding that is elicited through micro regulation may be used in a formative way to make better (or better founded) decisions about the next steps in instruction. Second, these next steps in instruction in whatever form they take (in terms of the activities that the teacher sets up) will themselves inevitably involve micro regulation and the various mechanisms that it comprises. Micro regulation plays a key role in the teaching and learning process because it allows the teacher to gain a rich picture of the pupils' developing understanding. Micro regulation is therefore of primary importance for the teacher as the evidence of student understanding that is elicited through this process enables him or her to adapt instruction to better meet the needs of the learners.

Understanding teachers' formative intentions: as Wiliam (2006) points out, 'assessments are formative … only if something is contingent on their outcome, and the information is actually used to alter what would have happened in the absence of the information'. It is clear, therefore, that whilst micro regulation may be present (and this study has found it to be a continuous feature of the whole class discussion activity) it does not necessarily follow that the information gathered will be used formatively to adapt the next stages in instruction. The decision that was made in this study to focus on micro regulation was based to some extent on strong evidence that suggested that there exists a weakness in the development of teachers' formative assessment practice. As such, it was considered important to examine that particular dimension of interactive regulation that occurs prior to formative assessment as the evidence of student understanding that is elicited and used at this point in the process may actually serve to help teachers to make better decisions about their next steps in instruction. It follows, therefore, that the way teachers regulate learning at a fine-grained micro level may actually hold the key to understanding teachers' formative intentions. It must be conceded that one of the limitations of this study was the decision taken not to interview the participants, a decision was based on a number of factors (discussed in Section 3.8.1). It is clear, however, that interviewing the participants subsequent to the classroom observations might have added an extra and important dimension to this study because it would then have been possible to identify teachers' formative intentions.

Research into formative assessment continues to be carried out along common and well-trodden paths, mainly focusing on the effectiveness and implementation of formative assessment as well as the development of innovative tools and techniques.   For example, Kingston and Nash (2011) have questioned the efficacy of formative assessment whilst Hollingworth (2012) has examined the challenges associated with implementing formative assessment into education institutions. Research is also ICT-related with Bibles (2011) recently studying the effects of using a classroom response system, Stull *et al.* (2011) looking at the effect on academic achievement of pre-lecture online chapter quizzes and student-initiated inquiries and Olofsson (2011) researching the use of reflective peer-to-peer technology-enhanced learning. However, it is argued here that rather than focusing on the development of formative assessment tools or techniques (which are often elaborate means of eliciting evidence of student understanding), future research should concentrate on developing a better understanding of the relationship between micro regulation and formative assessment. After all, in the context of whole class discussion at least, it is by regulating learning at a fine-grained micro level that the evidence of student understanding elicited may subsequently be used in a formative way. There would therefore appear to be two main strands that need to be considered when examining this relationship: the first concerns the techniques of micro regulation themselves and the quality of the evidence of student understanding that they are able to generate, whilst the second concerns how the evidence elicited is used formatively.

Regarding the quality of the evidence elicited, there is a well-known body of research carried out by Rowe (1974) that focuses on 'wait time'. Rowe identified two types of wait-time. 'Wait time 1' happens when the teacher pauses after asking a question and 'wait time 2' happens when the teachers pauses and reflects following the student response. Rowe found that during classroom discussion, teachers typically waited less than one second before asking a follow up question if an answer to the original question was not forthcoming. Increasing wait time led to a number of changes in the quality of classroom discourse including longer answers that are better supported by evidence, a decrease in students' failure to respond, an increase in student confidence and an increase in student questions. Focusing on wait time represents a possible way of improving the quality of the evidence generated whilst student learning is being regulated at a micro level.

What would appear to be of primary importance, therefore, is action on the part of the teacher to improve the quality of the evidence of student understanding. As this study has shown, this is achieved using the regulatory questioning techniques. Once evidence of student understanding has been elicited, it becomes in the main the task of the teacher to decide what to do with it; it is at this point that the evidence may be used formatively. This evidence will be used in a formative way only when the teacher's response is to adapt the next steps in instruction. Of course, adapting the next steps in instruction is not an inevitable outcome for, as Black and Wiliam point out, the best course of action may be 'that which the teacher had intended prior to the elicitation of evidence' (2009, p. 10). In such cases, the elicitation of evidence serves to enable teachers to make decisions that are 'better founded than the decisions they would have taken in the absence of the evidence that was elicited' (*ibid.*, p. 10). The relationship between micro regulation and formative assessment is therefore to be understood in terms of the extent to which the evidence elicited by the first is used to adapt the next steps in instruction.

Self-regulated learning – the third and final dimension of interactive regulation: the purpose of the final part of this section is to examine briefly how self-regulated learning may relate to the other dimensions of interactive regulation. Whilst self-regulated learning has largely remained outside the conceptual framework of this study, it is becomes necessary to return to this concept not least because as, Butler and Winne (1995, p. 245) point out, 'the most effective learners are self-regulating'. Furthermore, Butler and Winne (1995) link self-regulated learning with other forms of regulation, the sources of which are the students' teachers, peers, curriculum materials and assessment instruments. These authors refer to the notion of co-regulation of learning which results from the joint influence of student self-regulation and of regulation from teachers and peers. Self-regulated learning is conceptualised by Zimmerman (1998) as a three-part cyclical process of forethought, performance and self-reflection. During this process, students need to be metacognitively, motivationally and behaviourally active during the learning process (Azevedo *et al*, 2011). In practice, this means that students must develop the ability to 'determine whether they understand what they are learning ... modify their plans, goals, strategies, and effort' (Azevedo *et al*,

2010, p. 225). The central tenet here is that students must take an active role in their own learning because, as Harlen and James (1996) point out, teachers cannot learn for them.

One of the main functions of formative assessment is arguably to help students to become more active in their own learning. This comes across clearly in the work of Marshall and Drummond, whose notion of the spirit of formative assessment is expressed as 'high organisation based on ideas', the underpinning principle of which is the promotion of student autonomy (2006, p. 137). It also comes across in Black and Wiliam's (2009) five formative assessment strategies, each of which clearly necessitate a more active approach from the student. How these formative assessment strategies are implemented (in terms of the nature of the learning activities that are set up) is likely to have an impact on the extent to which self-regulation is constrained or facilitated; as Marshall and Drummond (2006, p. 134) point out, 'certain classroom activities afford more opportunity for pupils to develop independence than others'. Wiliam (2011, pp. 152 – 157), for example, proposes a number of possible activities that may be set up as a way of implementing the formative assessment strategy that is specifically concerned with activating students as owners of their own learning. These include the use of traffic lighting, learning portfolios and learning logs. In encouraging students to reflect upon their learning in this way, such activities are likely to have an impact on the ability of students to self-regulate. The significant factor here lies in the nature of the activity that the teacher sets up; Marshall and Drummond are quite justified when they note that the choice of activities 'affects all subsequent interactions' (*ibid.*, p. 147).

This penultimate section has begun to consider the relationship between the three dimensions of interactive regulation. Whilst developing a fuller understanding of the relationship between micro regulation, formative assessment and self-regulated learning is beyond the present scope of this study, it has been possible to begin to explain how the three dimensions interact with, and impact upon, one another. In doing so this study has brought a better understanding of the theory of interactive regulation.

6.6 Impact on the author's own professional development

Finally, speaking as author, it is worth touching briefly on the significant impact that this research has had on my own teaching practice. The impetus for the study came originally from a difficulty both in conceptualising formative assessment and in incorporating it into my teaching practice. This study has helped me to establish a clear rationale for the way I teach in the classroom, with particular emphasis on how, and the extent to which, I attempt to regulate student learning on a micro level. The pressure to incorporate innovative and what from my experience ultimately turn out to be episodic formative assessment practices into my day-to-day teaching has been removed; for me the focus has now shifted firmly onto the continuous regulation of the learning process that takes place

during the instructional activity itself through the micro regulation. As a result, I am now far more conscious of the potential for weakness in the questioning techniques that I employ and the extent to which these may restrict, rather than encourage student participation. I am also aware of the existence of the three-part QRF cycle and the importance of extending this wherever possible in an effort to break out of the recitation script. I am also more conscious of the importance of using the evidence of student understanding that is elicited during the process of micro regulation in a responsive way to adapt the next stages in my teaching; this, for me, has become the essence of formative assessment. Furthermore, the importance has also begun to emerge of ensuring that these next steps in instruction are able to both facilitate and develop the ability in the students to regulate their own learning. This, then, is the direction in which my own teaching practice has begun to develop in an effort to ensure that student learning is kept on track; it is also the direction that any future research that I decide to carry out will inevitably take.

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Appendices

Appendix 1   Annotated bibliography

The annotations made in this bibliography should give the reader an insight into the author's thought processes and how the argument for the regulation of learning has been constructed; many of the annotations are written in note (almost diary) form in the first person.

1. Kulhavy, R.W. (1977) 'Feedback in written instruction', *Review of Educational Research*, vol. 47, no. 1, pp. 211 – 232. (Pages 3 -5).

2. Kulik, J. A. & Kulik, C.C. (1988) 'Timing of feedback and verbal learning', *Review of Educational Research*, vol. 58, no. 1, pp. 79 – 97. (Pages 6 - 7).

3. Sadler, D. R. (1989) 'Formative assessment and the design of instructional systems', *Instructional Science*, vol. 18, pp. 119 – 144. (Pages 8 - 11).

4. Tunstall, P. & Gipps, C. (1996a) 'Teacher feedback to young children in formative assessment: a typology', *British Educational Research Journal*, vol. 22, no. 4, pp. 389 – 404. (Pages 12 - 14).

4. Tunstall, P. & Gipps, C. (1996b) ''How does your teacher help you to make your work better?' Children's understanding of formative assessment', *Curriculum Journal*, vol. 7, no. 2, pp. 185 – 203. (Pages 12 - 14).

5. Hattie, J. &Timperley, H. (2007) '*The power of feedback'*, Review of Educational Research, vol. 77, no. 1, pp. 81 – 112. (Pages 15 - 18).

6. Black, P. & Wiliam, D. (1998a) 'Assessment and classroom learning', *Assessment in Education*, vol. 5, no. 1, pp. 7 – 74. (Pages 19 - 27).

7. Sebatane, E. M. (1998)'Assessment and Classroom Learning: a response to Black & Wiliam', *Assessment in Education: Principles, Policy & Practice*, vol. 5, no. 1, pp. 123 — 130. (Pages 28 - 29).

8. Perrenoud, P. (1998) 'From formative evaluation to a controlled regulation of learning processes. Towards a wider conceptual field', *Assessment in Education: Principles, Policy and Practice*, vol. 5, no. 1, pp. 85 – 102. (Pages 30 - 34).

9. Perrenoud, P. (1988) 'La part d'évaluation formative dans toute évaluation continue'. Available at: http://www.unige.ch/fapse/SSE/teachers/perrenoud/php_main/php_1988/1988_05.html. (Accessed: 12 July 2010). (Pages 35 - 37).

10. Perrenoud, P. (1991b) 'Pour une approche pragmatique de l'évaluation formative', *Mesure et Evaluation en Education*, vol. 13, no. 4, pp. 49 – 81. Available at: http://www.unige.ch/fapse/SSE/teachers/perrenoud/php_main/php_1991/1991_12.html (Accessed: 12 July 2010). (Pages 38 - 43).

10. Perrenoud, P. (1991c) 'Towards a pragmatic approach to formative evaluation', in Weston, P. (ed.) *Assessment of Pupils Achievement: motivation and school success*. Amsterdam: Swets and Zeitlinger, pp. 79 – 101. (Pages 38 - 43).

11. Black, P. & Wiliam, D. (2009) 'Developing the theory of formative assessment', *Educational Assessment, Evaluation and Accountability*, vol. 21, no. 1, pp. 5 – 31. (Pages 44 - 50).

12. Torrance, H. & Pryor, J. (2001) 'Developing formative assessment in the classroom: using action research to explore and modify theory', *British Educational Research Journal*, vol. 27, no. 5, pp. 615 – 631. (Pages 51 - 54).

13. Coffey, J. E., Sato, M. & Thiebault, M. (2005) 'Classroom assessment – up close and personal', *Teacher Development*, vol. 9, no. 2, pp. 169 – 184. (Pages 55 - 57).

14. Marshall, B. & Drummond, M. J. (2006) 'How teachers engage with Assessment for Learning: lessons from the classroom', *Research Papers in Education*, vol. 21, no. 2, pp. 133 — 149. (Pages 58 - 61).

15. Poehner, M.E. & Lantolf, J.P. (2005) 'Dynamic assessment in the language classroom', *Language teaching research,* vol. 9, no. 3, pp. 233 – 265. (Pages 62 - 67).

16. James, M. & Pedder, D. (2006) 'Beyond method: assessment and learning practices and values', *Curriculum Journal*, vol. 17, no. 2, pp. 109 – 138. (Pages 68).

17. Webb, M.E. (2009) 'Technology in support of formative assessment in pedagogy', WCCE 2009 – Education and Technology for a Better World. Bento Gonçalves: Brazil, 27 – 31 July.

18. Webb, M.E.& Jones, J. (2009) 'Exploring tensions in developing assessment for learning', *Assessment in Education: Principles, Policy and Practice*, vol. 16, no. 2, pp. 165 – 184. (Pages 73).

1. Kulhavy, R.W. (1977) 'Feedback in written instruction', *Review of Educational Research*, **vol. 47, no. 1, pp. 211 – 232.**

Conceptual Framework – use these questions to demonstrate how formative assessment has become separated from instruction / teaching.

What aspects of formative assessment are being discussed? E.g. feedback, peer assessment, self-assessment

When does the formative assessment take place? E.g. synchronous / asynchronous, proactive, interactive, retroactive

Why does the formative assessment take place? E.g. correction, close the gap

How does the formative assessment take place? E.g. written, spoken

Who does the formative assessment involve? E.g. teacher => student, student => student

Where does the formative assessment take place? E.g. classroom / laboratory

Begin my narrative with Kulhavy. I am telling the story of how AforL became separated from instruction.

Kulhavy, 1977

Thirty years ago Kulhavy (1977) wrote on the subject of feedback. Kulhavy's work is important as the language he uses demonstrates clearly the stage at which the thinking at the time had got to.

Kulhavy's work is often cited as being concerned with feedback that is right or wrong (Sadler, 1989). On closer inspection there is, however, much more to what he was saying on the subject of feedback than a simple 'yes-no' format.

Kulhavy uses the term 'feedback' to describe 'any of the numerous procedures that are used to tell a learner if an instructional response is right or wrong'.

Kulhavy treats feedback as a 'unitary variable' and gives a continuum from simple 'yes – no' feedback to 'substantial corrective or remedial material information that may extend the response content, or even add new material to it'.

Although we are still clearly in the realm of deciding if a response is right or wrong, Kulhavy asserts here that feedback does not merely take the form of yes or no but can be far more detailed.

Here Kulhavy not only talks about feedback being advanced (beyond right – wrong which is so often attributed to him) but he also talks of feedback as being an extension of instruction:

'as one advances along the continuum, feedback complexity increases until the process itself takes on the form of new instruction [rather than just correctness].

For some time I had been pondering the difference between formative assessment and instruction; a separation of FA and instruction (and the formulation of a standalone theory for FA) did not seem appropriate even though this is what many commentators appeared, and still appear to be doing. *Here Kulhavy accepts that feedback can also be instruction – there is a clear difficulty of separating feedback from instruction. However, he goes on to note that in his paper feedback is treated as a 'unitary concept'. In doing so he has effectively separated it from instruction.*

Kulhavy differentiates feedback and reinforcement: scholars have worked overtime to fit the round peg of feedback into the square hole of reinforcement'. Kulhavy gives the example of a laboratory animal, derived of food, who is made to perform a task for food. When the task is performed correctly the animal is fed. Food, then is reinforcing a positive response; for Kulhavy reinforcement acts on correct responses. Kulhavy cites research that shows that feedback does not have its greatest effect on correct answers and in so doing distinguishes it from reinforcement.

Kulhavy then introduces the notion of 'delay'. He gives a fairly tenuous argument that reinforcement needs to come immediately after the response whilst feedback which is delayed for a day or more 'leads to significant increases in what students remember on a retention test'. Kulhavy clearly continues to distinguish feedback from reinforcement; in his opinion feedback does not reinforce.

Kulhavy notes that some studies combined what he called an 'extrinsic reinforcer' with feedback but that these extra rewards (such as money) had no significant effect. *This should be linked to Tunstall and Gipps or Hattie and Timperley who look at feedback that is directed towards the self.*

Kulhavy introduces the idea of 'presearch availability', in other words the answers, or the ease with which the answers can be located! *This is lower order thinking at its best. Can Bloom be introduced here? Not surprisingly, when presearch availability is high, students copy the answers whereas when it is low they study more the material before answering. It is clear that this paper remains very much in the realm of correct answers. This raises the question of how we have moved towards higher order thinking.*

'Subjects in the PEEK groups were repeatedly admonished not to look at the feedback [answers] before constructing their response'. *Again, this is lower order thinking and the use of 'admonished' demonstrates how far we have come.*

Kulhavy then attempts to explain how feedback facilitates learning (*still right – wrong).* He says that feedback functions in two ways:

1. As a device for acquiring data about how accurately a system is working
2. As a means of identifying and correcting error messages

Clearly what is missing from this notion of feedback is the idea of 'where to next' or 'closing the gap'. Perrenoud would say that this is not an adequate explanation of how feedback works as the student remains a 'black box'.

Kulhavy also notes that feedback is useless if the actual instruction did not serve the intended purpose – in other words the student has not learnt sufficiently in the first place. He notes that 'feedback performs its corrective function effectively only if mistakes result from faulty interpretation, not lack of understanding'. *It appears again that feedback has been separated from instruction (perhaps unwittingly). Many studies at around this time were flawed because adequate instruction was not in place; the subjects did not understand what they were being asked to learn and the task became one of pure memory (e.g. nonsense lists).* Hattie and Timperley also note something similar about feedback coming second and not working in a vacuum.

Kulhavy then moves on to talk about feedback following correct or incorrect answers. He mentions the 'terminal goal of transferring the information from text to learner' which is another interesting 'empty vessel style' quote. He asserts that 'supplying feedback after an error is probably far more important than providing confirmation'. He notes that when an answer is wrong the aim is to 'not only to eliminate the wrong answer, but also to substitute correct information in its place'. He also cites research that concludes that students that are given the right answer (when answering wrongly) rather than a simple yes or no do better.

Another assertion is that a delay in providing feedback is useful as it gives the student the chance to forget the wrong answer. Kulhavy suggests that the chances of repeating an initial error are lower when feedback is delayed for 24 hours.

Kulhavy then attempts to include what he notes is 'a most important feature'. The student! Students being active participants was something that was getting a lot of attention at the time. He notes that learners are 'sophisticated test performers' and that an 'acute dichotomy [of right – wrong] makes little sense to them. Unfortunately this line of thought does not appear to have been developed further; the paper remains in the domain of feedback that effectively corrects right – wrong responses and feedback that is separated from instruction.

Kulhavy concludes that 'feedback works to increase what a person learns from an instructional unit', that presearch availability should be low, instruction should be accessible, feedback is more effective on wrong answers. He did acknowledge that feedback can act as further instruction but does not explore this further.

Finally, and most interestingly, he notes that feedback should be given 'as often as possible during the course of the lesson'. This last is not examined in any greater details but suggests, almost by default that feedback should not be separate from instruction (process not practice).

2. Kulik, J.A. & Kulik, C.C. (1988) 'Timing of feedback and verbal learning', *Review of Educational Research*, **vol. 58, no. 1, pp. 79 – 97.**

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KK begin by referring to Pressey who, in the 1920s was one of the first to conduct experiments on the effects of feedback. Pressey believed that the long interval between instruction and feedback has a negative effect on learning. KK say that, according to Pressey, tests taken in the answer-until-correct format not only evaluated students but also taught them. So, in the 1920s feedback was clearly a part of instruction and not separated from it.

KK note that research in the 1950s into the effects of immediate feedback concentrated on three areas: applied studies in classrooms, experiments on acquisition of test content and experiments on list learning. Although KK cite Kulhavy they do not draw the same distinction as he does regarding the difference between feedback and reinforcement, noting that Skinner was involved in work on both.

Pressey reported positive results for immediate feedback in applied classroom studies. KK also cite Boersma (1966) who, in applied studies gave immediate feedback and feedback after 8 seconds – however their results are not reported.

KK refer to results from acquisition of test content where delayed feedback is considered more effective than immediate feedback. They refer to Kulhavy's theory of interference-perseveration where originally incorrect responses are forgotten over time. List learning experiment reported by KK feature delays of 0, 3 and 6 seconds.

KK do mention that the level of material studied varies in difficulty however what remains constant is that the actual instruction is not deemed important enough for consideration (participants are generally simply given things to learn) and the response remains in the realm of correct – incorrect.

KK's research involved comparing the effects of delayed versus immediate feedback. They gathered together a number of reviews by searching two databases and the keywords 'knowledge of results' and 'education'. This gave them 288 sources of which 53 were chosen for their review based on three criteria: quantifiable results, immediate and delayed feedback groups, and the availability / retrievability of articles. Each of the 53 studies was then coded using 12 variables as a basis. Not one of the variables referred to the actual instruction given; clearly the feedback is completely separate from the instruction – there is hence no need to study the instruction. KK coded each of their 53 sources as an effect size (the difference between the mean scores of two groups divided by the standard deviation of the control group).

For applied studies immediate is better than delayed (9 of the 11 studies found this), for test content delayed is better than immediate (13 of the 14 studies), for lists immediate is better than delayed (16 of the 27 studies). KK found that 'whether feedback is given after an item or after a whole test made a difference in list-learning studies'.

KK mention external and internal validity: laboratory experiments are high in internal validity whilst classroom studies are high in external validity. They note that some applied studies have been criticised for lack of experimental control however these studies do at least resemble what actually happens in a real-world situation, even though the correct – incorrect element still exists.

KK conclude that 'teachers who want their quizzes to help students learn should try to arrange conditions so that students receive feedback as quickly as possible after they answer quiz questions'. Also, that 'to delay feedback is to hinder learning'.

It is surprising that in the 1980s there should be a need for this type of report; clearly not much progress has been made since the 1950s. Whilst the level of material may differ in difficulty all of these studies have several things in common: the response given by the student rests in the realm of knowledge of results, the feedback given is on the basis of correct – incorrect, it does not attempt to close the gap and, therefore, does not purport to be actual instruction. If the studies are to remain in the laboratory then feedback clearly has to be seen as a separate entity, remaining as it does, completely separated from feedback.

Up until this point there appears to be a strange silence surrounding the ability of feedback to teach; it seems that feedback has been separated from instruction in order for experiments with high levels of internal and external validity to be conducted.

3. Sadler, D.R. (1989) 'Formative assessment and the design of instructional systems', *Instructional Science*, **vol. 18, pp. 119 – 144.**

Sadler's main premise is that it is the job of the teacher to develop the skills of self-monitoring in his students and that this self-monitoring should take place during the actual production of work; self-monitoring is therefore an on-going process and similarities can be drawn with the on-going process that formative assessment should take.

Sadler argues that a transition is needed from feedback to self-monitoring and that this transition depends on three conditions in as far as the learner has to:

- possess a concept of the standard
- compare actual performance with this standard
- take appropriate action to close the gap

Sadler organises the rest of his article on these three conditions arguing that they need to be satisfied simultaneously. He talks about 'control during production' (self-regulated learning) which he calls a micro process carried out in real-time.

Sadler cites Kulhavy as saying that feedback is 'any of the numerous procedures that are used to tell a learner if an instructional response is right or wrong'. Sadler suggests that we have now moved beyond this stimulus-response approach towards and acceptance that student development is 'multi-dimensional rather than sequential' and that 'it is more appropriate to think in terms of the quality of a student's response or the degree of expertise than in terms of facts memorized'.

Sadler begins his argument (for self-monitoring) by defining and giving examples of what he means by qualitative judgements (clearly diametrically opposed to judgement of the correctness of a response) which have one or all of five characteristics:

multiple criteria

he makes the distinction between fuzzy and sharp criteria

notes that usually only a small subset of criteria are in play at any given time

notes the difficulty of judging quality and that it is often meaningless to speak of correctness

that when a mark or score is assigned it is done so after the quality judgement has been made (qualitative judgements are not arrived at by counting things).

Condition 1:

Sadler then begins his argument proper by invoking the first of his three conditions: communicating standards to students. He argues that the student must 'come to know what constitutes quality'. Sadler refers to two methods of specifying standards: descriptive statements and exemplars.

Condition 2:

The second condition: making multi-criterion judgements. Sadler argues that 'students have to be able to compare their actual levels of performance with these standards' and that in order to do so they must be competent in making objective multi-criterion judgements.

Sadler invokes the notion of manifest and latent criteria:

manifest criteria are those which are constantly attended to either while a piece of work is being produced or while it is being assessed

latent criteria are those in the background, triggered or activated as occasion demands by some (existential) property of the work that deviates from expectation.

In latent criteria we have something that appears to be similar to Perrenoud's call to constantly rectify the aim and Black and Wiliam's contingent.

For Sadler self-monitoring is all about the ultimate submergence of these criteria so that they are taken for granted and no longer need to be stated explicitly to the student. Submergence, as a process, is a key concept but whereas for Sadler it is about the use of criteria in the larger field of self-monitoring, for the author submergence represents a state where formative assessment is no longer seen as an optional add-on to the process of teaching.

Sadler's aim is to reduce the reliance by the student on the teacher: 'the necessity to recycle work through the teacher (for appraisal) can be reduced or eliminated only to the extent that students develop a sense of quality'. The author's position is that the teacher remains ultimately responsible for the learning that takes place in the classroom and that reliance upon the teacher is not to be seen in a negative light.

Sadler goes on to say that knowledge of the criteria used to evaluate a piece of work is an 'inductive process' which he calls 'guild knowledge'.

Sadler talks about the variation in quality of students' responses and puts this down in part to deficiencies in task definition. Another possible reason he says is that the terms used in defining the task are not understood by the teacher which suggests that the initial instruction was at fault. Sadler says that 'the teacher might mistakenly assume that all students know what a theme is' [in his example of English composition] especially if the concept of 'theme' was taught in a previous year. Just when the reader might expect a reference to teaching and the way this is inextricably linked to formative assessment, Sadler distances himself from this by noting the importance of 'joint teacher-learner assessment' to 'test the adequacy of task specifications and modifying them if necessary for future use'. (Formative) assessment remains completely separate from the teaching.

Condition 3:

'The third condition for self-monitoring to occur is that students themselves be able to select from a pool of appropriate strategies to bring their own performance closer to the goal'. Sadler asserts that 'the guild knowledge of teachers should consist less in knowing how to evaluate student work and more in knowing ways to download evaluative knowledge to students'. Students therefore need to be given strategies.

He suggests that merely giving information about the gap will be insufficient in closing the gap and that different options need to be considered. This is his way of introducing the concept of peer assessment as the material of peers is readily available. However he notes that the labour intensive nature of traditional approaches to formative assessment such as peer assessment explains teachers' reluctance to engage with it: as he says, '*There is simply not the time to do it'.*

Sadler concludes by reasserting the approach of developing in students the skills necessary to evaluate their own work, especially whilst they are producing it. He notes that the transition from teacher feedback to self-monitoring is not 'something that comes about automatically which is clearly one of the main problems in our current view of formative assessment.

Unfortunately, here it is a case of 'doing' formative assessment. Formative assessment is a series of techniques that can be adopted by teachers if they choose to do so. Being so clearly separated from instruction (Sadler makes no reference whatsoever that formative assessment could in fact be instruction in itself) and being so time consuming what is the motivation to adopt these techniques? Sadler insistence on self-monitoring as an on-going process, a sort of holy grail at which formative assessment is aimed is an interesting one in as far as it alludes to the way that formative assessment should be seen as a process and not a technique.

Sadler may be on the right track as far as moving away from the traditional notion of providing feedback that assesses students work as correct or incorrect. He suggests an approach that requires students to develop self-monitoring skills (independent of the teacher) especially during the

actual production of work rather than simply relying on the qualitative judgements of their teachers. It would be difficult to refute the importance of students actively engaged in regulating their work as they produce it; this is much valued by teachers. The process of self-monitoring is Sadler's answer to the difficulties of incorporating formative assessment into teaching. He attempts to get around the many difficulties teachers face in using formative assessment by arguing that the ultimate goal is for the students themselves to take ownership. He advocates the use of peer assessment as a technique but does accept the time needed to follow it through.

Sadler's argument is convincing in as far as no teacher would argue against the fact that the more students self-monitor their work during it production the better that work will be. His insistence on self-monitoring being an on-going process is also a sound one. The formative assessment techniques which he refers to in his article are just that; techniques (and therefore separate) and as long as they remain so they are unlikely to become fully integrated into the teaching process.

The author's argument is that when formative assessment is seen as one part of the on-going process of regulating learning (and in no way separate from teaching) then it is no longer becomes a case of finding time to 'do it'.   Sadler's belief that 'the traditional definition of feedback is too narrow to be much use' is not something that the author would argue with. Where he does part company is how to expand this definition of feedback / formative assessment into something that is workable. For Sadler, it is a transition from teacher feedback to self-monitoring which he sees as an on-going process and one that is fully submerged into the day to day practices of the student. For the author it is also the case of an on-going process requiring full submergence but not one that is limited to the student but one that is enlarged to encompass the interaction between teacher and student to regulate learning.

4. Tunstall, P. & Gipps, C. (1996a) 'Teacher feedback to young children in formative assessment: a typology', *British Educational Research Journal*, **vol. 22, no. 4, pp. 389 – 404.**

Tunstall, P. & Gipps, C. (1996b) ''How does your teacher help you to make your work better?' Children's understanding of formative assessment', *Curriculum Journal*, **vol. 7, no. 2, pp. 185 – 203.**

Continuing the discussion of feedback (before widening the discussion to include other formative assessment techniques as highlighted by BW).

Tunstall and Gipps (1996a) synthesise the theory of formative assessment as developed by Sadler (1989) with their observations of actual teacher feedback given to children of infant school age.

T&G state that formative assessment is 'the process of appraising, judging or evaluating students' work or performance and using this to shape and improve their competence'. They say that this essentially means that teachers use their judgement of students' knowledge or understanding to feedback into the teaching process. This feeding back may be in the form of re-explaining a task/concept, giving further practice or moving on to the next stage.

Clearly for T&G formative assessment is separate from teaching.

In 1993/4 T&G carried out a study in six schools across five London LEAs. Year 1 and 2 teachers and students were involved. The main focus of the research was on students' perceptions of the feedback they received from the teacher. T&G tape-recorded classroom dialogue and also interviewed the teachers and students. 15 visits were made to each school. Interviews with the students lasted 30 – 45 minutes, although it is not clear if these interviews were conducted individually.

T&G created a typology of assessment. They identified, coded and indexed a range of different feedback. To establish the basis of the typology they drew on previous work in assessment and records of achievement work and also drew on the theory of Sadler.

Broadly speaking they established that feedback appeared to function on an evaluative – descriptive continuum. Feedback was essentially of four types (not including what they termed socialisation feedback which was general feedback incorporating messages such as how children were expected to behave) which they termed A, B, C, D.

A = rewarding – punishing

B = approving – disapproving

C = specifying attainment – specifying improvement

D = constructing achievement – constructing the way forward

T&G related Feedback C and D to mastery (behaviourist e.g. pre-specified criteria, sequential goals) and learning (constructivist e.g. pre-specified and emergent criteria, goal setting, self-monitoring, collaboration between teacher and student) goals and related their overall typology to achievement goal theory.

Feedbacks C and D were both deemed to come under the umbrella of formative assessment (Feedbacks A and B were seen as outside formative assessment) which demonstrates that formative assessment is not restricted solely to one particular approach to learning: 'formative assessment can be seen to draw on both behaviourist and constructivist theory' (T&G, 1996b). Perrenoud has stated the same.

T&G (1996b) assert that 'feedback is central in learning, and that systematic study in this area can make an important contribution to the conceptual framework of the relationship between teaching, assessment and learning'. Clearly for T&G assessment is separate from teaching and learning.

T&G synthesise their work with both Kulhavy (1977) in terms of the correction of mistakes and knowledge of results and Sadler (1989) in terms of the use of 'sharp' criteria. These corrective approaches were deemed to accord with Specifying Improvement (C2) of their typology.

The children interviewed were able to describe correction and practice (C2) and constructing learning together (D2).

T&G (1996b) also note the teachers' approaches to 'fostering the transition from feedback to self-monitoring and in so doing agree with Sadler (1989) that this is one of the goals.

Very interestingly, T&G note the confusion that existed in the minds of some students when it was a subject of their work being corrected: 'a number of responses could be interpreted purely as examples of children reporting instructional approaches rather than children's perceptions of formative assessment. This is not surprising given that the ages of the children involved ranged from 5 to 7; confusion between instruction and assessment when the task involves copying (presumably previously incorrect words) from the board. For the purposes of the T&G study, of course, a distinction needed to be made between instruction and formative assessment.

T&G themselves acknowledge the difficulty of distinguishing between instruction and assessment:

> The borderline between what is defined as teaching, feedback and learning strategies is very close indeed in these examples. The search for legitimation of formative assessment in constructivist approaches does mean that activities once defined as teaching or learning strategies are being reconceptualised in assessment terms.

T&G clearly accept that the boundaries are blurred. They are the first authors that seem to have the courage to acknowledge that there is a problem here with the way we are attempting to

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conceptualise formative assessment. When, for example, does formative assessment become instruction? The question that needs to be asked is why do we need to legitimise formative assessment? Perhaps it is because of the huge number of case studies that have reported its efficacy (cause and effect, bring in Perrenoud); perhaps as a result of this it needs to be seen as an objective set of techniques that can be adopted at will. When it becomes possible to 'do' formative assessment, it becomes equally possible to 'not do' it especially when it is seen as separate to teaching. Objectifying formative assessment has effectively separated it from teaching.

T&G should be thanked for being prepared to raise the thorny issue of the place formative assessment should have; many others authors have ignored the issue altogether, preparing to consider it separate from teaching and as a result warranting a theory of its own. T&G have really added to this second group, attempting to produce a typology of something which can only be talked about in research articles; transfer it to a real classroom situation and the problems begin.

T&G (1996b) conclude by stating that:

The 'children's voices demonstrate their understanding of a wide range of teacher feedback in infant classrooms'

'they describe formative assessment in both behaviourist and constructivist modes'

The children 'were able to articulate freely shared, evaluative experiences and self-monitoring strategies'

all learners need the same support: 'praise and reward linked with the recognition of competence (where the learners are), together with the provision of strategies for developing critical appraisal (self-monitoring in order to close the gap).

Why do we continue to consider formative assessment a separate from teaching?

Use the Pryor article who reported the difficulty of teachers who used their model

5. Hattie, J. &Timperley, H. (2007) '*The power of feedback'*, Review of Educational Research, vol. 77, no. 1, pp. 81 – 112.

Conceptual Framework – use these questions to demonstrate how formative assessment has become separated from instruction / teaching.

What aspects of formative assessment are being discussed? E.g. feedback, peer assessment, self-assessment

When does the formative assessment take place? E.g. synchronous / asynchronous, proactive, interactive, retroactive

Why does the formative assessment take place? E.g. correction, close the gap

How does the formative assessment take place? E.g. written, spoken

Who does the formative assessment involve? E.g. teacher => student, student => student

Where does the formative assessment take place? E.g. classroom / laboratory

Hattie and Timperley carried out a very detailed meta-analysis in order to derive effect sizes for the effectiveness of different types of feedback.

H&T conceptualise feedback as 'information provided by an agent (e.g. teacher, peer, book, parent, self, experience) regarding aspects on one's performance or understanding'. They further note that 'feedback is a consequence of performance'. There is no reference here to feedback that 'closes the gap' or feedback that leads to action as noted by Sadler. Feedback in this sense can be formative or not.

H&T's article appears to assume a situation where feedback could be absent and then argues its importance in the teaching process. (Contrast with Sadler who talks about feedback being as important as having a teacher at all). The inclusion of feedback appears to be fairly simple in H&T's terms and, as Black and Wiliam (2009) note, appears to remain at the level of 'dealing with transactions in which a teacher is interacting with the individual student about a piece of written work'.

H&T consider a continuum of instruction and feedback: 'at one end of the continuum is a clear distinction between providing instruction and providing feedback'. They cite Kulhavy who has already been cited above when he talks about feedback 'taking on the forms of new instruction'. H&T then go on to cite Sadler (1989) who of course talks about formative feedback closing the gap between what is understood and what is not. H&T suggest that feedback that closes this gap is feedback that has taken on an 'instructional purpose'.

H&T go on to say that 'feedback has no effect in a vacuum' and that for it to be effective there 'must be a learning context to which it is addressed'. Interestingly, H&T assert that 'it is but part of the teaching process and is that which happens second – after a student has responded to initial instruction – when information is provided regarding some aspect(s) of the student's task performance'. Although H&T allow that feedback can take on instructional purposes it does still appear to be separate from instruction. Feedback therefore is part of the teaching process but is only part of instruction if it closes the gap.

Whilst H&T note that feedback does have the ability to take on an instructional purpose, they do however still appear to be asserting that there is an important divide between instruction and feedback. Black and Wiliam above have used the term 'transaction' to describe the feedback that H&T are referring to. There is an almost behaviourist flavour to this where teaching situations devoid of any feedback can and do exist. Although H&T contend that their focus does not sit with a behaviourist input-output model the terms in which they couch feedback suggest that this is exactly the case.

In their meta-analysis of the effects of feedback, H&T note that lower effect sizes were related to praise, rewards and punishments, whilst higher effect sizes involved' students receiving information about a task and how to do it more effectively'. These effect sizes are comparable to T&G's actual classroom observations where they had also outlines praise and rewards / punishments on one of the spectrum and feedback that closes the gap (and is therefore formative) at the other end.

H&T then appear to further separate instruction from feedback: 'effective teaching not only involves imparting information and understandings to students but also involves assessing and evaluating students' understanding of this information, so that the next teaching act can be matched to the present understanding of the student'. Again there is a real sense of transaction, and of cause and effect and little feeling of the actual interaction that goes on in a classroom in as far as teaching cannot be separated into blocks of instruction followed by blocks of feedback (assessment). This is the way in which feedback is being discussed and is, the author would assert, one of the main reasons why formative assessment remains so underdeveloped in schools: formative assessment remains separated from instruction as opposed to a dynamic, on-going process.

The 'assessing and evaluating students' understanding is H&T assert the 'second part' and as such relates to three major questions:

- Where am I going? (What are the goals?)

- How am I going? (What progress is being made towards the goals?)

- Where to next? (What activities need to be undertaken to make better progress?)

It is not difficult to draw comparisons with Sadler's 1989 model for formative assessment which was itself drawn from the work of Ramaprasad. H&T assert that how effectively these questions are

answered depends on the level at which the feedback operates and then suggest a model of feedback which differentiated four different levels of feedback:

- Task level – information about a task or product, such as whether work is correct or incorrect

- Process level – feedback which is directly aimed at the process used to create a product or complete a task – the processing of information, or learning processes

- Self-regulation level – this feedback has 'major influences on self-efficacy, self-regulatory proficiencies and self-beliefs about students as learners

- Self level – feedback which is not related to the task but is personal

H&T argue that FS is least effective (and most frequent), that FR and FP are 'powerful in terms of deep processing and mastery, and FT is powerful when the task information subsequently is used for improving strategy processing or enhancing self-regulation. Clear comparisons can be drawn with both Sadler who also asserted that the ultimate level of feedback is self-monitoring (similar to H&T's self-regulation) and with T&G whose four types of feedback can quite easily be mapped onto H&T's four levels. Where T&G do differ from H&T is their view that all four levels of feedback have a place in the classroom, including feedback aimed at the self (which they termed approval / disapproval).

H&T note that 'feedback is more powerful when it is about faulty interpretations, not lack of information. If students lack necessary knowledge, further instruction is more powerful than feedback information (Kulhavy said exactly the same).

H&T conclude their discussing the use of feedback in classrooms: they note that first of all teachers need to undertake 'effective instruction' as feedback 'is what happens second' and that it occurs 'typically after instruction'. Yet again it is difficult not to consider this view of feedback as moving towards the behaviourist end of the spectrum rather than dynamic and the result of continuous interaction between teacher and student and between students themselves.

Although H&T do talk about combining feedback with effective instruction in order to enhance learning, the two remain disappointingly separate. Unfortunately, in H&T's review, a teaching situation completely devoid of feedback appears a distinct possibility. This is a far cry from Sadler who asserted that feedback is as important as having a teacher at all. Even Sadler however appears to consider feedback as separate from instruction.

H&T also discuss the implications of their review of feedback for assessment however they make no mention of either formative assessment or assessment for learning which is surprising.

6. Black, P. & Wiliam, D. (1998a) 'Assessment and classroom learning', *Assessment in Education*, **vol. 5, no. 1, pp. 7 – 74.**

Conceptual Framework – use these questions to demonstrate how formative assessment has become separated from instruction / teaching.

What aspects of formative assessment are being discussed? E.g. feedback, peer assessment, self-assessment

When does the formative assessment take place? E.g. synchronous / asynchronous, proactive, interactive, retroactive. Dynamically with instruction or separate from it?

Why does the formative assessment take place? E.g. correction, close the gap

How does the formative assessment take place? E.g. written, spoken

Who does the formative assessment involve? E.g. teacher => student, student => student

Where does the formative assessment take place? E.g. classroom / laboratory

QUESTIONS to consider:

What is the relationship between instruction and assessment as demonstrated by this review?

What are the possible effects on teachers' views / use of formative assessment as a result of this relationship?

The path of feedback has been travelled long enough; it has been demonstrated how feedback (one element of formative assessment) can and usually is considered separate from instruction, rarely appearing to sit in dynamic partnership with instruction.

The discussion now needs to be widened to include other things teachers and students do that can be considered 'formative' in order to establish whether in these cases formative assessment still remains outside of instruction. There is no better place to begin this discussion than with the Black and Wiliam's 1998 article, an article that is widely considered to have been the catalyst for the current interest in formative assessment and assessment for learning. Throughout their review, Black and Wiliam exhibit great faith in the ability of formative assessment to improve learning: 'it is an essential component of the pedagogic process' (P. 10) and it 'can lead to significant learning gains' (P. 17).

Black and Wiliam review is undoubtedly thorough, reviewing as they did 250 publications in 76 education journals which fit their criteria for inclusion in their own review. Each of the 250 publications were coded with a total of 47 different labels (2.4 labels per study) being used. Problems were encountered when attempting to carry out this search especially when defining the field. Their review is split into seven sections all of which are relevant to this current study and so all of which will be discussed in some detail below. The seven sections are as follows: Examples in

evidence, Assessment by teachers, Students and formative assessment, Strategies and tactics for teachers, Systems, Feedback and, finally, Prospects for the theory and practice of formative assessment.

Black and Wiliam begin by outlining their understanding of the term formative assessment, a term, they say, is not tightly defined. Formative assessment, then, is interpreted in their review as

> 'encompassing all those activities undertaken by teachers, and / or by their students, which provide information to be used as feedback to modify the teaching and learning activities in which they are engaged'.

For their first section, Examples in evidence, Black and Wiliam selected eight accounts which they considered demonstrated the effectiveness of formative assessment. All but one of the eight accounts produced quantitative comparisons of learning outcomes, used pre and post-tests, and used experimental and control groups. The accounts are used to identify a set of considerations which, together with the second section which discusses current assessment practice are then used to introduce the other more analytic and theoretical sections. All of the eight accounts were quantitative studies with   This first section, then, contains many examples of what Black and William frequently refer to as 'initiatives' or 'innovations' requiring radical changes to practice. The first example documents how Portuguese teachers were trained in self-assessment which they used with students between the ages of 8 and 14. The self-assessment by the students took place on a mainly daily basis, with the students also being given the opportunity to choose their own learning tasks along constructivist lines. In this experiment the experimental group's mean gain was roughly double that of the control group. This first account is typical of the ones that follow in that impressive learning gains are documented however, little attention seems to have been paid towards how the actual assessment relates to the initial instruction and the dynamic way in which the two interact.

The teaching change involved in the second account involves a 'completely new learning regime for the students', the third is connected with mastery learning and involves frequent testing but apparently very little detail of how test results are fed back to students, in the fourth the teachers are trained to 'implement a measurement and planning system' that involved the 'embedding of a rigorous formative assessment routine within an innovative programme', whilst in the fifth is a non-curriculum-related experiment on the nature of feedback given (grade only, comment etc.). In the sixth example students worked for seven days on seven packages of instructional material 'under the instructions of graduate students' and followed this up with frequent self-assessment, the seventh example, a science 'project' involved both peer and self-assessment and the implementation of a 'carefully constructed curriculum plan' and finally the eight example was a 21 study meta-analysis which revealed a much larger effect size (0.92 compared with 0.42) for those teachers who were 'constrained to use the [assessment] data in systematic ways which were new to them.

Black and Wiliam's main argument in citing these eight examples, is the impressive learning, recorded in quantifiable terms, which were achieved by the implementation of formative assessment. Whilst they do call into question the ecological validity of some of their examples they still claim that there are many useful lessons to be learnt here.

The reason for citing all of these examples here is that they have many features in common which are relevant to this study. The first has already been suggested above in that many of the studies are clearly innovations and as such bear little resemblance to the normal day to day practices of the teacher. Many also clearly required a radical change in the practice of the teacher; Black and Wiliam themselves note how 'it is hard to see how any innovation in formative assessment can be treated as a marginal change'. Also, the examples contained no reference whatsoever to the quality of the teaching that presumably has preceded the assessment; the closest that was come to mentioning actual teaching / instruction was in the sixth example, however the students were, worryingly, only under the 'instructions of graduate students'. Nor was there any mention of how the teaching and assessment will have interacted dynamically in the classroom. The assessment, in many of these examples clearly came second, to use the rather simplified terms of Hattie and Timperley, and it appeared to do so in ways which could almost be termed transactional, with the instruction giving rise to the feedback but in a world where there could also perfectly easily be no feedback at all.

At the end of this section Black and Wiliam do refer to the interaction between teacher and student and student and student and also the lack of this in the eight examples they gave: 'the nature of these interactions ... will be key determinants for the outcomes of any changes but it is difficult to obtain data about this quality from many of the published reports'. What needs to be highlighted here is that they are speaking of interaction happening whilst formative assessment is being used(?) however this study is interested in something far more advance i.e. the nature of the interaction between instruction and assessment and the significance this has on the interactions of the main actors involved.

Any teacher, after reading this review will be left with little doubt: formative assessment leads to huge learning gains but its use requires a radical change to practice often in the form of an innovation or initiative, and, most significantly, formative assessment has absolutely nothing whatsoever to do with instruction (teaching).

Having set up on a pedestal this fine selection of innovations / innovations / projects it is no real surprise that the second section of their review, Assessment by teachers, should be so pessimistic. Black and Wiliam outline three main features of the current assessment practices of teachers:

4. Formative assessment is not well understood by teachers and is weak in practice
5. The context of national or local requirements for certification and accountability will exert a powerful influence on its practice
6. Its implementation calls for rather deep changes both in teachers' perceptions of their own role in relation to their students and in their classroom practice

They back up these claims with three quotes from previous research into formative assessment:

- One report on science practices sees formative and diagnostic assessment as 'being seriously in need of development'
- Another study asks 'why is the extent and nature of formative assessment in science so impoverished?'
- A Canadian survey 'teachers pay lip service to it [formative assessment] but consider that its practice is unrealistic in the present educational context'.

These three quotes, whilst clearly very carefully selected, appear to present damning evidence of the under-development of formative assessment. Black and Wiliam go on to note a full length quote from a US study into teachers' perceptions of formative assessment saying that teachers are 'caught in conflicts among belief systems, and institutional structures, agendas and values'. The authors then continue to paint a bleak picture noting that even when changes involving formative assessment have been introduced with a high level of training and support progress has been slow. They suggest this is because it is 'difficult for teachers to change practices which are closely embedded within their whole pattern of pedagogy'. The author certainly acknowledges the difficulty with effecting wholesale change involving formative assessment both in his own practice and in attempting to change the practice of others.

Whilst Black and Wiliam acknowledge the 'close link of formative practice with other components of a teacher's own pedagogy' they do not appear to discuss its links with the actual act of instruction, a link which it is difficult to ignore given the way the two must interact. There is little indication that the object under discussion is anything other than completely separated from instruction. The use of the word 'object' is intentional as this is how formative assessment, aided by the work of Black and Wiliam, has come to be seen; an object that can be broken down into component parts, techniques for a teacher to 'try his hand at', initiatives, innovations and projects to be attempted before returning to the real world and getting on with the real job of teaching. Formative assessment has become an object which is deemed worthy of its own theory when what is really needed is a clearer understanding of the dynamic relationship between formative assessment and instruction.

The fourth section of Black and Wiliam's review takes a closer look at the strategies and tactics which they say represent effective formative assessment. It will be useful here to examine this section in some detail in order to get a clearer understanding of the way these formative assessment strategies and tactics are perceived as relating to the act of teaching / instruction.

The fourth section discusses possible tactics and more all-encompassing strategies. Black and Wiliam use the 'temporal sequence of decisions and actions' entailed in formative assessment as a framework to break their discussion of tactics logically into four sections: choice of task, discourse, questioning, tests and feedback. Again, formative assessment is being broken up into a number of component parts and it is difficult to see how these parts interact dynamically both with each other and with the teaching.

Choice of task is, arguably, the most closely related to the actual task of teaching, and Black and Wiliam cite the work of Garnett and Tobin (1988) who argued that the key to success was the ability of teachers to 'monitor for understanding'. This is significant as it appears to suggest that formative assessment, as far as the choice of tasks is concerned, is a dynamic, on-going activity rather than an 'add on' to the act of teaching which the teacher is already engaged in. There is also no mention here of any initiative or innovation suggesting that monitoring for understanding is something that is a realistic possibility. Black and Wiliam's third example in this sub-section does refer to an ambitious intervention (which they call a 'scheme') which called for a shift in current pedagogy of the teachers involved.

In the sub-section on discourse, there is a call for 'assessment in social sciences to focus on discourse' and this plea could have a bearing on the current study as it is arguable that the very nature of discourse is dynamic. Discourse can be seen as the key to regulation of learning. The third sub-section covers questioning, which the authors have separated from discourse, the two being themselves separate from the choice of tasks and the wider field of teaching. One study cited does appear to draw links between the instructional nature of formative assessment: King (1991) used three groups in their research, most significantly a control group which they record as having been given 'no extra instruction'. Two more groups were trained in various levels of questioning. No extra instruction suggests there are links between instruction and formative assessment. Another study cited suggests that 'there is no evidence that peer interaction [in the generation and answering of questions] is superior to direct instruction in question generation'. Again, the nature of the two (where peer interaction in the generation of questions is considered a formative assessment tactic) are separate.

The next sub-section deals with the use of tests and Black and Wiliam begin by citing a number of studies that present conflicting evidence that frequent testing can lead to improved learning. The authors note that many of the studies into the effects of tests do not explain the precise nature of the said tests and so the results need to be considered in the light of this. The main area of discussion in this sub-section is whether these tests actually serve any formative function; i.e. how are the results of the tests actually used by the teachers and students involved and what is the quality of the feedback? The inclusion of this sub-section is questionable as it does not appear to refer to any great extent to formative assessment; it does, however, serve as an introduction to the next section which is clearly linked to formative assessment: the quality of feedback.

The quality of feedback sub-section begins be referring to a 1991 meta-analysis study into the 'Instructional effects of feedback' which clearly has a link to the current study. Clearly this study recognises the instructional effects of feedback ('the quality of the feedback ... was the largest influence on performance'), however the conclusions drawn do not go any way towards linking teaching and formative assessment. The next study cited in this study demonstrated, not surprisingly, that written feedback concentrating on specific errors and poor strategy together with suggestions on how to effect an improvement is better than no feedback at all. The following study is another meta-analysis into the effects of what is termed 'enhanced instruction' and therefore

clearly an innovative approach to teaching. The next study completely divorces instruction from assessment: this study explored 'the possible enrichment of a scheme of systematic assessment of student development by setting up an 'expert system' which teacher could consult to guide their instructional planning in relation to the students' assessment results'. The authors conclude this section by asserting that teachers need 'more than good assessment instruments' but also training to interpret and respond to students' actions in a formative way.

Black and Wiliam then conclude this whole section with a discussion of strategies. One key point in this section is the training and support that the authors claim is necessary for teachers to incorporate formative assessment techniques into their teaching: difficulties that teachers encountered, both in making their assessments relating to learning criteria, and in changing their teaching and feedback to break away from norm-referenced assumptions in supporting students' learning. This study will be making the case that much of the problem is to do with the way in which assessment is perceived by teachers as separate from their teaching. Also to be examined will be the widely held, and extremely unhelpful, view that formative assessment needs innovation. An example of this can be found in the review's second section on Students and formative assessment which notes an approach where 'both the teachers and the students involved had to analyse what had happened in a piece of the learning work, and each side had to propose three changes to be put into effect'. Clearly in this study the instruction and the assessment are not interacting dynamically, and the actual formative assessment is little other than an addendum; surely formative assessment could not have been completely absent whilst the teaching was taking place? Students and formative assessment will be the next section to be examined.

Students and formative assessment. The authors begin this section by noting that at the heart of formative assessment are two actions: first, that the learner perceives there is a gap between his current level of understanding and his desired goals, and second that the learner takes appropriate action to close this gap. The authors then underline the importance of not viewing the student as 'the passive recipient of a call to action'. The authors split this section into the two areas noted above. One important sub-section is on self-assessment. The authors note that a teacher always has two options: either the teacher remains responsible for generating formative feedback or he can begin to develop the ability to do this in the student (i.e. the skill to self-assess). Clear comparisons can be drawn here with Sadler's 1989 paper which argued that the ultimate goal is for the student to develop the ability to regulate his own learning. After arguing that self-assessment is underdeveloped in schools, the authors then discuss a number of 'initiatives' many of which involve students being taught the skills of self-assessment. Peer-assessment is also discussed however the authors do not that 'it is often difficult to disentangle the peer-assessment activity from other novel activities'. I can relate to this: the pee assessment that I have attempted was certainly novel.

Finally in this section the authors discuss possible links to learning theories. It is noted that the use of self / peer assessment should 'be an essential component in programmes for the implementation of authentic assessment in classroom practice'. Interestingly the authors note that 'assessment is to be seen as a moment of learning' which does appear to suggest that it should not be considered as

separate from teaching. As a moment of learning it is clearly dynamic; certain comparisons need to be made with Perrenoud's regulation of learning as well as Black and Wiliam's later comment that formative assessment is a 'moment of contingency'. This is the direction that needs to be followed.

After discussing the importance of self-assessment the authors conclude the section by noting that teachers often do not have 'a good model of problem-solving and of effective reasoning to transmit, and therefore lack both the theoretical framework within which to interpret evidence provided by students and the model to which to direct them in the development of their own self-assessment criteria'. Again, Perrenoud argues something similar.

The section on Systems, the fifth in this review, considers the place of formative assessment within more comprehensive teaching systems. The authors look at mastery learning, assessment driven models, portfolios and summative examination models and underline the difficulty, when examining these systems, of identifying the exact nature of the formative assessment as well as its contribution to learning. One small element of the assessment driven models sub-section is worth further examination here in as far as the comment is made that 'instructional decisions taken on the basis of assessment evidence are justified' which would appear to set assessment apart from instruction yet again. Apart from this there is very little in this section which is relevant to the current study which is a shame given its focus on whole systems rather than individual practices and tactics. This section could have been the one where formative assessment was seen to interact dynamically with instruction but this did not materialise. The authors appear to want to keep the concept of formative assessment separate from the act of instruction.

The sixth section focuses on feedback. The authors note that 'the two concepts of formative assessment and feedback overlap strongly', however it could be argued that feedback is actually a sub-set of formative assessment. In fact, the authors do note feedback's central position in formative assessment. The authors begin by giving the historical usage of the term in as far as it was used to describe electronic circuits. They then open this explanation up to the behavioural sciences and Ramaprasad (1983) who is usually quoted as he asserts that feedback is information that 'is used to alter the gap in some way', the gap being between the student's current level and his desired goal. The authors, however, prefer to keep their definition of feedback as simple as possible, defining it (strangely in the seventh section) as 'any information that is provided to the performer of any action about that performance'. Black and Wiliam cite a number of studies showing the effectiveness of feedback (e.g. Kluger and DeNisi (1996), the different types of feedback (e.g. Tunstall and Gipps (1996)) as well as how students attribute success and failure (e.g. Dweck 1986). The authors also discuss feedback that directs attention towards the task itself and again cite Bangert-Drowns (1991). An interesting comment in this section is the note about 'review tests at the end of a block of teaching'. Here not only is the formative assessment separate from the teaching but it also appears that formative assessment may have been completely absent whilst the teaching was actually happening; a complete absence of formative assessment is difficult to imagine.

At the end of this section Black and Wiliam do hint at the dynamic nature of formative assessment: it is easy to gain the impression that formative assessment is a static process of measuring the amount of knowledge currently possessed by the individual, and feeding this back to the individual in some way'. Here a comparison can be drawn with Hattie and Timperley already discussed who, for them, feedback did appear to be just this, a transaction between teacher and student. The authors go on to note that formative assessment is as much concerned with prediction (i.e. what someone can learn) as with what they have already learnt, and it is only in interaction with the learner (and the learning) that useful assessments can be made'. Allal talks about something similar with her proactive regulation. It is a shame that it has taken until the penultimate section for the true nature of formative assessment to begin to be revealed but his review. What still isn't being acknowledged is the dynamic relationship between the teaching and the assessment.

Prospects for the theory and practice of formative assessment

This section begins by calling into question the validity of various quantitative studies that have used meta-analysis mainly due to their narrow focus on formative assessment (even though this review uses these meta-analyses extensively). Also questions the value of these studies' generalisation as they appear to ignore certain aspects of quality (e.g. the quality of the interactions taking place).

The section then notes that many of the studies they reviewed have involved a particular pedagogy – 'one that in many cases has been constructed as the main element of the innovation under study'. Clearly innovations have been a real focus in this review and many have involved adopting entirely new pedagogies. (Perrenoud's concept of the regulation of learning transcends pedagogy).

The authors then make the case that 'a great deal of theory building still needs to take place in the area of formative assessment'.

The authors note a need for a paradigm shift in implementing assessment – away from summative functions towards formative functions, and then note that formative functions 'prioritise desirable consequences for small groups of students and individuals (similar to Perrenoud's contention that formative assessment is actually differentiation).

The authors do not claim in this review to have developed a theory of formative assessment but they do say that 'the interpretative paradigm has to be adopted in formative assessment' which will of course have an impact on the way formative assessment is studies.

The authors cite Dessa *et al* (1993) in that teachers are aware of the benefits of, for example, richer questioning but 'find that such approaches are difficult to implement in 'real classrooms''. This is an interesting quote – difficult maybe when looking at formative assessment in the traditional view of something that needs an innovation and is separated from teaching.

Ina sub-section on Expectations and the social setting the authors come close to those of Perrenoud who makes very clear the distinction between regulation of learning and regulation of activities. They cite Torrance and Pryor (1995 / 6) who note that 'teachers actions are as often concerned with

establishing routines, order and student satisfaction as they are with establishing students' capabilities'.

The authors include a sub-section on the needs of research and suggest a number of areas requiring further work including:

- The assumptions about learning underlying the curriculum and pedagogy
- The rational underlying the composition and presentation of the learning work
- The perceptions and beliefs of teachers about learning

They do not however refer to the relationship between teaching and formative assessment and the way the two interact dynamically, nor do they consider the teachers' perceptions and beliefs of the importance of formative assessment or the place it has in the classroom.

Of relevance to this study is the authors' note regarding the nature of the research that is needed: 'there is a need for ... richer qualitative studies of processes and interactions within the classroom'. Clearly a study into regulation of learning is a study of processes and interaction, which is what seems to have been largely ignored throughout this review as it has focused on wholesale innovations of formative assessment which have apparently had continually appeared separate from teaching. Unfortunately the authors go on to argue the need to 'evolve new processes as quickly as possible' which is the wrong way to go about it as it will merely lead to superficial implementation of formative assessment with little chance of becoming permanently embedded into the day to day interactions of a classroom.

The authors suggest that particular attention needs to be paid to two areas: first the reported benefits of formative assessment for low achiever and, of great relevance to this study, to 'the possible confusions and tensions, both for teachers and for learners, between the formative and summative purposes for which their work might have to serve'. It could be argued that when viewing formative assessment as integral and part of the on-going regulation of learning rather than an add-on to the main tasks of teaching and learning these tensions are reduced. It may also be that those teachers who demonstrate a real ability for the on-going regulation of learning (spirit of formative assessment) have gone some way in resolving these formative / summative conflicts whilst those who believe that innovations, initiatives, projects, schemes or dramatic shifts in pedagogy are required will continue to experience problems and tensions. The authors note that 'formative work will always be insecure because of the threat of renewed dominance by the summative'.

In conclusion the authors note that the research they have reviewed 'shows conclusively that formative assessment does improve learning'. It is difficult to argue with this, however the methods used throughout are questionable as is the position of formative assessment in relation to instruction. The authors argue that 'teachers need to be provoked and supported in trying to establish new practices in formative assessment'. This review has really been the catalyst for the many more innovations and initiatives that have followed however as OFSTED note, formative assessment remains to date under-developed. Finally the authors note that 'there is enough evidence in place

for giving helpful guidance to practical action' – arguably there is too much evidence and it is evidence of the wrong kind.

What follows now is a short section on the effects of the Black and William review detailing the nature of the work that has followed as a direct result.

7. **Sebatane, E. M. (1998)'Assessment and Classroom Learning: a response to Black & Wiliam',** *Assessment in Education: Principles, Policy & Practice*, **vol. 5, no. 1, pp. 123 — 130.**

Conceptual Framework – use these questions to demonstrate how formative assessment has become separated from instruction / teaching.

What aspects of formative assessment are being discussed? E.g. feedback, peer assessment, self-assessment

When does the formative assessment take place? E.g. synchronous / asynchronous, proactive, interactive, retroactive. Dynamically with instruction or separate from it?

Why does the formative assessment take place? E.g. correction, close the gap

How does the formative assessment take place? E.g. written, spoken

Who does the formative assessment involve? E.g. teacher => student, student => student

Where does the formative assessment take place? E.g. classroom / laboratory

QUESTIONS to consider:

What is the relationship between instruction and assessment as demonstrated by this review?

What are the possible effects on teachers' views / use of formative assessment as a result of this relationship?

Sebatane, 1998, a response to Black and Wiliam

In the same journal number as the Black and Wiliam review is featured Sebatane's (1998) response.

One key point in the introduction of his review is his suggestion that 'the authors could as well have used the title 'Assessment and classroom *teaching* and learning' (Italics the author's). The author would disagree with this suggestion as it is clear from the black and Wiliam review that they wanted to separate out 'teaching' from the techniques of formative assessment. Sebatane notes that 'in most of the studies reviewed some element of teaching was in place'. However, it was not the teaching that was being reviewed but the assessment and in such a way that it appeared that the two were separate. There were examples in the Black and Wiliam review where it was suggested that a situation could occur which was completely devoid of any form of formative assessment at all.

Sebatane then backs up his comment about the inclusion of the word 'teaching' by citing Gipps (1996) in saying that 'assessment does not stand outside teaching and learning but stands in dynamic interaction with it'. Whilst it cannot be argued that the Black and William review situated learning outside of assessment, it certainly appears to have situated teaching outside. Sebatane

suggests that there is a three way interaction between teaching, learning and assessment which is something missing in Black and Wiliam's review.

Sebatane then contends that whilst formative assessment is a key factor in promoting learning, it is not the only factor (Perrenoud would agree with this).

Sebatane then agrees with Black and Wiliam that reforming teachers' assessment practices will take a long time, citing the fact that there is no one optimum model for teachers to follow and also that radical rather than marginal changes to classroom practice and pedagogy are needed. Sebatane is then quite right to note that 'there is little point in identifying particular assessment procedures [which is what the Black and Wiliam review was mainly about] for teacher use in the hope that their adoption would impact on teacher practice'. This has been the author's personal experience and also appears to be the experience of other teachers as well. Sebatane then goes on to note that 'non-radical interventions in teachers' information base can impact on student achievement'. The black and Wiliam review focused clearly on interventions and initiatives [and the resulting changes in teachers' pedagogy) however here is a call for interventions that would not be labelled in this way, and are therefore more realistic. As argued at the end of the black and Wiliam section, perhaps smaller interventions may serve to reduce the tensions between formative and summative assessment.

Sebatane then discusses the influence of high stakes assessment which is obviously linked to formative assessment. He suggests that 'unless high stakes cease to be attached to these examinations, it will be difficult to get rid of the well-known 'backwash' effect' (whatever this means). My belief is that high-stakes will obviously continue to exist but that the tension between summative and formative can be resolved through the regulation of learning rather than large scale formative assessment initiatives, and also that teachers involved in the 'spirit' of formative assessment are doing just this – regulating learning and in so doing feel less the tensions. Sebatane suggests that whilst teachers may be trained in the theory and practice of formative assessment, circumstances may lead to them not developing it in the classroom (link to what Black and Wiliam said).

Sebatane concludes that 'assessment is a broad subject touching on virtually all aspects of education'. The link between teaching and assessment is clear. This leads onto the work of Perrenoud who situates assessment and teaching in dynamic interaction with one other as opposed to separate entities.

8. Perrenoud, P. (1998) 'From formative evaluation to a controlled regulation of learning processes. Towards a wider conceptual field', *Assessment in Education: Principles, Policy and Practice*, **vol. 5, no. 1, pp. 85 – 102.**

Conceptual Framework – use these questions to demonstrate how formative assessment has become separated from instruction / teaching.

What aspects of formative assessment are being discussed? E.g. feedback, peer assessment, self-assessment

When does the formative assessment take place? E.g. synchronous / asynchronous, proactive, interactive, retroactive. Dynamically with instruction or separate from it?

Why does the formative assessment take place? E.g. correction, close the gap

How does the formative assessment take place? E.g. written, spoken

Who does the formative assessment involve? E.g. teacher => student, student => student

Where does the formative assessment take place? E.g. classroom / laboratory

QUESTIONS to consider:

What is the relationship between instruction and assessment as demonstrated by this review?

What are the possible effects on teachers' views / use of formative assessment as a result of this relationship?

Perrenoud's intentions are clear from the title of his paper: he argues for the widening of the conceptual field and in effect encompasses formative assessment with his notion of regulation of learning. He begins by noting that for the past 20 years or French language contributions have concentrated on what they call the 'individualised regulation of learning' which he says takes into consideration not only formative assessment but also the didactic content of disciplines and differentiation.

Perrenoud notes that 'all those evaluations are formative which contribute to the regulation of an on-going learning process'. He also notes that 'formative evaluation is not incompatible with the notion of feedback, but the mere presence of feedback is not sufficient'. This comment refers to many of the studies in the black and Wiliam review which have referred to feedback in an almost transactional form. Perrenoud suggests that Black and Wiliam have gone for the 'lowest common denominator' which is the study of feedback and in particular the effect of feedback compared to situations when no feedback is possible. Again, this relates to a situation where feedback is absent (and divorced from instruction), which, in a real classroom is difficult to imagine. In studying feedback in this way Perrenoud suggests that Black and Wiliam have had to disregard a number of important factors, the most significant for this study being 'its links with a concept of learning and teaching'. Clearly for Perrenoud formative assessment and teaching are NOT separate.

Perrenoud suggests that a French language literature review on formative assessment would focus less on 'the comparison of the achievement of pupils having experienced feedback and those who had not'. This again is significant as surely no teaching situation would be completely devoid of feedback; clearly the two concepts are linked, however Black and Wiliam fail to recognise this. Perrenoud makes an important call for further research:

> It would seem more important to concentrate on the theoretical models of learning and its regulation and their implementation. These constitute the real systems of thought and action, in which feedback is only one element.

In order to understand Perrenoud's ideas about the regulation of learning it is important to understand the distinction he makes between regulation of learning and regulation of activities. The former appears to involve adjustment once the activities have been initiated, whilst the latter involves the actual selection of the activities.

If I can link regulation of learning with teachers reportedly engaged in the spirit of formative assessment then I can begin to answer the question Perrenoud asks: what mediations are activated by teachers who are seen to regulate learning? (P. 89).

Argue the formative assessment needs to be encompassed by regulation of learning because FA attempts to lay claim to improving learning but in fact it acts to remove itself from the initial instruction. Formative assessment alone does not improve learning, it merely gets it back on track during moments of contingency. As such, formative assessment introduced as part of large scale initiatives and resulting in changing a teachers' practice and pedagogy dramatically is not contingent but is a superficial technique. Perrenoud asserts that:

> Regulation does not include setting up the activities suggested to, or imposed on, the pupils, but their adjustment once they have been initiated

Essentially we are not talking about whole scale initiatives but possibly finer tuning requiring, as Perrenoud says, 'a clear understanding of the ways pupils function and the manner in which they incorporate contributions external to their own thought processes'. Regulation, then, is *regulation of cognitive processes* which Perrenoud admits are little understood by researchers and even less understood by teachers: we need to 'possess ever more finely honed models of the mediations thus activated' (maybe my intervention can come here?).

On Page 90 Perrenoud discusses the role of formative assessment claiming that it does not have a monopoly over regulation. He essentially situates formative assessment within regulation: 'not all regulation of learning processes uses evaluation'. Perrenoud also acknowledges the different concepts and practices that teachers employ with formative assessment saying that 'some limit themselves to information based on feedback, whilst others opt for a total integration of teaching and formative evaluation, both insisting on interactive regulation'. This quote is of vital importance: the first approach could be rather behaviourist in nature whilst the second could represent more of a constructivist approach. The first could be seen as the letter of formative assessment whilst the

second the spirit'. The total integration of teaching and formative evaluation is where we should be heading however the literature previously reviewed has tended to separate out the two. Perrenoud goes on to note that in traditional (behaviourist) classrooms evaluation is a 'specific event' and 'confines formative evaluation to tests which are quite distinct from lessons even if one follows the other, whereas in more active methods 'formative evaluation becomes one aspect of managed learning'. Finally we have an author who is prepared to accept the notion that formative assessment should not, in fact cannot, be seen as separate from instruction.

Page 91 Perrenoud notes that 'the regulatory influence of formative evaluation is weak if it is 'limited to a subsequent criterion referenced evaluation which, at the end of a phase in teaching highlights gaps in knowledge, errors…' Clearly comparisons can be drawn with the distinct between the letter and spirit of formative assessment which will be discussed later. The letter of formative assessment seems to separate teaching from assessment whilst the spirit appears to integrate the two. Many of the initiatives discussed previously only serve to separate the two.

Perrenoud introduces Allal's (1988) three levels of regulation:

- Retroactive
- Interactive
- Proactive

Retroactive being regulation that happens after a piece of work has been produced (feedback in its basic sense) with interactive regulation being something that 'operates during the activity though an exchange with the pupil (face to face or in a group)'. This assertion has implications for my intervention. Perrenoud goes on to say that it would be 'useful to develop categories of classes and teaching methods within which one could legitimately compare the operation of formative evaluation and its effects'. He suggests this instead of comparing the existence and presence of formative assessment in classes (which is what Black and Wiliam did: 'educational practices which have nothing in common will be compared).

A further suggestion is to 'distinguish classes according to their potential in the interactive regulation of learning, as incorporated in the normal organisation of work'. 'Normal organisation of work' is significant as it is a far cry from any type of innovation or initiative. It also disagrees with Black and Wiliam who suggest that work on formative assessment requires planned interventions (need to find quote in Black and Wiliam 1998 if using this). Perrenoud asserts that 'a systematic conception of the potential regulation of learning' is lacking. Perrenoud suggests that it is 'not enough to engineer situations' which is exactly what happened in many of the studies reviewed by Black and Wiliam.

Perrenoud draws parallels between the regulation of learning and the concept of differentiation which he notes favours 'no particular type of classroom organisation, refers to no standard model, for example mastery learning or active pedagogy'. Here, then, is regulation of learning that can be studied, without the need for innovations that dramatically alter pedagogy, in its 'interactive form, and one that clearly interacts dynamically with teaching rather than sitting apart from it.

Page 95 Perrenoud again notes the type of research that is needed to understand the regulation of learning: 'without a theoretical model of the mediations through which an interactive situation influences cognition, and in particular the learning process, we can observe thousands of situations without being able to draw any conclusions'.

Perrenoud (Page 97) gives a good, clear example of what he means by regulation of learning, although the description appears to regulation of learning and regulation of activities:

> if the teachers intervenes to regulate the activity this should not be seen as the formative evaluation of a skills, giving rise to feedback, but rather an incursion into the representations and thought processes of the pupil, to accelerate a breakthrough in understanding…'

Clearly to 'accelerate' is also to teach.

A new section on 'Conceiving a favourable organisation of work' discusses the organisation of work in a classroom which Perrenoud describes as being 'rich or poor in evaluation'. He attributes this to the scheme of work which he says 'has consequences for the probability of an interactive regulation of learning processes'. There are clear links here to summative assessment which can sometimes be seen to almost 'invade' the scheme of work. It might be useful to study which forms of organisation encourage regulation of learning and to study in particular the organisation of schemes of work where the teacher is deemed to be involved in the spirit of formative assessment.

Perrenoud's conclusion: he suggests that fusing or dissolving formative assessment into a larger concept of regulation of learning opens up new possibilities for 'analysing even the most commonplace aspects of the classroom. This assertion goes completely against Black and William who say that these commonplace aspects are not worth investigating. Perrenoud further asserts that 'the task is thus not to just describe and compares situations, and the organisation practised by various teachers, but to observe more closely the mechanisms for regulating the learning process within each case'. There is the suggestion that in the past we have tended to fall back upon the much more straightforward conceptualisation of the various tasks relating to formative assessment. Perrenoud does still sound out an important warning: 'the concept of regulation is at the same time very ordinary, in its common sense approach, and very difficult to conceptualise in a stable and shared way'.

Finally Perrenoud suggests that enough evidence has now been collected (by reviews such as Black and Wiliam's) to justify a new departure. My intervention could come in the form of a link between regulation of learning and the spirit of formative assessment. This link could well establish the dynamic interaction between assessment and teaching: the more the evaluation is integrated into situations [and not merely feedback after a test of piece of class work], becomes interactive and lasts, the further it distances itself from … summative evaluation'. I believe that here is the real possibility of resolving the formative summative conflicts.

However, Perrenoud, does not suggest abandoning the concept of formative assessment altogether. As he says, the conceptual field has 'considerable inertia'.

Unlike other authors who suggest the point of formative assessment is to aim for students to self-regulate their learning (e.g. Sadler), Perrenoud is more realistic (and accurate) in his claim that 'the role of the teacher as initiator or conductor of regulation remains central, even if and especially if he does not intervene in person but puts in place a 'meta-cognitive culture'…' My own bus metaphor could be used here (and cite Woollard's work on metaphor).

9. Perrenoud, P. (1988) 'La part d'évaluation formative dans toute évaluation continue'. Available at:
http://www.unige.ch/fapse/SSE/teachers/perrenoud/php_main/php_1988/1988_05.html**. (Accessed: 12 July 2010).**

This paper clearly sees formative assessment as something that interacts dynamically with teaching.

Perrenoud begins by stating that 'une évaluation est formative si, du moins dans l'esprit du maitre, elle est censée contribuer à la regulation des apprentissages en cours dans le sens des maitrises visées.

Perrenoud notes at the beginning of this paper that 'on sous-entend que seuls certains maitres, dans certaines classes ou certaines écoles, pratiquent une évaluation digne du nom, insérée de préférence dans une pédagogie plus individualisée'. Effectively, this is the 'spirit' of formative assessment. Perrenoud goes on to note how formative assessment when practised as part of an innovative new pedagogy is not the approach to take: 'plus on lie l'évaluation formative a des pedagogies différenciées, plus on la confine dans quelques écoles expérimentales ou quelques classes pilotes'. This is exactly what has happened, and Black and Wiliam calling for changes in pedagogy has been the cause of this. Rather than 'se limiter a ces pratiques innovatrices' Perrenoud argues the need to enlarge the conceptual field and not to confine formative assessment to a restricted definition. Perrenoud denies that this enlargement risks taking away the rigour of formative evaluation, in fact I would argue that this is exactly what is needed.

Perrenoud then goes on to cite Bloom (1972) who asserts that these models of formative assessment 'n'ont fait qu'expliciter ... une forme de regulation presents dans toute action educative d'une certain durée'. This is not what Black and Wiliam or Hattie and Timperley appear to be saying as to read their work a classroom without any formative assessment appears possible. I would add to this that in making many of these techniques explicit, we have essentially objectified them the result being that they are now seen as optional extras that can be added on to lessons as opposed to deeply integrated. As optional extras the decision is often taken not to adopt them as they also appear separate from the act of teaching. After drawing comparisons between formative evaluation and differentiation, Perrenoud cites himself and others by asserting that 'aucun enseignement, même le plus traditionel, n'est complètement indifférencié' which is the same as saying that no teaching is without formative assessment.

The next section (La regulation comme volonté comme réalité) begins by noting two very simple functions of formative assessment: comment l'enseignant contrôle, en fin de parcours, qu'il a atteint les buts qu'il se fixait and quels moyens il se donne, en course de parcours, pour vérifier que les apprentissages progressent. The first can be linked to Allal's notion of retroactive regulation and the second, possible more important with her notion of interactive regulation. Perrenoud explains this second part of formative assessment with the words 'rectifier le tir' which suggests something

continuous and working in dynamic interaction with the act of teaching. Perrenoud suggests that to find out if regulation is effective it is not enough to find out the teacher's intentions, not to describe his practice (as has been done so often before). He notes the need for a quasi-experimental situation and also the necessity of having to 'suppose' what is going on, based on 'le contenu des intéractions, sur l'analyse des reactions observables de l'élève, éventuellement sur certains tests rapprochés'.

Perrenoud then goes on to distinguish regulation of learning from regulation of activities by noting that the job of the teacher, apart from teaching, is also to maintain order, encourage exchanges between students, keep students on task, keep the learning environment peaceful etc.

In the following section Perrenoud asks why regulation is so often ineffective. His main argument is that evaluation and the resulting intervention are carried out by human beings in situations that are often not conducive to such action. Perrenoud gives an excellent description, on four levels, of the mediations involved in the regulation of learning from information collected by the teacher, how the teacher treats or interprets this information, how the teacher then feeds back to the student and finally how the student assimilates the feedback / information. All of this is the regulation.

Perrenoud then mentions prescriptive models that essentially idealise those actors involved in regulation. A parallel could be drawn here with many papers which call upon teachers to implement formative assessment techniques as if they work in an ideal world – Harris (2007) is an example. Perrenoud notes the following which is very pertinent: une approche descriptive des pratiques part du fait que les acteurs réels sont souvent des gens presses, émotifs, distraits, fatigués, énervés, paresseux, oublieux, fantasques… Noting practices which can be incorporated into lessons is not sufficient for many of these reasons. Following on from the discussion of practices associated with regulation, Perrenoud notes that 'le principal instrument de toute l'évaluation formative est et démeurera l'enseignant engage dans une intéraction avec l'apprenant'. It is these interactions which need to bestudied.

My intervention could come in the form of an answer to a question that Perrenoud asks: pourquoi le maître ne recueille pas toujours des informations pertinentes, ne les interprète pas toujours judicieusement, n'intervient pas toujours à bon escient'. To look at those teachers apparently approaching the 'spirit' of formative assessment may be a fruitful path to take. Perrenoud suggests several reasons for this, beginning with the most obvious, this being a lack of training for teachers and their conditions, together with the simple challenging nature of incorporating formative assessment.

Perrenoud then goes on to outline four obstacles in the way of regulation.

First, he notes that the emphasis of the curriculum is on the content that needs to be taught rather than the learning that needs to take place. He says that regulation takes place by 'petites touches, au moment où l'élève est aux prises avec une difficulté concrète'. He suggests that when this is the case the teacher often intervenes to keep a student on task, or to complete the task rather than to regulate the students' learning' (a comparison can be drawn here with the authors who note that the message most teachers convey is 'more').

The second obstacle is the abstract notion of the term regulation. He notes how students are 'black boxes'. He notes that even when teachers are trained in the theory of learning, their theoretical understanding remains too abstract (also that psychologists also lack this understanding). I would argue that the real obstacle is the way in which formative assessment is presented to teachers. However, Perrenoud notes, this lack of understanding does not prevent regulation.

The third obstacle is more practical: the lack of time, the other decisions that a teacher needs to take. Again, a lack of time comes into play when this regulation (formative assessment) is perceived as an add-on. Perrenoud notes that 'nombre d'interventions restent sans effet parce qu'inachevées ou trop fragmentes'. 'Fragmentées' is a key word here and this is the experience of the author.

The fourth obstacle is the priority that many teachers accord to the regulation of activities as opposed to the regulation of learning: 'l'important est que le travail soit fait, que les élèves arrivent au bout de leurs exercises, qu'ils participent aux leçons et aux activités collectives, qu'ils fassent leur métier d'élève'. My intervention could come in investigating how certain teachers are involved with the spirit of formative assessment.

Perrenoud further claims that 'la regulation est permanente dans une classe' – it should be possible to establish evidence of this from a questionnaire and then to investigate the exact nature further. He also asserts that 'tout depend de la nature de l'aide apporté' and that what most teachers fall back on is the regulation of activities through which the students 'n'auront pas appris grand chose, parce que toutes les decisions importantes auront été suggérées par le maître'.

Questions arising from this paper:

What, then, is the nature of a classroom where a teacher could be said to practice the regulation of learning?

Can the regulation of learning be compared with the 'spirit' of formative assessment?

How do those teachers involved in this 'spirit' view the relationship between summative and formative assessment? Are the tensions less apparent for these teachers?

How do they organise the regulation of activities and the regulation of learning?

How do they organise the dynamic interaction of formative assessment and teaching?

The best way forward would be to establish several teachers who are involved in the regulation of learning (spirit) and to then investigate what happens in their classroom. What does not need to happen is a comparison of classes with formative assessment and classes without.

10. Perrenoud, P. (1991b) 'Pour une approche pragmatique de l'évaluation formative', *Mesure et Evaluation en Education*, **vol. 13, no. 4, pp. 49 – 81. Available at:**
http://www.unige.ch/fapse/SSE/teachers/perrenoud/php_main/php_1991/1991_12.html **(Accessed: 12 July 2010).**

Perrenoud, P. (1991c) 'Towards a pragmatic approach to formative evaluation', in Weston, P. (ed.) *Assessment of Pupils Achievement: motivation and school success***. Amsterdam: Swets and Zeitlinger, pp. 79 – 101.**

Perrenoud situates formative assessment within a wider concept of the regulation of learning. The main content of this paper deals with formative assessment.

Perrenoud begins by asking rhetorically whether researchers and practitioners are asking the corrections regarding formative assessment and claims that formative assessment is still trying to find its way. That was in 1991 and in 2010 the same appears to be the case.

Perrenoud begins by defining formative evaluation as 'toute évalutation qui aide l'élève à apprendre et à se développer' and then notes that it is evaluation that participates in the regulation of learning.

Perrenoud notes how formative evaluation has for a long time been associated with the idea of a criteria test coming after a period of instruction the results of which are interpreted to see if the student has learnt what he should have done – this is the way that it was often seen in the Black and Wiliam review. Perrenoud then claims that French speaking researchers have for a long time attempted to enlarge this model.

Perrenoud suggests in this larger model that it would be better to talk about formative 'observation' as opposed to evaluation. He notes how this observation can be 'planned or intuitive, deep of superficial, deliberate or accidental, quantitative or qualitative, long or brief, original or banal, rigorous or approximate, punctual or systematic' and goes on to say that no information is excluded. Perrenoud further notes that the actual observable field is as diverse and complex as the actual learning process and conditions themselves (P.3).

Perrenoud then underlines the need for a wider conception of intervention and begins by noting that 'il n'y a aucun raison d'associer l'idée d'observation formative a un type particulier d'intervention'. This clearly goes against a lot of English language research which has been obsessed with studying the actual methods / tactics / strategies involved in formative assessment.

Perrenoud notes how a student can be helped to progress is a number of ways: by explaining more simply or at length, by engaging the student in another task, by relieving the student of any anxiety and filling him with confidence, giving the student other reasons to act or to learn, by putting the student in a more appropriate ability grouping, by modifying the regulation (formative assessment), by modifying the rhythm of the work, modifying rewards and sanctions.

In the section 'une conception large de la régulation' Perrenoud begins by noting the historical approach of formative assessment as having developed in a 'logique de l'après-coup'. He then claims that we should be considering it as forming part of 'des regulations ordinaires de l'apprentissage' and therefore part of the whole process. Perrenoud uses the work of Allal (1978) who distinguished three levels of regulation:

- Retroactive
- Interactive
- Proactive

He says that these three levels work dynamically with one another. Proactive regulation takes place 'aux limites de l'évaluation', whilst there is no reason to consider 'retroactive regulation as taking only the form of remediation. For Perrenoud, interactive regulation is the priority 'parce que seul véritablement capable de mordre l'échec scolaire'. Perrenoud uses the concept of interactive regulation to 'faire basculer l'évaluation formative du cote de la communication continue entre maitres et élèves'. This is absolutely key as it places the whole process (of which formative assessment is only one part) in dynamic interaction as opposed to methods / tactics / initiatives which are separate to teaching.

In the section 'les limites de l'élargissement' notes that these formative observations, interventions and their levels (proactive, interactive, retroactive) Perrenoud is moving in the direction of 'une pédagogie plus efficace'. Important here, is that he does not claim any new pedagogy just a more effective one. The key to my whole thesis could be the important conceptual problems that this evolution poses linked especially to defining what is meant by formative assessment as an identifiable practice, distinct from other types of pedagogic action. Of course, I will argue that it should not, in fact must not, be seen as separate and it is this view which is partly responsible for its current under-development. The way formative assessment is currently being promoted (as distinct practices) is mainly responsible for this situation. Perrenoud further notes that this problem is accentuated when dealing with meta-cognition and self-regulated learning (meaning still unclear). Perrenoud suggests that it is time to reconstruct the problem around the notion of the regulation of learning as opposed to remaining restricted by the term formative assessment which, he asserts, is one form of regulation amongst other. Here it is possible to see the difference with the current line of thinking which situates many practices that are considered formative within formative assessment itself.

New section: Didactique et régulation des apprentissages. Perrenoud considers all feedback, wherever it comes from or whatever the intention is, as formative if it contributes to the regulation of learning. Perrenoud then goes on to note that formative assessment should be considered in the actual 'cadre d'une didactique'. This is significant as it suggests the two (teaching / instruction and assessment) should never be considered separately.

Perrenoud (Page 7) notes how teachers are caught between two opposing models: the first which is the projects based, socio-constructivist model which (he claims) does not have a lot to do with

formative assessment (Black and Wiliam would disagree as would I here) and the second model which is the one where theories and strategies / tactics of formative assessment have developed 'indépendmment de la didactique et du curriculum spécifique d'une discipline (in the second model the formative assessment here is separate from the teaching). Perrenoud agrees with Allal (1988) here in the need for an 'élargissement de la pédagogie de maîtrise' – note here we are not talking about a different pedagogy just an enlarged one that is able to encompass formative assessment.

Perrenoud (Page 8) then debates the relationship between teaching and formative assessment, a discussion of which seems confusingly absent in most other papers (could bring in the first paper which discussed the way formative assessment is a form of teaching). After noting how formative assessment is defined by its contribution to the regulation of learning, Perrenoud asks the absolutely key question: qu'est-ce qui distinguee l'évaluation formative de la pédagogie tout court? Why is no one else asking this question? Because we are obsessed with developing a theory of formative assessment. Perrenoud suggests that we need to 'concevoir la didactique comme dispositif de regulation' and in so doing we will be rid of a classic distinction between a time for teaching and a time for regulation (formative assessment). Perrenoud notes the tendency in the past to 'dissocier deux moments succéssifs dans l'action'.

Perrenoud further notes in continuing with this theme (of no clear distinction between teaching and formative assessment) that 'le succès des apprentissages se joue dans la regulation continue ... advantage que le genie de la methods'. In so doing he puts the emphasis on continual assessment as opposed to planned (and often superficial interventions) based on certain tried and tested methods (which has been my approach in the past). In other words 'des régulations fortes tout au long de l'aprentissages'.

Perrenoud uses the metaphor of the chess player: his first moves (based on his strategy) are unlikely to win the game, and he will need to adjust his play in response to that of his opponent sometimes going as far as changing everything. The same can be said of the work of a teacher: anticiper, prévoir tout ce qu'on peut, mais savoir que l'erreur et l'approximation sont la règle, qu'il faudra *constamment rectifier le tir*. It will be interesting to investigate how teachers involved with the 'spirit' of formative assessment perceive this continuous regulation. Perrenoud draws this section to a close by noting that this level of regulation is not a specific moment (as it has often been in my teaching, add-on, superficial) but a permanent and continuous part of what happens in the classroom, and that formative assessment is a form of regulation, one form amongst others.

The next section moves the discussion away from direct regulatory action by the teacher towards the notion of self-regulated learning.

La regulation par l'action et l'intéraction: there are a few points made in this section which may be pertinent. For example, Perrenoud notes that 'l'action est facteur de régulation du développement et des apprentissages tout simplement parce qu'elle oblige l'individu a accommoder, différencier, réorganiser ou enrichir ses schemes de représentation. Put this way, the 'action' does not appear such a mysterious notion as it often does when reading other papers (Sadler, Black and Wiliam).

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Perrenoud also notes that 'tout apprentissage n'exige pas un feed-back ad hoc' which suggests that this has been the approach taken by many.

In the section specifically devoted to self-regulated learning Perrenoud suggests that the way forward is not simply to increase the external feedback (i.e. from a teacher or a fellow student) but to train the student in techniques of self-regulation. Again, the parallels with Sadler here are clear. Perrenoud does not position self-regulation with the area of formative assessment – he suggests that formative assessment should have a more precise signification that comes out of the actual act of the teacher. I have said something similar when making the case that self-regulated learning is more of an on-going process whilst self or peer assessment should be seen as part of formative evaluation as it is something instigated by the teacher, more of a technique than a process.

Perrenoud posits a model in which he has formative évaluation as a part (but not the only part) of the didactic mechanism (teaching) which in turn is a part (again not the only part) of the process of regulation of learning. Although Perrenoud argues that there is no reason to 'dissocier deux moments successifs dans l'action pédagogique' he does still say it should be possible to train teachers in techniques of formative assessment and to make these techniques an object of study. So, although the process is on-going (rectifier le tir) and in dynamic interaction with teaching, it can and should still be studied. This is important if I am to investigate the 'spirit' of formative assessment.

Perrenoud (Page 14) notes how the emergence of formative assessment has enabled teaching and evaluation to come together. I would argue that the exact opposite has happened in as far as our obsession with building a theory of formative assessment has effectively isolated it from teaching. Further on Perrenoud notes something which is similar to the above but just coming at it from the opposite angle: he notes how the work of those interested in teaching have preferred, in their study of it, not to integrate assessment so as not to 'complicate the task'. Here we have two approaches none of which appear to acknowledge the dynamic interaction between teaching and assessment. Perrenoud notes how assessment (whether it be summative or formative) has remained 'le parent pauvre' in the training of teachers. It would be interesting to look at the current situation in the UK in 2010. Perrenoud concludes this section by arguing the vital need to integrate formative assessment and teaching.

Section: 'régulation de l'apprentissage ou de l'activité'. Perrenoud underlines the difference of the two in this section. He notes how in a real classroom the distinction between the two is hard to study. Of importance here is Perrenoud's argument that not all regulation of activity actually contributes to learning (discussed already in previous Perrenoud paper) but, perhaps more importantly, that not certain approaches to the regulation of learning actually have a destructive effect on the actual activities being undertaken by the students. This, perhaps, is key as it appears to discuss in a slightly oblique fashion the effect of formative assessment when it is seen as separate to the teaching. When it is added on, or is superficial, it does in fact have this destructive effect. Again, how does this work with teachers engaging with the spirit of formative assessment?

Perrenoud's views often reside in the real world and for this reason are sometimes perceived as pessimistic. They are, however, extremely pertinent. Page 16 for example he notes that when the teacher is simply engaged in the demanding task of managing the classroom there is often not a lot left in terms of availability and strength to gather a valid picture of the actual learning that is taking place. Perhaps this is why a lot of formative assessment is seen as coming after the event (e.g. Hattie and Timperley) as at least here the teacher has more room to ensure formative assessment is effective. When teaching, Perrenoud notes how the teacher's actions may be formative but that there may be little actual 'assessment' going on. Again, hat is the situation in the 'spirit' classroom?

Page 18: Perrenoud notes how each teacher who wishes to practice formative assessment must 'reconstruire le contrat didactique, contreles habitudes acquises par seséleves'. Again, rather pessimistically Perrenoud notes how students are generally happy to just get by, whilst practising formative assessment forces them to become active participants, be more responsible for their learning, concentrate less on grades and more on the process of learning including strengths and weaknesses. This has certainly been the case in Ringwood with 9CG girls and to a (surprisingly) lesser extent at Pilgrims.

Page 19 Perrenoud suggests that formative assessment is often in conflict with other goals such as passing exams (the usual formative / summative tension) and that it will only be 'used' when it is perceived as a means to an end (rather than an end in itself).

Section: pas d'évaluation sans différentiation. Perrenoud begins by arguing that it is very difficult to practice no differentiation whatsoever and gives an example of a lecturer in front of potentially hundreds of students who differentiates his address according to their reactions or understanding. Perrenoud then makes the case that anyone involved in formative assessment is essentially involved in differentiation. He argues that no global adjustment (or rectification of the aim) fully meets each student's needs: the only answer is to differentiate the teaching. He goes on to say that formative assessment when practised with some continuity leads to a pressure to differentiate. Page 22 Perrenoud notes that there is no reason to give each student the same dose of formative assessment.

Réinventer l'évaluation formative (Page 21). He begins this section by arguing that whilst it is natural for certain researchers to attempt to theorise formative assessment it is not they that are actually in the classroom. The failure of the many reforms are evidence of this. One can draw from this the need for more observation (contrary to Black and Wiliam). Perrenoud further notes that this exterior pressure will have little effect on what goes on in the classroom and that the focus should be on 'l'identité et la qualification (skill?) des enseignants' which is exactly what I am planning to do. He argues (Page 22) that simply proposing new approaches that require of the teacher a 'renoncement a ce qu'il est, a ce qu'il fait volontiers, a ce qu'il croit equitable ou efficace' has no hope of leading to any real long lasting change. This is where Harris 2007 can be discussed with her must, could, should approach. Perrenoud suggests there is nothing to be gained by attempting to insert an advanced approach into a rudimentary approach to teaching.

Perrenoud suggests the solution is to invest in the training of teachers. This is true but I believe that before this happens we need to have a clearer understanding of this process of the regulation of learning and to gain this by studying the classrooms of the 'spirit' teachers. He does sound a warning here that it is difficult to distinguish the part of the regulation of learning in the dynamics of the classroom.

Perrenoud concludes by saying that his pragmatic approach does not turn its back on theory building. He suggests we should not hide behind either words or practices that are impossible to practice. As he says, 'pour être pragmatique avec continuité et méthode, il faut une grande cohérence personnelle alliée à une certain tranquillité d'esprit. For this to happen he argues that this pragmatism must be shared across a number of teachers, and assumed collectively by teachers with the same objectives.

Next steps:

Black and Wiliam (2009) and their attempts at theory building 'moments of contingency'.

The fact that in 2010 formative assessment remains underdeveloped.

The authors who studies the letter and spirit of formative assessment

Possibly beliefs and practices

Then my own intervention which will hopefully reinvent formative assessment is something that is practicable, seen as interacting dynamically with teaching, on-going rather than sporadic, realistic in a real world classroom and is more part of the on-going regulation of learning.

11. Black, P. & Wiliam, D. (2009) 'Developing the theory of formative assessment', *Educational Assessment, Evaluation and Accountability***, vol. 21, no. 1, pp. 5 – 31.**

The authors begin by giving formative assessment a place within broader theories – not sure if they do in BW 1998, maybe a slight change? They relate their theory building to 'pedagogic initiatives' which demonstrates that we are still in the realm of initiatives.

In the paper, the authors have five aims:

1. To provide a unifying basis for the diverse practices which are said to be formative.
2. To locate formative assessment interactions within more comprehensive theories of pedagogy
3. To link their analysis to other theoretical writing about learning interactions
4. To demonstrate how their findings might suggest ways to extend/improve formative assessment practices
5. To offer suggestions for further research

**Need to look up Wiliam 2007a who has written about regulation of learning – clearly the term is beginning to see more usage

The authors begin in their first aim by stating five practices which their earlier work on formative assessment concentrated on:

1. Sharing success criteria with learners
2. Classroom questioning
3. Comment-only marking
4. Peer and self assessment
5. Formative use of summative tests

They say that whilst these five practices are connected previous work has not demonstrated how. They go on to note three key processes (using work of Ramaprasad):

1. Establish where learners are in their learning
2. Establish where learners are going
3. Establish what needs to be done to get there

The authors note that traditionally the teacher has been responsible for all three but that now we must consider the learner's (and his peer's) role. (I think P 1991 may have disagreed with this about who responsibility it is).

The authors then cross the three processes with the three agents (teacher, learner, peer) in order to come up with five strategies:

	Where the learner is going	Where the learner is right now	How to get there
Teacher	1. Clarifying learning intentions and criteria for success	2. Engineering effective classroom discussions and other learning tasks that elicit evidence of student learning	3. Providing feedback that moves learning forward
Peer	1. Understanding and sharing learning intentions and criteria for success	4. Activating students as instructional resources for one another	4. Activating students as instructional resources for one another
Learner	1. Understanding learning intentions and criteria for success	5. Activating students as the owners of their own learning	5. Activating students as the owners of their own learning

This framework can be seen as what happens. What is more important to understand is *how* it happens. I.e. how are these strategies link not only with one another but also with instruction (only point 4 above mentions instruction) and how the whole regulates learning.

The authors note how the five practices above can be seen as ways of 'enacting these key five strategies'. The authors note that they are not the only way and Perrenoud would agree with this in as far as formative assessment is not the only way to regulate learning.

On the fifth practice (formative use of summative tests) the authors note how the issues are more complex. In fact, they are very simple as the main issue is the intended purpose – if the intended purpose (and ultimate use) is formative then the test no longer sits under the summative umbrella. In fact, the distinction is unhelpful and many authors have discussed this.

Of the five strategies above, the first three are discussed in detail in this paper. The authors note how the subject of formative assessment has been expanded to include other areas such as meta-cognition and self-regulated learning / self-assessment (I still distinguish between the two, the first being a process and the second being a practice; for this reason I would put the second within formative assessment but not the first – may be worth referring to Perrenoud here). In enlarging the field the authors claim that they are moving away from a list of activities which are likely to be introduced superficially towards a linking of these concepts. Perrenoud might argue that we are essentially moving towards regulation of learning as it would seem wrong to continually enlarge what

we mean by formative assessment. Better, perhaps, to keep formative assessment at a level of practices?

Based on these discussions, the authors identify four main themes for discussion:

1. Teachers, learners and the subject discipline
2. The teacher's role and the regulation of learning
3. Feedback and the student-teacher interaction discussed in terms of levels of feedback, the fine grain of feedback and differentiation
4. The student's role in learning

There are very clear links to Perrenoud's work on the regulation of learning. In their paper, the authors deal in depth with the second and third themes.

In the next section (formative assessment, communication and contingency) the authors present a general overview. They begin by defining formative assessment as follows:

> Practice in a classroom is formative to the extent that evidence about student achievement is elicited, interpreted, and used by teachers, learners or their peers, to make decisions about the next steps of instruction that are likely to be better, or better founded, than the decisions they would have taken in the absence of the evidence that was elicited

Key to my study is the reference to 'next steps in instruction'. It is clear that we are not talking about instruction here, which the authors note is the 'combination of teaching and learning'. So the main point here is that the two remain separate.

Of further relevance is the authors' reference to 'moments of contingency' which, they say, helps to distinguish it from an overall theory of teaching and learning'. Perhaps it does, but this is unfortunate. Comparisons can be drawn between moments of contingency and regulation of learning – contingency is a plan made in case something else happens and with regulation of learning Perrenoud notes how 'il faut constamment rectifier le tir'. Where Perrenoud and Black and Wiliam part is in Perrenoud's rhetorical question: pourquoi dissocier deux moments consécutifs? (i.e. instruction from assessment).

The authors then note how moments of contingency can be either synchronous (happening in real-time in the classroom) or asynchronous as in written feedback on a piece of work.

There is then a brief discussion about what is termed I-R-E – initiation, response, evaluation before the authors outline the way they perceive the process of formative assessment. They set out a number of steps, step one being the teacher's interpretation of the pupils' responses, step two being to decide on the best response in light of the original task and finally step three involves formulating the detail of the response 'to best serve the overall strategy'. The authors use these three steps as a basis for the next three sections of their paper. What would be useful here is an example of how this works in practice, an example that demonstrates how it is impossible for the response not to involve instruction at one level or another. It would then be useful to demonstrate how, as a result, a distinct

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theory of formative assessment is neither possible nor helpful (especially if meta-cognition and self-regulated learning are included)

Section: models for interpretation of the learner's responses. In this section connections between formative work and theoretical writing about student's learning are explored. Begins by noting that a teacher's own thinking may also come to be modified and gives the work of Davis (1997) as an example – 'hermeneutic listening'.

The authors cite Perrenoud: 'without a theoretical model of the mediations through which an interactive situation influences cognition, and in particular the learning process, we can observe thousands of situations without being able to draw any conclusions'. The authors use this as a justification to develop their standalone theory of formative assessment however Perrenoud, in saying this, is not suggesting this particular approach as he does not see why instruction should be separated from formative assessment. The authors are correct in stating that a teacher needs to understand the thought processes of the student in order to design the most appropriate response: the authors talk about responses that need to be 'constructed in the light of some insight into the mental life that lies behind the student's utterances'. This is a valid point as formative assessment is not just about working out how to respond to students' responses but also, and perhaps more importantly, an understanding of why they made it

The authors then consider theories that come under the umbrella of self-regulated learning. They claim this meets Perrenoud's requirements for 'theoretical models of the mediation' however it completely misses the point as by the term 'mediation' Perrenoud means the mediation between formative assessment and instruction as well as the mediations between student and teacher.

Black and Wiliam do agree with Perrenoud in as far as these decisions (on how to respond to a student's response) need to be taken quickly and often without the time for reflection. The two steps involved (diagnosis and formulation of appropriate response) involve complex decisions. This is further complicated by the lack of knowledge we have as to what is actually happening in the mind of the student: 'teacher can never compare the model he or she has constructed of a child's conceptualisations with what actually goes on in the child's head'. Again there is agreement between Black and Wiliam and Perrenoud. Black and Wiliam suggest the best that can be achieved is a model, whilst Perrenoud asserts that this still does not prevent the regulation of learning from taking place.

The next section discusses 'feedback strategy and the learning aims'. It might be expected that this section will accept that much of the way in which a teacher provides feedback actually takes the form of further instruction. This however does not happen:

The authors begin by noting that 'in the practice of instruction the first step is to decide upon the aims and then to plan the activities through which these aims may be realised (similar to Perrenoud's regulation of activities). The authors argue that the different nature of these aims has an impact on the nature of the formative assessment. The authors assert that the formative practices that they

have set out previously reflect general principles of learning such as socio-constructivism and meta-cognition. Perrenoud would argue that this is not necessarily the case and that formative assessment moves beyond particular pedagogies as it can be just as present in a behaviourist classroom.

The authors introduce two *innovative* and *distinctive* forms of instruction (note the emphasis): The cognitive acceleration programme and dynamic assessment. It would appear that the authors have not progressed much since their 1998 paper which documented a large number of innovations and new pedagogies which reportedly made use of formative assessment. The main three elements of cognitive acceleration, for example, are cognitive conflict, meta-cognition and interaction but exactly what this has to do with building the theory of formative assessment is unclear. This cognitive acceleration takes place outside of normal lessons (in the example given). This could be another way of perceiving it as separate as it is so clearly not part of the normal instruction.

Dynamic assessment is based on 'an explicit theory of guiding and interpreting teachers' work', and centres on the principles of 'challenging and developing the learner's thinking'. They note that a teacher should not focus upon the completion of tasks but should 'follow up each success in a sustained and strategic way to build up further the learner's capacity to learn'. Furthermore this should happen even if it is at the expense of students making progress in a particular topic or subject. It has to be asked how realistic this actually is within the confines of a real classroom. Again, Perrenoud (1991) could be brought in here as he discusses in some detail the 'reality' of teaching. In discussing dynamic assessment which is 'a comprehensive pedagogy' Black and Wiliam appear to continue their need for a new pedagogy, whilst Perrenoud would argue not for a new pedagogy but an enlargement of those that already exist.

In discussing 'subject content priority – lesson plans' the authors note that teachers have to start with an 'opening move' (perhaps this is where the links between formative assessment and instruction will be made). They say this opening move often begins with an explanatory question. The example given is a Japanese one, called 'neriage', which means 'kneading'. However, after noting this opening move, formative assessment seems to appear almost immediately, and it is not clear what type of teaching / instruction has actually taken place. In order to 'recitifier le tir' there clearly needs to be some sort of 'tir' in the first place. The authors cite the work of Takahashi (2008) who, in explaining neriage notes how the students are 'carefully guided by the teacher'. Again, the actual instruction seems absent and this approach almost appears to be in the realm of discovery learning which the authors criticise. The authors do not that 'the teacher will have some sort of learning attention' but pay scant attention to any act of instruction on the teacher's part. The opening move is where one might expect to see at least a passing reference to instruction, however the example given only goes as far as to note an 'exploratory question'.

Later in this section the authors discuss the nature of these tasks or problems that are put to the students by the teacher. Is this really the way many teachers teach? It is possible to draw a comparison in this section with Perrenoud's regulation of learning as the authors note that 'as any particular task is implemented, the 'tuning' of that task to the responses can also be very challenging

for teachers'. Clearly, tuning and regulation are similar if not identical, and in fact it is possible to argue that the whole of formative assessment is in fact tuning and therefore fully encompassed by regulation. Again, the tasks are only 'implemented' and so the actual instruction appears absent. Having passed quietly over the discussion where instruction could reasonably be thought to come up the authors then move their discussion onto feedback tactics.

In the section on 'feedback tactics' Black and Wiliam critique the work of Hattie and Timperley who formulated four levels of feedback. Hattie and Timperley did not however cover several important areas: they did not examine how the teacher actually diagnosed the student's response and therefore the feedback cannot be restricted to one of the four types of feedback. The authors suggest that self-regulated learning, which clearly has an impact on the student's responses also needs to be taken into account (Black and Wiliam position self-regulated learning within formative assessment whilst Perrenoud does not). Hattie and Timperley are also critiqued for not having considered the effects the feedback has on the 'learning orientation' of the learner and for not considering reverse feedback (from student to teacher). The feedback considered by Hattie and Timperley is 'transactional' in nature – the authors make this point and then bring in once again their focus on classroom discourse which is, at least, more akin to Perrenoud's regulation of learning.

On the subject of classroom discourse, the authors note the importance of further research but underline that it is not directly related to the five-strategy model which, they say, are the key processes of formative assessment. The authors then assert that none of the five strategies occurs in isolation which is true of course, however from reading this paper there is the underlining assumption that these five strategies appear to occur in isolation from teaching. Black and Wiliam note the interplay between strategies as being 'particularly complex in the conduct of classroom discourse' however I would suggest that it is more important to consider the interplay not only of these five strategies but also of the deliberate acts of instruction, and to consider the whole as a part of the regulation of learning.

Conclusion. In this section the authors do posit that 'formative assessment must be analysed as reflecting the teacher's chosen path to develop learning. Presumably the teacher's chosen path includes some acts of instruction. Unfortunately, and yet again, the two successive moments have been completely disassociated. It is therefore vital to (page 24) there is little evidence to suggest they acknowledge the dynamic interaction between instruction and formative assessment, and how the latter can, in essence, become the former.

The authors note the 'complexities of educational practice' but I would argue that in attempting to simplify these practices (in conducting a study of formative assessment as a standalone concept) the theorising of academics has only lead to the concept of formative assessment being even more complex in the minds of the teacher; the two clearly need reuniting.

Finally the authors note the importance of creating and capitalising upon 'moments of contingency' (clear links to regulation of learning) as well as using the five key strategies that they outlined. In particular the authors suggest that moments of contingency 'create the possibilities for whole class discussion to be improved'. There could be room for further study here; clearly a teacher's approach

(which is itself a result of their pedagogy) is responsible for both creating these moments of contingency and, more importantly, acting upon them. It is a positive sign, at least, that this paper ends by referring to moments of contingency as they are so similar to Perrenoud's regulation of learning. Instruction, however, remains absent throughout.

The authors suggest two further lines of enquiry (differences between school subjects as regards formative assessment, and differences between the stages of a student's education). My line could well be the differences between those teacher appearing to be involved in the spirit of formative assessment and those involved in formative assessment to the letter. It could investigate differences between regulation of learning and regulation of activities and relate these differences to the spirit / letter approaches towards formative assessment by the teachers.

I will certainly claim that:

1. Formative assessment is a form of instruction and should be recognised as such (pour quoidissocier deux moments consécutifs)
2. Until this is the case it will remain a superficial add-on
3. Formative assessment is on-going (constamment rectifier le tir)
4. Innovations are not helpful – formative assessment requires 'petites touches'
5. Black and Wiliam have an act to grind – their insistence on developing a theory of formative assessment (something that is as simple as on-going regulation) is exacerbating the problem

In order to back up some of these points, I now need to examine papers that do not have a particular point to make in order to understand what is reportedly happening in the classrooms under study – how are teachers dealing with formative assessment?

12. Torrance, H. & Pryor, J. (2001) 'Developing formative assessment in the classroom: using action research to explore and modify theory', *British Educational Research Journal***, vol. 27, no. 5, pp. 615 – 631.**

Method: this project used an analytic framework developed in previous research, it then carried out action research, the analytic framework was adjusted in light of the research and then a model was produced.

This paper will be used to discuss the different approaches by teachers towards assessment before introducing the notion of spirit and letter of formative assessment. It is a good practical example of how teachers develop formative assessment. The paper demonstrates clearly that teachers find formative assessment is a continual process rather than a technique that happens at a given moment. It also appears to continue to place assessment as separate from teaching.

The paper begins with a useful general statement about the need to 'develop the potential of classroom assessment to support learning' which has become more apparent through the work of many researchers, notably Black and Wiliam (1998). They note how Black and Wiliam have called for research 'in trying to establish new practices in formative assessment'. This could well be one of the possible causes of the under-development of formative assessment – maybe there is more of a need to develop current practices rather than in developing new ones that situate assessment apart from teaching.

This project reported in this paper had two aims:

1. It focused on classroom issues and sought to build on basic research already carried out
2. A focus on how a collaborative action research project approach to professional development might bring about change in practice

The authors refer to their previous project in which they were able to produce an analysis of teacher's informal assessment practices with children aged 5 – 7. They looked at the way routine classroom assessment might be integrated with pedagogy which suggests that they were not looking to develop a new pedagogy but fit formative assessment into one that already existed. Their project paid 'close attention to linguistic structures' (essentially what was said in the classroom) which is something that I could focus on i.e. examining dialogue in the 'spirit' classroom.

KEY: The authors draw attention to 'forms of language which departed from the usual patterns of classroom discourse' and in so doing this could be compared with the dialogue that regulates activities and the dialogue that regulates learning (after drawing comparisons with regulation of learning and the 'spirit' of formative assessment. The authors note the 'great differences between children in the same class' which suggests a link to differentiation which, as Perrenoud argues, is a primary assumption of formative assessment. Perhaps 'spirit' teachers are successful in differentiating?

Divergent and convergent assessment:

The previous research identified two practices which they said were not mutually exclusive in practice: divergent assessment and convergent assessment. Maybe the following concepts can be divided up as follows:

Divergent assessment	Convergent assessment
Formative assessment	summative assessment
Regulation of learning	regulation of activities
'Spirit' of formative assessment	'letter' of formative assessment
Socio-constructivist classroom	behaviourist classroom

The authors note that divergent and convergent reflect 'the teachers' differing views of learning and the relationship of assessment to the process of intervening to support learning'.

Formative assessment appears in the two columns above suggesting, in agreement with Perrenoud that it can be present whatever the teaching style.

The authors discuss the difficulties of getting teachers to change their practice. They cite Brown and McIntyre (1993) who note that 'innovations are rarely accepted by teachers because they are viewed as impractical'. This may be a reason for lack of formative assessment in schools, especially as it is often seen as an add-on to current practice and therefore impractical. There may be some mileage on concentrating on the ability of formative assessment to be present regardless of the teacher's adopted style: formative assessment therefore transcends pedagogy. What I will study is not an innovation but an enlargement if current practice.

The authors produced an analytic framework of the processes of formative classroom assessment. They note how the teachers involved in their project came to view the framework more critically with respect to 'how it was necessary to reintegrate aspects of this framework into a more holistic model of classroom assessment'. The framework was subsequently modified.

KEY: There is a hugely important quote from this paper about the nature of assessment:

> While assessment was no longer conceptualised purely in terms of officially sanctioned test [the researchers spent a lot of time with the teachers discussing the nature of assessment] the teacher researchers still viewed it as an essentially formal requirement. Assessment, even within the regular routines of the classroom, was seen as an *additional task, separate* from teaching.

> There was little sense at this stage that classroom assessment might be a process

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I would argue that this is the way formative assessment continues to be recognised, partly due to the way in which it is being presented to teachers. My study will look at formative assessment as a process, and one that interacts dynamically with teaching.

In the first phase of the project the teachers identified two key phases, the second of which is particularly relevant. This involves the need for teachers to 'respond more flexibly to students in the classroom and think about a more divergent approach'. In other words, the teachers recognised the need to regulate learning and not just the behaviour or tasks. This also raises again the notion of differentiation.

In the second phase the teachers 'began to operationalise changes in their practice'. They began viewing the framework more critically, pointing out that in practice the processes as presented in the framework 'were often embedded one within another, or occurred in linked sequences or progressions'. Again this is key as teachers are recognising the dynamic interaction between the processes but they still (as far as it is possible to tell from the paper) do not appear to recognise the dynamic interaction between teaching and assessment.

The authors note how goals and criteria had to be 'continually refined and re-established through interaction' and again it is possible to see here links to the on-going regulation of learning (rectifier le tir).

Page 624 raises once again the important notion of differentiation as part of the on-going process of formative assessment: it was recognised that making criteria clear to students should take place at the individual student level rather than as a whole class.

Two contrasting styles are given on page 624 which demonstrate how formative assessment can be seen to work across all teaching styles. One teacher found herself more confident in dealing with the changing requirements of students in an ad-hoc manner whilst another found that more thought was being put into the presentation. Here formative assessment is being incorporated into practice in two markedly different ways. Another teacher noted how he felt 'more fluid' in lessons again suggesting formative assessment more on the 'spirit' end of the spectrum or, if speaking in terms of regulation of learning, there is clear evidence of 'rectifier le tir'.

Conclusion. The authors note the importance of allowing the teacher researchers to realise that they could begin to explore a 'repertoire' of assessment strategies rather than implement something completely new. Reading other papers, implementing something completely new appears to be the approach adopted, which may explain why it has been so unsuccessful. After initially using the analytic framework it was accepted that 'subsequent practical development required reintegration into a more holistic (taking everything into consideration) and dynamic model'. In this project the focus was on initial discussion, questioning, observation and feedback. The teaching element still appears rather difficult to distinguish.

This paper also raised the difficulties of getting teachers to see the importance of formative assessment (find page for citation)

This could link in with Harlen (2005) who wrote about tensions and synergies between summative and formative assessment.

After discussing tension could then move on to look at spirit and letter of formative assessment – have 'spirit' teacher resolved these tensions? How do they approach the issues of formative assessment?

13. Coffey, J. E., Sato, M. & Thiebault, M. (2005) 'Classroom assessment – up close and personal', *Teacher Development*, vol. 9, no. 2, pp. 169 – 184.

This paper is first and foremost related to the type of change that is needed in the development of formative assessment.

It suggests that teachers' beliefs must be taken into consideration.

It suggests that change is often superficial when this does not happen.

It suggests that teachers are not always aware of any gaps between practice and beliefs.

It suggests that change is personal.

It suggests that classroom change that is adopted quickly is often superficial (innovations therefore are not the way forward)

I would add to this the way that formative assessment is perceived as separate from teaching (this paper says that it is inseparable).

This paper considers teachers' beliefs and the way they influence their use of assessment. It takes the view that the approach needed was a concerted effort to help teachers to incorporate assessment into 'their own ways of working with students'. In this way the issue is not about innovations but about a slow change in practice. The paper notes at the very beginning that assessment is inseparable from the instructional practices of the teacher which is the first admission of this type since the very early papers on assessment. Finally here we have a united assessment and teaching.

The approach taken was for teachers to become aware of the nature of the gap between their actual practice and the beliefs they have of themselves as professionals.

The paper recounts in some depth the experiences of two high school teachers in the USA who were part of a project to improve their assessment practices in science: 'they all believed that high quality assessment is a central feature of good teaching but that their existing practices fell short of their own goals. The approach was deliberately non-prescriptive: 'teachers were provided with opportunities and room to grow in terms of their teaching practices, particularly with respect to assessment'. The two teachers were chosen from a group of 30 as they had markedly different approaches to assessment.

The first teacher had a strong focus on content knowledge and on frequent testing. These were influenced by 'her view of subject matter, constraints due to class size, her sense of fairness and how she saw her role as a teacher'. Interestingly one approach was not to help any student more than another in order not to be unfair – clearly there is a lack of differentiation here. For example she would place little weight on the comments made by students (as evidence of learning) as there was no opportunity for every student to respond to every question. This teacher's questioning practices were examined and these could form the basis of my own study (see page 173 for these questions).

As the project progressed and the teacher spent more time with the researchers she began to reflect more critically on her questioning techniques, in particular 'what she was looking for in terms of student understanding'. She began to change the way she listened to students.

The second teacher was helped to improve his concept of assessment to include the formative aspect – before the project his view of assessment was that it was primarily a device for labelling students as successes or failures rather than to improve learning. Whilst the teacher was eager to move from assessment of learning towards assessment for learning he still had to find a place for it that fit his beliefs and his teaching practice. The authors suggest a 'move' is necessarily, but maybe a better way of describing this is an expansion to encompass formative assessment. For this teacher there were no sweeping changes or adoption of innovative techniques and strategies (refer to Black and Wiliam). The authors refer to this teacher' 'internal compass' responsible for his decision-making, a comment which could be related to regulation.

Through working with the researchers this teacher began to understand possibilities of using assessment to support learning, and also began to actively look for ways to incorporate it into his teaching in such a way that it is linked to teaching and learning.

The nature of change:

The authors discuss the nature of change, noting that it is 'shaped by the beliefs and values held by each teacher, particularly towards areas where they felt that their changes would matter'. Clearly a focus on formative assessment matters. The authors note the varied paths that teachers must go down when effecting change in their classrooms – change is personal and the desire to change is driven from within.

The authors discuss in some detail their approach when working with the teachers. They began by clarifying how teachers viewed assessment and asked them to produce an inventory of the types of assessment already practiced. The researchers then worked with the teachers on their emerging interests. They note that 'long lasting change must be seated within the person, so it must arise from the work and reasoning of the teacher if it is going to last'. Furthermore, 'form meaningful and lasting change a teacher's priorities, beliefs and visions cannot be overlooked. They note that

Effecting change:

'efforts to catalyse change must involve much more than introducing new ideas and strategies' (page 182). The authors also discuss the practice of 'scaling up' which they say 'implies teachers will employ new practices well solely if they transfer the techniques faithfully to their own classrooms'. The authors view is that for real change to happen 'the individual teacher's priorities, visions and contexts' need to be honoured.

Perhaps change, as introduced in many schools, is leading to formative assessment to the letter – superficial and short lasting: the authors note that 'classroom change adopted quickly and that which may look like progress can turn out to be fleeting and superficial'.

What, then, is the nature of a teacher's belief and the resulting nature of their classrooms that encourages formative assessment to the letter?

This paper has demonstrated what can happen when there is a team of researchers present to help effect change over an extended period of time. This is clearly not a real life example.

Here beliefs are seen to affect practice and these beliefs have been slowly changed. What is needed is a discussion of actual practice that is not being affected by a concerted effort by teachers to change teacher's practice.

The next paper (Marshall and Drummond) discusses two different approaches to wards formative assessment – the letter and the spirit of formative assessment. This paper will look at actual evidence of practice.

14. Marshall, B. & Drummond, M. J. (2006) 'How teachers engage with Assessment for Learning: lessons from the classroom', *Research Papers in Education*, vol. 21, no. 2, pp. 133 — 149.

This paper is useful as it describes the practices of four teachers who are conversant with the practices of formative assessment but who integrate them into their teaching practice in markedly different ways. It moves on from the Coffey paper as in that paper the teachers were taking part in an action research project and therefore actively engaged in changing their own practice with the support of the researchers. Coffey was a planned intervention, whilst this paper examines actual formative assessment practice.

The paper begins with the hypothesis that formative assessment is built on an underlying pedagogic principle that foregrounds the promotion of student autonomy. The papers looks at the ways teachers practice reflects this principle and in so doing draws a distinction between teachers engaged in the 'spirit' of formative assessment and those engaged in the 'letter'.

The paper begins by noting the four underlying principles of formative assessment as forwarded by authors such as Black and Wiliam:

1. Questioning
2. Feedback
3. Sharing criteria
4. Peer and self-assessment

The paper sees formative assessment as 'essentially provisional, partial, tentative, exploratory and, inevitably, incomplete' and it is these features that can be said to represent its 'spirit'. Clear comparisons can be drawn with Black and Wiliam's moments of contingency and Perrenoud's 'rectifier le tir'. The authors bring in Torrance and Pryor's notions of divergent and convergent assessment. They also refer to Perrenoud's notion of the regulation of learning but are wrong in saying that Perrenoud characterised assessment for learning as the regulation of learning; in reality what he did was encompass assessment for learning with his notion of regulation of learning. Perrenoud does say that tasks 'are not just imposed on the pupils but adjusted once they have been initiated' and this is of course correct.

The authors appear, quite rightly, to distance themselves from considering formative assessment as merely the 'application of certain procedures' noting that it is more about the 'realisation of certain principles about teaching and learning'. The authors ask whether teachers need to share these principles in order to carry out change to their practice, or 'whether altering classroom practice through the application of certain techniques is sufficient'. I have attempted the second of the two and found the result to be superficial and impossible to maintain.

In discussing underlying principles the authors cite Coffey *et al* who noted that 'practice is ripe for modification when teachers begin to understand the nature of the gap between their own current actions and the picture they have of themselves as professionals'.

The authors found that there was a real difficulty in transforming these formative assessment procedures / techniques into 'classroom cultures that promote pupil autonomy'. They found that about a fifth of lesson captured what they called the 'spirit' of formative assessment. They characterise this 'spirit' as the 'high organisation based on ideas' where the underpinning principle is developing student autonomy. The spirit also implies a move away from the application of a rigid technique.

The first main section, after looking at their methods, was an in depth observation of interactions between teachers and pupils in lessons.

The authors look at two particular features of lessons – tasks and dialogue and for both compare two teachers who appear to sit at opposite ends of the spirit – letter continuum.

Tasks: both of the teachers examined adopt two of the formative assessment procedures noted above: making criteria explicit and peer and self-assessment. The first teacher focused on accuracy and could be said to be convergent in approach. The teacher sought right answers. The second teacher's approach was more divergent in nature and did not focus on getting the answer right. The authors note the main differences as being concerned with 'the potential scope of the tasks and the opportunities these afforded for current and future pupil independence'

Dialogue: again two teachers are compared. The first 'spirit' teacher appears constantly engaged in developing the students' ability to 'understand what constitutes quality or a good answer': students frame their own notions or quality and refine these in interaction with members of their group. The second 'letter' teacher makes learning explicit through instruction and then 'teases this out through a series of closed questions'. Of real relevance to this paper is the observation that

> 'there is a disjunction between the initial expression of the intended learning outcome – phrased as a question – and the subsequent activity – writing a monologue as one of the characters'.

The authors describe how the 'instructional tenor of the exchanges continues beyond the opening phase of the lesson and into the group activity'. In this example, instruction and formative assessment appear to be separated. The authors continue to note that 'the exchange has been preceded, and so framed, by a sequence which is closed and again instructional in nature'. The authors note that the 'letter' teacher's use of formative assessment procedures appear as 'surface features' and also that 'one activity does not rise out of the previous one' and is therefore fragmented.

The authors here are drawing a distinction between instruction and formative assessment which could well be seen as a result of a 'letter' approach to the development of formative assessment. The letter approach is characterised by 'surface features' which are separated from instruction, superficial and difficult to maintain. They are completely at odds with Perrenoud's notion of

regulation of learning which required a constant 'rectifier le tir'. The nature of the formative assessment being developed in the second example has the effect of separating it clearly from instruction. Not only should the two interact dynamically but the instructional nature of formative assessment should be accepted.

The next section discusses the role of teachers' beliefs.

The key messages from this section are as follows:

- Teachers do not all negotiate the pressures of the performance culture in the same manner
- To a great extent teachers value student autonomy as an explicit aim in their teaching
- Teachers hold themselves (and not the pupils) for any impediments to the children's' learning

Again letter and spirit teachers are compared. With a letter teacher 'formative practices map onto practice as procedures, which can be adopted to change the behaviour of pupils, as an aid towards their greater independence'. It is said that this teacher 'enjoys less of a symbiotic relationship between the underlying principles of formative assessment and the process of learning and the learner. This teacher's use of procedures ensures that there is little / no continuity between her teaching and the resulting formative assessment technique employed. Whilst the letter teacher employs 'procedures, the spirit teacher appears to work in the area of 'ideas'.

Significantly the authors note that the adoption of formative assessment techniques, strategies or procedures 'does not sufficiently aid them in creating the classroom culture they claim to want'. Adoption is not enough.

Conclusion. The authors note the following:

- The beliefs of some teachers map more readily onto what we have called the spirit of AforL
- That the four procedures identified (questioning, sharing criteria, feedback, peer / self-assessment) need revision
- The spirit of formative assessment is related to the way teachers 'conceptualise and sequence the tasks undertaken by pupils in the classroom

Essentially we now need to move beyond a discussion of techniques which can be applied (or not) in a classroom. There is nothing to be gained (as Perrenoud points out) from comparing those teachers who engage with formative assessment and those who do not. The whole question has become much more complicated. It does involve a dynamic interaction between the four procedures but that is not all; also needed is an understanding of the dynamic interaction between the various formative assessment techniques and what is traditionally known as instruction.

Can my study look at the instructional nature of formative assessment in the classrooms of teachers who appear to engage with the 'spirit' of formative assessment?

Can my study examine the dynamic interaction between instruction and formative assessment in the classrooms of teachers who appear to engage with the 'spirit' of formative assessment?

Either way, I want to examine what happens in the 'spirit' classroom, and I want to do this with a focus on the integration / interaction of instruction and assessment because I see this as the cause of the problems currently being faced in the development of formative assessment i.e. formative assessment is being presented as a set of techniques that are separate to instruction. Whilst now it is accepted that these techniques interact dynamically, there seems to be very little work in how instruction and formative assessment (as characterised by these techniques) interact.

Can the whole be compared with Perrenoud's concept of the regulation of learning? Is there anything to be gained from a synthesis of 'spirit' of formative assessment and the regulation of learning? Perrenoud himself admits that the concept has 'considerable inertia' – in other words formative assessment is here to stay.

15. Poehner, M. E. & Lantolf, J. P. (2005) 'Dynamic assessment in the language classroom', *Language teaching research,* **vol. 9, no. 3, pp. 233 – 265.**

The main aim of this article is to link dynamic assessment and formative assessment. It suggests a reconceptualisation of formative assessment along dynamic assessment principles.

Dynamic assessment is an approach that argues that it is wrong to consider a person's 'solo performance on a test represents a complete picture of the individual's capabilities'. Two extra pieces of information are needed:

- the person's performance with assistance from someone else
- the extent to which the person can benefit from this assistance both in completing the task set and in transferring this mediated performance to other tasks

Essentially, what the individual is able to do one day with mediation, he or she is able to do tomorrow alone'. This is one of the central arguments of Vygotsky's Zone of Proximal Development.

A key element of dynamic assessment is the idea that any assessment should 'have the expressed goal of modifying learner performance during the assessment itself'. In this way assessment and instruction are united.

Dynamic assessment appears to take place in sessions e.g. initial dynamic assessment followed by an enrichment programme followed by a subsequent dynamic session.

Dynamic interaction as the name suggests is assessment that takes place dynamically between the teacher and the student

Page 254: the express goal of dynamic assessment is to 'unify assessment and instruction into a single activity'

Spirit / letter gave us a situation where formative assessment appeared to have become the whole thing with little, if any, room left for instruction. Dynamic assessment appears to unite the two. This unity however appears to take place in smaller groups, or one to one sessions and also has a focus on the right / wrong that has been discussed earlier.

This paper begins with a discussion of Vygotsky's ZPD. The authors note that, as called for in the ZPD model, 'assessment and instruction are dialectically integrated as the means to move towards an (always) emergent future…'

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The authors include a section where they refer to 'socio-cultural theory' which argues that 'cognitive change arises from the productive intrusion of other people and cultural tools in the developmental process'. They say that the unit of analysis is not merely the individual acting alone but 'the interpersonal functional system formed by people and artefacts…' This is relevant to dynamic assessment as it is concerned with looking at the individual and the environment as an 'inseparable dialectical unity that cannot be understood if the unity is broken'.

Two approaches to dynamic assessment:

- Interventionist
- Interactionist (the focus of their article)

The authors cite an article which reports a study that focused on interactionist dynamic assessment within a theoretical framework provided by the ZPD. In this study a distinction is made between assessment *by* teaching (which is dynamic) and assessment *while* teaching. In this section the authors note that when teachers are engaged in instructional activity 'things can move in unanticipated directions and at unanticipated rates'. This is comparable to regulation of learning.

In many of the examples given of dynamic assessment the teachers appear focused on things that are wrong e.g. 'do you see anything wrong?' (Page 245). Learning also appears at the level of knowledge recall: there is an example where the teacher is trying to tease out the French 'n'a pas cru' – there is only one answer that the teacher is looking for.

Links can be made to both Black and Wiliam and Perrenoud: the quality and quantity of mediation were always contingent upon a learner's responsiveness. (Page 246)

The authors dedicate an entire section to 'dynamic assessment and formative assessment'. (Page 250). After noting that formative assessment serves teachers in four ways they call into question the validity and appropriateness of formative assessment because 'as a knowledge base formative assessment has remained an informal procedure rather than being systematically into the curriculum and classroom practices'. This is one of the criticisms of formative assessment that I have made on several occasions.

The authors claim that the research into formative assessment has focused on implementing techniques rather than 'the ways in which pupils participate in this process'. Can compare to Perrenoud who criticised Black and Wiliam for studying the 'lowest common denominator' rather than studying in detail classes that appear to practise regulation. Interactions, then, seem to be a worthy object of study.

A distinction is then made between 'planned' and 'incidental' formative assessment. They say that incidental formative assessment is implemented through the 'instructional conversations that arise between teachers and students during normal classroom pedagogical activity'. Again, formative assessment and instruction no longer appear so very far apart. There is then a distinction between internal and external incidental formative assessment, with internal relating to the accomplishment of

a particular task (similar to Allal's interactive regulation) and external more to do with teacher and student reflection on learner performance (more to do with proactive and retroactive regulation).

Key: not surprisingly, the focus is on internal incidental formative assessment. Perrenoud's focus on interactive regulation is similar and this is probably where I should also focus.

Dynamic assessment brings in the notions of present and future (prognosis) development. Page 237 talks about constructing the future 'not *a priori* but on the basis of concrete mediated activity'. These notions appear similar to Ramaprasad and Sadler's discussion of 'closing the gap' but the authors would argue that their (R & S) approach is unsystematic

The focus of the paper is on internal incidental formative assessment. Not only do the authors argue that formative assessment is unsystematic (Page 254) they also note the way it has become separated from instruction, talking about the 'implicit bifurcation between assessment and instruction'. These two remain separate activities even though they may be jointly carried out'. The goal of dynamic assessment, they argue, is to unify these two concepts. This comment can be compared with Perrenoud who talks about the black box that is the student.

The key difference between formative assessment and dynamic assessment is summed up by the authors as follows:

> In formative assessment 'learning is a potential consequence that is sometimes unintended, and in dynamic assessment the learning is deliberate

I would argue that just because an approach is unsystematic it does not necessarily follow that it is unintentional.

The authors then argue that teachers have an incomplete understanding of the theory of the relationship between instruction and assessment and as such resort to 'gentleness' and 'extrinsic rewards' (Page 255). The result, they say, is that the teachers fail to intervene in the developmental process. Again, this can be compared to Perrenoud who talked about the difference between the regulation of activities and the regulation of learning. It would be interesting to see what we can learn from this completely new form of pedagogy and how this can be applied to the development of formative assessment.

There follows a couple of examples of dynamic assessment which do not appear all that different to formative assessment. In a dialogue between teacher and learner, the teacher conceded that the learner's spelling errors may have been due to a lack of allotted time. The authors suggest that a dynamic assessment approach would have given the student another opportunity to re-spell the word and in so doing discover the real source of the problem. It is debatable to what extent his example is good teaching and to what extent it is dynamic assessment.

The authors then proceed (Page 259) to distinguish dynamic assessment from 'scaffolding' suggesting that for an interaction to be seen as dynamic assessment the learning must not stop with the completion of a task but must involve the opportunity for students to demonstrate how they have

appropriated their newly developed abilities. This is clearly related to the goal of the ZPD which (Page 257)

> 'is not simply to help learners to master a specific task but to help them to develop a principled understanding of the object of study that will enable them to transfer from a given activity to other activities'.

The authors discuss the way in which a student's mediated performance can be used as a 'springboard for exploring the extent to which they were able to reduce the distance between their present and their future'.

The authors conclude their section on formative assessment by arguing that formative assessment which incorporates scaffolded assistance is not the same as opening a ZPD because scaffolding merely compensates from an ability lacking in the student (during the length of the particular task) and is not aimed at supporting long-term development . In doing so they are arguing for a dynamic assessment approach to assessment.

The authors distinguish formative assessment and dynamic assessment in three ways:

Formative assessment	Dynamic assessment
Unsystematic, with an incomplete understanding of the process through which learner development takes place (but with regulation of learning, mediation is also continually being renegotiated) Incidental	Follows a systematic approach based on negotiating a learner's Zone of Proximal Development. Systematic (negotiation of mediation aimed at development, with mediation being continually renegotiated) Intentional
Support during a specific task (scaffolding) is short-term	Aimed at long-term development
Limited to a classroom setting? And often contrasted with summative assessment, with feedback during assessments seen to compromise reliability	Assists on the inseperability of instruction and assessment. 'interaction during the assessment, with feedback during administration of an assessment are not a cause for concern but rather

and validity of these assessments'.	an indispensable component of the procedure'.

The third way in which formative assessment is distinguished from dynamic assessment appears to be rather confused as it brings in the concept of summative assessment –it is unclear if the authors are now contrasting summative assessment and dynamic assessment which, of course, would be much easier if they are to bring in the idea of support whilst a test is being carried out.

Finally the authors argue that dynamic assessment 'represents a perspective on assessment and instruction in which these are seen as two sides of the same coin. In other words, true assessment is not possible unless it entails instruction and vice-versa'.

These words are tempting indeed for someone who has spent so much time attempting to bring together instruction and assessment! The concept of dynamic assessment does however have several drawbacks:

- Is it not slightly patronising? E.g. 'the tutor calls her attention to the problem without indicating its precise nature'.
- It appears to ignore the real-world in which summative assessment, whatever one's views of it, inevitably plays a large part. We have to ask why we carry out summative tests.
- It involves the development of a whole new pedagogy involving initial session, dynamic assessment intervention, followed by another session. Perrenoud argues that regulation of learning does not apply to a particular pedagogy
- Appears to take place in small groups at best or individual basis
- Appears to involve sessions, followed by enrichment programmes followed by more dynamic assessment sessions
- Appears to concentrate on questioning designed to prise out the correct response (page 249 – the teacher 'interrupts again, this time explicitly naming the two tenses she should use and calling her attention to the fact that there is a difference between them')

Dynamic assessment unites instruction and assessment. This also is my goal but to unite the two in a different way. Dynamic assessment, like regulation of learning, is highly 'contingent upon a learner's responsiveness' (Page 246)

BUT it appears to put the argument back into the arena of correct responses with little room for higher order thinking

Formative assessment appears enlarged to the extent that there is no room left for instruction. Studies examining formative assessment ignore instruction. Marshall and Drummond (2006) is a

good example of Formative assessment becoming the whole thing. Here the argument has shifted completely in the direction of formative assessment.

We need an approach that reunites the two but not in the way that dynamic assessment appears to. For example, can I find evidence of what the authors would call intentional rather than incidental formative assessment but such that it does not fall back on simple right / wrong tasks – maybe includes higher order thinking, or encourages meta-cognition / self-regulated learning.

I am essentially looking at the spirit of formative assessment but the spirit working in dynamic interaction with instruction.

We do not require a whole new pedagogy but the widening of the one we already have so that formative assessment can sit comfortably with instruction.

It may be time to bring back into play the concept of the regulation of learning!

Expand formative assessment into the regulation of learning as a way of uniting the two concepts of assessment and instruction. Could the regulation of activities be compared to letter formative assessment and the regulation of learning be compared to the spirit of formative assessment.

Theoretical arguments / conceptual framework:

Letter of formative assessment (separate techniques, assessment and instruction separate) = regulation of activities

Spirit of formative assessment (assessment has become the whole thing) – excludes instruction

Dynamic assessment = unites assessment and instruction but has many drawbacks if it were to be developed in a normal classroom situation

Assessment + instruction = regulation of learning. (no new pedagogy, possible in a normal classroom)

16. James, M. & Pedder, D. (2006) 'Beyond method: assessment and learning practices and values', *Curriculum Journal*, vol. 17, no. 2, pp. 109 – 138.

The authors established three underlying dimensions of assessment practice:

1. Making learning explicit
2. Promoting learner autonomy
3. Performance orientation

They concluded that:

1. Tensions existed between the first two and the third (i.e. between formative and summative assessment).
2. Teachers need to be supported in closing their practice – values gaps (in particular for learner autonomy)
3. Teachers feel challenged in achieving a satisfactory blend of practice that they are comfortable with
4. Teachers placed high importance on making learning explicit and performance orientation
5. Gaps were wider for promoting learner autonomy and performance orientation
6. The widest gaps were for promoting student autonomy: teachers valued it but struggled in putting it into practice
7. Making learning explicit requires less radical change than developing student autonomy

My study will examine in much finer detail the characteristics of teachers who:

1. Appear to engage with formative assessment
2. Do not feel the tensions between formative and summative assessment

It will examine the characteristics of the teachers who fulfil the above two criteria. What, for example, are the characteristics of teaching that enables formative and summative to coexist without tension.

I will hypothesise that their engagement with formative assessment is implicit / deep / permanent / continuous / in dynamic interaction with assessment / only one way in which they regulate learning

Teachers who are involved in the on-going regulation of learning (or teachers who consciously differentiate their teaching) feel the formative / summative tension less keenly because the formative practices that result are so deeply embedded in their normal day to day teaching as to become indistinguishable from instruction.

I will use questionnaires to establish an initial sample from which I will be able to choose interviewees.

17. Webb, M. (2009) 'Technology in support of formative assessment in pedagogy', World Conference for Computers in Education. Universidade Federal do Rio Grande do Sul, Rio Grande do Sul, Brazil, 27-31 July. Available at:
http://www.wcce2009.org/proceedings/papers/WCCE2009_pap142.pdf**. (Accessed: 27 September 2009).**

Webb asked the research question: how can technology support the interactions and feedback processes of formative assessment?

Webb characterised the range of facilities and opportunities provided by technologies for improving feedback processes associated with formative assessment. These processes are beginning to be understood in relation to wider pedagogical processes but Webb did not investigate this in detail apart from to noting the complexity of these processes. Webb does note that there are huge challenges in trying to understand the interactive regulation of learning where technology has a role to play. Webb notes in her conclusion that the 'greatest challenges are pedagogical rather than technological' which is exactly where the question should be located i.e. it is not about the technology.

The study reported two very distinct strands:

- Six primary teachers who were embedding formative assessment practices into their teachers with the support of King's College, London. The aim being to understand 'classroom practices in formative assessment, the nature of interaction and feedback, and how formative practices were related to pedagogy'.
- ICT PGCE students. The aim being to investigate how technology 'can facilitate interaction and collaborative learning between beginning teachers within the classroom and beyond in an integral and coherent way'.

  Webb notes the work of Black and Wiliam who focused on oral and written feedback between teacher and student(s) and between students in pairs or in larger groups.

Webb recognises the work of Hattie and Timperley into feedback, but like, Black and Wiliam, notes how the feedback they studies involved a teacher – student interaction. Webb notes they did not look at peer, group and whole class interactions which are 'more complex' and the focus of Webb's paper. The paper focused on how technology can enable interactions between teacher and student and student and student and parent and student and in so doing support the feedback element of formative assessment.

It concentrates on teacher-to-student**s** and student**s** to student**s** (as opposed to teacher-to-student in written feedback. The study represented formative assessment that was 'synchronous' in the words of Black and Wiliam or the 'interactive regulation of learning' in the words of Perrenoud.

Webb cited Perrenoud on many occasions, in particular the two stages of regulation of learning: setting up activities that facilitate regulation, and actually regulating these activities.

Of the six primary school teachers all of them used technology in their teaching but only two of them 'were observed making use of the technologies to facilitate feedback processes'. Webb characterises the processes as:

- Use of IWB where both teacher and students annotate a piece of work – teacher models a feedback discussion whilst annotating work. Students are encouraged to participate in the discussion.
- Word processing with students working individually to respond annotations on their work made by the teacher
- Word processing to enable students to annotate their own work in a self-assessment process
- Word processing where students annotate each other's work in a peer assessment process

The following facilities of the technology are described as:

- Being able to return to previous versions of work
- Interactive nature of the screen
- Highlighting of work in a traffic light system

The PGCE strand used:

- Mobile phones for arranging meetings
- GoogleDocs for collaborative working
- Wikis for presenting finished work / resources
- VLE for course documents

Web notes that whilst the feedback process involved the use of technology, 'it is important for these processes to be part of a series of pedagogical processes'. Most importantly:

> 'sequences of pedagogical processes often comprised of complex sequences of activities alternating between whole class and group work'

My view is that these sequences become even more complex when looking at the process from the point of view of the regulation of learning. First, it is difficult to distinguish it from the regulation of

activities. Second, it is important to view the sequences as part of an on-going 'adjustment' rather than an intervention such as a 'feedback lesson'.

Webb used the work of Mercer (2007) related to 'the temporal aspects of talk in learning' and the work of Wells (2007) in connection with using activity theory to understand the complex sequences.

In particular Webb looked at the roles of the teacher, students and technology. These roles, especially of the teacher and students can be seen to relate to the 'division of labour' node of activity theory.

Webb notes that the sequence of activities that the PGCE students are involved in were 'heavily engineered'. Feedback was one of the planned activities and could therefore be considered at the level of regulation of activities as it is not clear whether regulation of learning was a feature. Only the final reported activity was open-ended where students were encouraged to continue their development through peer support – this was perhaps the autonomous learning element which Webb has mentioned previously.

The sequences of activities that the primary teachers were engaged in were also highly engineered. Again, this does not look like regulation of learning. The feedback lesson that is reported in more detail in Webb and Jones (2009) appears somewhat disassociated from the instruction that must have preceded it. This is not really the regulation of learning but the application of formative assessment as a procedure.

Finally, Webb notes something very important in connection with the use of technology:

> 'there is no suggestion in our research that technologies could actually generate feedback or become actors in these feedback processes in the near future'.

> 'the role of the technologies is to provide a range of tools to support and mediate the interactions and feedback processes between students and between the teacher and students'

Of interest to my study is the claim from Webb that 'technologies can extend opportunities for learning through feedback processes by making it easier to generate, store, retrieve, combine and review feedback information'. Again, we appear to be looking at formative assessment (feedback processes) as something that is separate from instruction.

Webb's methods:

Structured lesson observations, structured teacher interviews, student focus group interviews, informal discussions and scrutiny of lesson plans and students' work.

Webb then analysed their findings using a framework derived from activity theory.

My thoughts:

Many of the examples given could possibly have been done with simple pen and paper.

I will be looking at what the technology has added. What, for example, can be done with technology that before would have been difficult or even impossible.

Examples of technology supporting formative assessment include:

RMTutor – to facilitate synchronous (interactive) peer assessment (regulation of learning) or to allow the didactic control of student computers (regulation of activities)

Science Mark schemes on the VLE to allow parent – student interaction

English reading together on the VLE

English poems anthology on the VLE together with a forum.

Oral feedback on the VLE in MFL

Webb (2009) situates formative assessment within a larger set of pedagogical processes in which the teacher regulates learning on two levels:

- Setting up situations which favour the interactive regulation of learning
- The interactive regulation of these situations

My study builds on Webb in several ways:

Webb concentrated on feedback lessons - I will look at use of technology in normal lessons

Webb looked at PGCE ICT students and primary school teachers – I will look at secondary school teachers of a range of subjects

18. Webb, M. & Jones, J. (2009) 'Exploring tensions in developing assessment for learning', *Assessment in Education: Principles, Policy and Practice*, **vol. 16, no. 2, pp. 165 – 184.**

The focus of this study is on the changes in the roles of teachers and students that are the result of efforts to incorporate formative assessment (and the interaction this inevitable leads to) into teaching.

Webb and Jones used activity theory as a way of attempting to understand the changes involved when formative assessment was the focus for a number of primary school teachers.

Appendix 2   Presentation to ITT trainee teachers

Slide 1

Slide 2

How do you teach?
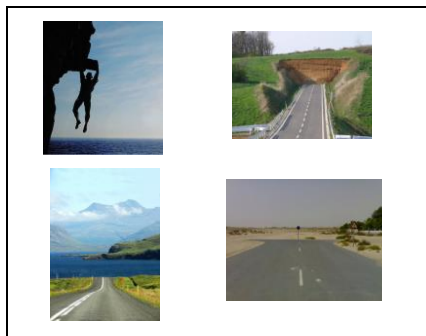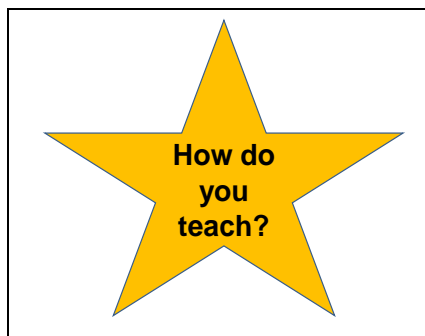
It is as simple as this! But there are plenty of terms that need to be understood

Slide 3

Investigating the relationship between Teaching, Learning and Assessment

Teaching

Learning

?
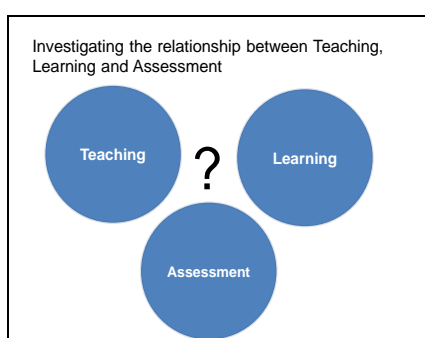
Assessment

Slide 4

Objectives:

What you *might* get out of the session:

Some thoughts on the relationship between instruction (teaching and learning) and assessment.

What I *will* get out of the session:

A valuable opportunity to present my thoughts to a wider audience.

What John *will* get out of the session:

An opportunity to work out whether I'm talking absolute nonsense or not!

Begin with a brief history of the development of formative assessment and then link this to my own experiences of developing formative assessment in my classroom. This will serve as a springboard to introduce where I am hoping to take my research.

Slide 5

Summative Assessment

Formative Assessment

For Sadler (1989) the main difference between Formative and Summative Assessment relates to purpose and effect rather than timing

Assessment *of* Learning

Assessment *for* Learning
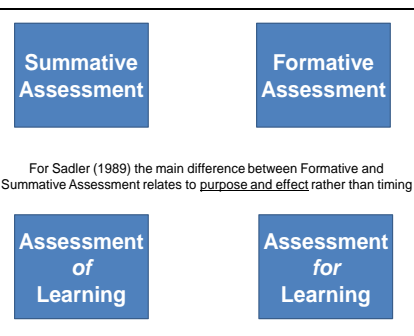
Briefly differences between AforL and AofL / FA / SA. Refer to Capel, Leask and Turner and the space dedicated to formative assessment

Scriven (1967) originally made the description between form and summative evaluation but Cronbach's paper (1963) alluded to the practice

Prefer the latter term as it suggests that nature of the assessment can be formative for both the teacher and the student (does not exclude the teacher).

Slide 6

Hypothesis:

The current approach to developing formative assessment in schools is failing as it encourages the *superficial* adoption of a set of *techniques* that are *separate* from instruction.
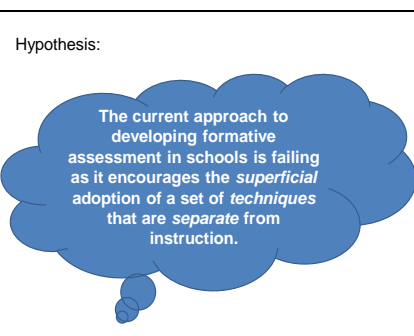
The next few slides will demonstrate how I have come to this conclusion.

Slide 7

Feedback in the 1920s

Pressey (1926) argued that tests taken in the answer-until-correct format not only evaluated students but *also taught them.*

Slide 8

Feedback in the 1970s

Immediate feedback seen as more effective than delayed feedback (a matter of seconds)

'…any of the numerous procedures that are used to tell a learner if an instructional response is right or wrong…'

Laboratory based

1970s and 1980s focused on the interval between instruction and feedback, focused on correct / incorrect responses, and was largely laboratory based. As a result the actual feedback became the object under study as it needed to be separated from instruction.

Slide 9

Feedback in writteinstruction

Kulhavy (1977)

'...as one advances along the continuum feedback complexity increases until the process itself takes on the form of new instruction...'

This quote demonstrates quite clearly that the relationship between instruction and formative assessment (or feedback in this case) is not a clear cut one.

This is what I have been thinking in my own teaching -

Whilst Kulhavy appears to accept that feedback can take the form of new instruction, he goes on to note that in his paper feedback is treated as a unitary concept and in so doing separates it from instruction.

Slide 10	but feedback also... 'works to increase what a person learns from an instructional unit' Kulhavy (1977)	So although feedback can be instructional there is nothing here to suggest that the two are linked Knowledge of results Feedback still in realm of correct – incorrect Laboratory studies (control groups) mean that feedback as an object of study has to remain separate to instruction
Slide 11	Feedback in the 1980s '...feedback is information about the gap between the actual level and the reference level of a system parameter which is used to alter the *gap* in some way...' Ramaprasad (1984)	Researchers jumped on the notion of closing the gap as it suggested active rather than passive involvement by students. E.g. Correcting every misspelt word in a French exercise book does not close the gap BUT doing corrections is time consuming and not always considered part of instruction. Feedback appears to be transactional in nature, retrospective, involving one to one
Slide 12	'...the goal of many instructional systems is to facilitate the transition from feedback to self-monitoring...' Sadler (1989) 1. Students possess a concept of the standard 2. Students compare actual performance with the standard 3. Students take appropriate action to **close the gap**	Sadler moves on from Ramaprasad by bring in the idea of a transition from feedback (which is often seen as transactional) to self-monitoring. Almost a transition from a procedure (feedback) to a process (self-monitoring). Can agree with this in so far as we appear to be moving away from procedures, but how far you can go in self-monitoring is debatable. Sadler notes that it is no longer appropriate to judge work in terms of correctness: it is more appropriate to think in terms of the quality of a student's response or the degree of expertise than in terms of facts memorised.

Slide 13	Creating a typology of assessment	Real classroom-based research. Feedbacks A and B do not close the gap and are not considered formative assessment.

<table>
<tr><td>Slide 13</td><td>

Creating a typology of assessment

Tunstall and Gipps (1996)

Evaluative ———→ Descriptive

A. Rewarding ———→ punishing
B. Approving ———→ disapproving
C. Specifying attainment ———→ specifying improvement
D. Constructing achievement ———→ constructing the way forward

</td><td>

Real classroom-based research. Feedbacks A and B do not close the gap and are not considered formative assessment.

Feedback A and B were seen as outside formative assessment

Feedback C seen as coming under the formative assessment umbrella. Feedback C was seen as relating to mastery goals (behaviourist, pre-specified criteria

Feedback D seen as relating to learning goals (constructivist, emergent criteria in discussion with students)

</td></tr>
<tr><td>Slide 14</td><td>

'...the borderline between what is defined as teaching, feedback and learning strategies is very close indeed ... Activities once defined as teaching or learning strategies are being **reconceptualised in assessment terms**...'

Tunstall and Gipps (1996)

Teaching   Learning

?

Assessment

</td><td>

When for example does formative assessment become instruction?

Tunstall and Gipps are talking a lot of sense; they seem to be the few authors who have the courage to accept that there is a problem with how we are conceptualising formative assessment. They do not appear to be attempting to separate assessment from instruction and to make it an object of study.

The whole situation was about to get a lot worse with the publication in 1998 of Black and Wiliam's huge review: Assessment and classroom learning.

</td></tr>
<tr><td>Slide 15</td><td>

Taking the initiative…

Assessment and classroom learning
Black and Wiliam (1998)

• Existence / absence of formative assessment
• Initiatives / innovations / projects
• Radical changes to practice
• New pedagogies

</td><td>

Black and Wiliam are the authors who have done the most damage to formative assessment!

Describe the rise of AforL since Black and Wiliam's 1998 study. Also Personalised Learning – nine gateways of which New Technologies and AforL were two

Describe my experiences of attempting to introduce AforL techniques in my teaching:

MSc based on the self and peer assessment of skills using RealSmart

Peer assessment based on two stars and a wish – Year 7 Ringwood

Audio and the VLE Forums (possible

</td></tr>
</table>

PhD to John's horror – based on action research)
Pilgrims – post exam Target Setting

All of these attempts could quite easily have found their way into Black and Wiliam's review.

However, I have found them all to be unsustainable. Ask myself 'why?'
Possible answers: superficial, sees assessment as separate from instruction
Then I looked into whether I was the only one to experience this – OFSTED– AforL under-developed
So, bigger picture was that other teachers were experiencing similar. Again ask 'why?' and began to develop the hypothesis that it is the way in which it is being promoted to schools, as a set of techniques, that can be adopted in lessons, which is the cause of its under-development. These techniques essentially work to keep AforL as a separate entity to instruction.

Slide 16

Five practices:

- Sharing success criteria with learners
- Classroom questioning
- Comment-only marking
- Peer- and self-assessment
- Formative use of summative tests

The results? A catalyst for a raft of policies, initiatives, projects which developed formative assessment in a superficial way because it was separate from instruction.

Slide 17

And I quote…

'…it is hard to see how any innovation in formative assessment can be treated as a marginal change…'

'…evolve new processes as quickly as possible…'

'…there is enough evidence in place for giving helpful guidance to practical action…'
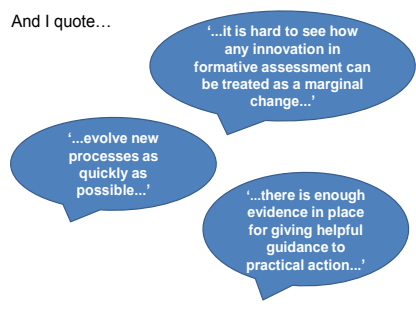
Slide 18

1. Peer assessment with two stars and a wish

2. Peer assessment of skills

3. Audio feedback through VLE forums

4. SMART Target setting

I returned to my laboratory (classroom!) and began experimenting. In each of these 'experiment' my instruction (teaching and learning) had become completely separated. The result – the adoption was superficial and of short duration.

Slide 19

From formative evaluation to a controlled regulation of learning processes: towards a wider conceptual field

Perrenoud (1998)

Regulation of Activities

Regulation of Learning

Formative Assessment
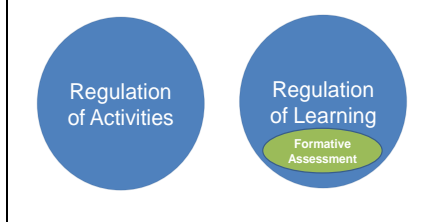
Very short reference in Black and Wiliam's paper to Perrenoud, almost missed it!

Black and Wiliam have gone for the lowest common denominator in comparing classrooms that practice formative assessment with those that do not.

Perrenoud notes that a French language review of the literature would have focused less on 'the comparison of the achievement of pupils having experienced feedback and those who had not'

'It would seem more important to concentrate on the theoretical models of learning and its regulation and their implementation'.

Now we have the concept of the regulation of learning.

Key is that regulation does not include setting up the activities suggested to, or imposed on, the pupils, but their adjustment once they have been initiated. Setting up the activities he calls regulation of activities.

Formative assessment does not have a monopoly on regulation. Formative assessment is essentially situated within the regulation of learning.

Although Perrenoud admits that formative assessment can be present in both traditional / behaviourist and constructivist classrooms he notes that in the former the assessment is a 'specific event' and 'confines formative assessment to tests which are quite distinct from lessons even if one follows the other'.

Perrenoud suggests developing categories of classes and teaching methods within which one could legitimately compare the operation of formative assessment and its effects.

Perrenoud suggests that fusing formative assessment into a larger concept of the regulation of learning opens up new possibilities for 'analysing even the most common place aspects of the classroom'. This is a far cry from the radical change suggested by Black and Wiliam.

Perrenoud admits that it would be difficult to abandon the concept of formative assessment altogether as it has 'considerable inertia'.

Slide 20

Lacking in initiative...

'...the more formative assessment is linked to different pedagogies, the more it is confined to certain experimental schools or pilot classes...'

The speech bubble says it all: this is exactly what has happened. Perrenoud argues that formative assessment should not be confined to a restricted definition but that the concept should be enlarged.

Slide 21

Towards a pragmatic approach to formative assessment
Pour une approche pragmatique de l'évaluation formative

Perrnoud (1991)

'...tip the balance of formative assessment in favour of continuous communication between teachers and students...'

Slide 22

The role of formative assessment in all assessment
La part d'évaluation formative dans toute évaluation continue

Perrenoud (1988)

'...constantly adjust one's aim...'

'...why disassociate two consecutive pedagogical moments...?'

A wonderful metaphor which has had a real effect on my approach in the classroom.

Finally someone seems to be asking this question.

Must be remembered that this was being asked back in 1988 and even in 2009 there are researchers (Black and Wiliam) who are solely concerned with developing the theory of formative assessment and its methods.

Slide 23

Formative assessment strategies

Allal (1979)

- Proactive Regulation
- Interactive Regulation ⭐
- Retroactive Regulation

Perrenoud draws on Allal's three levels of regulation. Note this work was done in 1979.

Proactive is related to what the teacher does before the act of instruction and is therefore not necessarily linked to formative assessment. It concerns the teacher considering who the students are, what they know already, what are the likely barriers to learning.

Retroactive, being what happens after a piece of work has been produced. Lots of research into this area, we began earlier by looking at Kulhavy. To me it seems transactional in nature and therefore not particularly dynamic.

Interactive, being the one that I am mainly interested in as it relates to the dynamic, synchronous interactions that take place in the classroom during the actual process of instruction between teacher and students and between students and students. Perrenoud suggests it would be useful to develop categories of classes and teaching methods in order to compare the operation of formative assessment and its effects.

Slide 24

Develpoing the theory of formative assessment

Black and Wiliam **(2009**)

'...practice in a classroom is formative to the extent that evidence about student achievement is elicited, interpreted, anbd used by teachers, learners or their peers, to make decisions about **the next steps of instruction** that are likely to be better, or better founded, than the decisions they would have taken in the absence of the evidence that was elicited...'

Use this slide to demonstrate that even in 2009 again with Black and Wiliam the focus is still on separate formative assessment and instruction.

Slide 25	Classroom assessment: up close and personal Coffey et al (2005) '...efforts to catalyse change must involve much more than introducing new ideas and strategies...'	Move beyond the strategy, technique, innovation. The change was personal
Slide 26	'...assessment is inseparable from instruction...' Coffey et al (2005) Assessment Teaching? Instruction Assessment	Notes at the very beginning that assessment is inseparable from instruction which is a step in the right direction. Recounts the experiences of two US teachers and the way in which they incorporate assessment into their practice. Action research project designed to change the teachers' beliefs about assessment. Developed the notion that teachers will approach assessment in markedly different ways and in accordance with their beliefs.
Slide 27	How teachers engage with assessment for learning Marshall and Drummod (2006) The 'letter' of formative assessment Assessment Instruction '...formative practices map onto practice as procedures which can be adopted...'	These authors also appear to distance themselves from the notion that formative assessment is the application of a number of procedures. In a classroom that practises the 'letter' of formative assessment, the formative assessment appears to be separate from the instruction. Formative assessment procedures are just that, procedures and appear as surface features of the lesson. In a classroom that practises the 'spirit' of formative assessment, the formative assessment appears to be 'the whole thing'
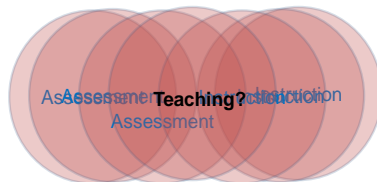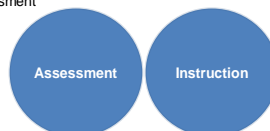
Slide 28
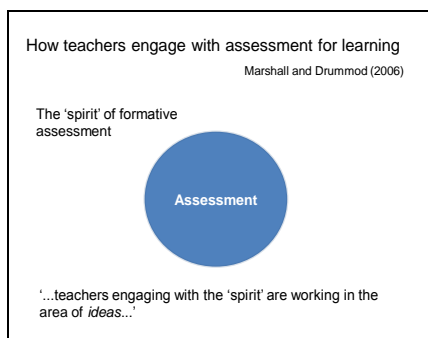
How teachers engage with assessment for learning

Marshall and Drummod (2006)

The 'spirit' of formative assessment

Assessment

'...teachers engaging with the 'spirit' are working in the area of *ideas*...'

In a classroom that practises the 'spirit' of formative assessment, the formative assessment appears to be 'the whole thing'. Where is the instruction?

Marshall and Drummond (2006) Gives examples of classrooms where formative assessment is deep rather than superficial but where the relationship between assessment and instruction is unclear

Slide 29

Dynamic assessment is modelled upon Vygotsky

'...what an individual is able to do one day with mediation, he or she is able to do tomorrow alone...'
Vygotsky
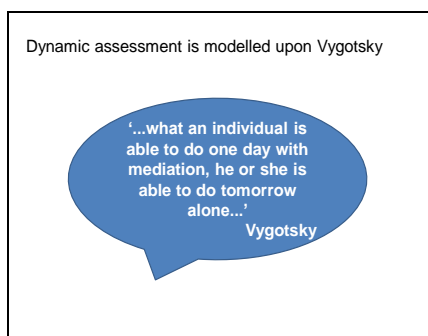
Dynamic assessment is based on socio-cultural theory which basically argues that cognitive change arises from the productive instruction of other people.

| Slide 30 | Dynamic Assessment in the language classroom
Poehner and Lantolf (2005)
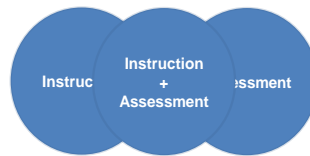
Instruc**tion** **Instruction + Assessment** **ssment** | The express goal of dynamic assessment is to unify assessment and instruction.

So the spirit of formative assessment gave us a situation where formative assessment had become the whole thing almost, whilst dynamic assessment appears to unite the two.

The authors argue that formative assessment is unsystematic: learning is a potential consequence that is sometimes unintended, it relies upon scaffolding which focuses on the completion of the immediate task in hand. Dynamic assessment on the other hand is systematic; the learning is deliberate, it is aimed at the long term.

There are a number of issues:

• It appears to take place in one to one (or small group) sessions
• Appears to focus on right / wrong (knowledge of results) responses with little room for higher order thinking.
• It is based on an entirely new pedagogy – initial session, dynamic assessment session, enrichment session...
• Appears either slightly patronising or rather simplistic: the teacher calls her attention to the problem without indicating its precise nature
• It ignores the real world where summative assessment features strongly |

Slide 31

Where now?

Dynamic assessment unites instruction and assessment which is also my goal, but I want to investigate how this is done in a different way. I do not want to return to right / wrong responses, nor look at the development of new pedagogy / nor pretend that we do not have to do summative tests / nor study what goes on in a laboratory / nor have experimental and control groups / nor look at innovations or initiatives / nor look at retroactive regulation (i.e. Feedback).

Regulation of learning could be the way forward as it supposes that formative assessment is only one part of the solution. But as Perrenoud says formative assessment has considerable inertia.

In a way I am looking at the spirit of formative assessment but the spirit that functions in dynamic interaction with instruction. It is not a case of implementing techniques but, as Marshall and Drummond rightly put it 'ideas'. It is really back to the initial question: how do you teach? Constantly adjust one's aim... instruction and assessment are such that they are not seen as separate but one continuous activity

Appendix 3   Research seminar to SJIE group

Slide 1

Developing the theory of interactive regulation: how teachers regulate student learning during whole class discussion activities

Andy Neil

Slide 2

Setting the scene

Slide 3

Assessment and Classroom Learning (Black and Wiliam, 1998)

- questioning
- feedback
- sharing criteria
- peer- and self-assessment

Four main areas of classroom practice that were effective in improving student learning.

Slide 4	**Definition of formative assessment** Practice in a classroom is formative to the extent that evidence about student achievement is elicited, interpreted, and used by teachers, learners, or their peers, to make decisions about the next steps in instruction that are likely to be better, or better founded, than the decisions they would have taken in the absence of the evidence that was elicited. (Black and Wiliam, 2009)	Elicited / used Next steps in instruction An important point which is rarely acknowledged in the literature is that differentiation is at the very heart of formative assessment: it is about providing differentiated learning to different students at different times according to their individual needs. But it is more than this as it involves continuous adjustment that takes place in the situation rather than upstream as in the case of the traditional notion of differentiation.
Slide 5	**Faith in formative assessment** A teaching strategy of 'very high leverage' (Hargreaves, 2004) Assessment for Learning Strategy (2008) Government has invested £150 million pounds over three years (DCSF, 2008)	Assessment for Learning Strategy (2008) the main aim of which is to 'support schools in developing their assessment of pupils to enhance learning and improve the rate at which pupils progress'. Formative assessment is now being recognised as a teaching strategy of 'very high leverage' (Hargreaves, 2004). Not only has the Government drawn up a strategy to develop formative assessment in schools but is also prepared to back its beliefs with an investment of £150 million pounds over three years (DCSF, 2008).
Slide 6	**The current situation** Formative assessment 'is still not consistently embedded across phases and subjects and it remains a comparative weakness in provision' (Ofsted, 2009) Formative assessment 'isn't happening' (Black, 2010)	What is actually happening in the classroom, however, does not paint such a positive picture with many teachers struggling to integrate formative assessment into their practice. The Office for Standards in Education has reported that formative assessment 'is still not consistently embedded across phases and subjects and it remains a comparative weakness in provision' (OFSTED, 2009). More recently, in an article in the Times Educational Supplement (2010) one of the two main proponents of formative

assessment Professor Paul Black acknowledged that formative assessment 'isn't happening' in classrooms.

Slide 7

Formative assessment procedures (Black et al., 2003)

• rich questioning
• feedback through marking
• peer-and self-assessment
• formative use of summative tests

The central tenet of this research is that the under-development of formative assessment is less due to formative – summative tensions and more linked to the direction in which its theory has developed and the resulting impact this has had on practice.

Conceptualising formative assessment as a number of procedures not only fails to recognise the complexity of the process, but also leads to a separation of instruction (that is to say the combination of teaching and learning) and practice that is now begin termed 'formative'. The resultant instruction – formative assessment dichotomy is one that is unhelpful both in theory and in practice.

A time for formative assessment and a time for instruction: the *doing* of formative assessment appears to have developed into an activity that the teacher is expected to plan into his or her teaching.

May explain why formative assessment is so easily discarded. Referring to peer- and self-assessment, noted how there was simply 'not the time to do it' (Sadler, 1989:142).

| Slide 8 | | More recent research from Black and Wiliam does recognise formative assessment as a process but in the search for legitimation of formative assessment 'activities once defined as teaching or learning strategies are being reconceptualised in assessment terms'. The result is that formative assessment has become a catch all term in which one part now appears to represent the whole (Perrenoud, 1991b: 14). |

| Slide 9 | | With confusion surrounding what formative assessment actually is and the ease with which it is possible to stop doing it no wonder it remains underdeveloped in schools.

There may be an alternative:

Two successive moments have become disassociated from one another resulting in the 'classic distinction' between a time for instruction and a time for formative assessment.

The goal from the teacher's perspective is to constantly adjust one's aim and in doing so develop an environment where regulation is not a specific moment during teaching but a permanent component (Perrenoud, 1991b: 9).

Rather than enlarging the concept of formative assessment, Philippe Perrenoud restricts it and places it instead within the broader concept of the regulation of learning. Formative assessment effectively becomes one means amongst others of regulating the learning process. |

Slide 10	**3 types of regulation** • proactive • interactive • retroactive It would be absurd to proceed with formative assessment without first making the teaching situations more interactive and richer in spontaneous feedback (Perrenoud, 1991)	Perrenoud (1991c: 81) explains that proactive regulation 'takes place when the pupil is set an activity or enters a learning situation'. Proactive regulation takes place at the very limits of formative assessment (Perrenoud, 1991b: 5) and is arguably more closely linked to differentiation in which the teachers sets up situations in which each student is most likely to learn. Retroactive regulation takes place 'after a shorter or longer learning sequence, on the basis of micro-summative evaluation' (1991c: 81). Perrenoud (1998: 91) notes, is weak 'when limited to a subsequent criterion referenced evaluation which, at the end of a phase in teaching, highlights gaps in knowledge, errors and an insufficient grasp of the subject, leading to remediation'. (the formative use of summative tests) Interactive regulation is the type that Perrenoud prioritises in order to tip the balance away from formative assessment.
Slide 11	**Definition of interactive regulation** The integration of different forms of interactive regulation within an instructional activity allows continuing adaptations of learning as it takes place. Interactive regulation contributes to the progression of student learning by providing feedback and guidance that stimulate student involvement at each step of instruction. (Allal cited in Allal and Lopez, 2005)	In this definition regulation is integrated with the instructional activity It takes place at each step of instruction Regulation of learning is therefore a form of differentiation – it represents the offer of different things to different people according to their needs.

Slide 12

Such a distinction can 'avoid identifying all actions of the teacher with permanent regulation' (1998:88).

Perrenoud goes to great pains to emphasise the difference between these two levels of regulation: 'regulation [of learning] does not include setting up the activities suggested to, or imposed on, the pupils, but their adjustment once they have been initiated' (1998:88).

The activities, Perrenoud argues, are merely 'contrivances to assist learning' (1998:90) and as such 'can only have an indirect effect on mental processes' (1998:89).
But Marshall and Drummond note how the choice of activities 'affects all subsequent interactions' (2006:147). It is clear that whilst the activity does not directly impact upon the learning it dos at least set the scene making regulation more or less likely; it remains important therefore to consider the activity or task that the teacher sets up and then subsequently regulates.

The regulation of the activities 'does not always have as its main objective the regulation of the learning process' (1998:88).

The visual navigation through the activities

Example of a student attempting to master a difficult concept e.g.

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Slide 13

Slide 14

Intervention:

How do teachers regulate student learning during whole class discussion activities?

Three foci:

• interactive regulation
• teacher-mediated
• whole class teaching

The purpose behind further developing the theory of regulation represents an attempt to establish whether it is a concept that, unlike formative assessment, is workable both in theory and in practice. Can it describe satisfactorily the dynamic process that is teaching and learning? Can it be used to further improve practice?

Three foci

With a better understanding of the mechanisms that teachers use to regulate the learning process (the 'how' in the above research question) it may be possible to make a strong argument in favour of prioritising the regulation of learning over formative assessment.

Prioritise the interactive regulation of the learning process over either proactive regulation or retroactive regulation. This is the form of regulation that takes place during the cut and thrust of lessons; it is through interactive regulation that continuous communication between teacher and students is achieved.

Teacher-mediated regulation of the learning process. Perrenoud (1998:100) notes how 'the role of the teacher as starter and conductor of regulation remains central', whilst Black *et al* (2003:3) point out that 'formative assessment has to be within the control of the individual teacher'. Allal and Lopez also highlight the central role of the teacher: 'it is the teacher who decides what place will be given to

formative assessment' (2005:251). The decision to look at teacher-mediated regulation is also methodological and this is justified in Chapter 4/5.

Wiliam (2007:32) refers to the way in which during whole class teaching teachers are 'constantly having to make sense of students' responses, interpreting them in terms of learning needs, and making appropriate responses'. The third focus on whole class teaching however it will not be possible to more precisely define the unit of analysis until the study is underway.

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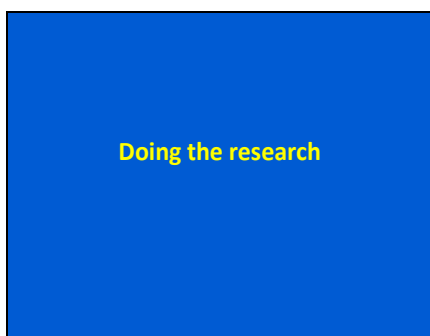
Doing the research

Slide 16

Developing the research design

• Qualitative – theory building
• Multi-case research design
• Defining the unit of analysis
• Sampling
• Observation
• Transcription
• Locating the unit of analysis
• Analytic induction

Quantitative methodology has a heavy bias towards numbers as a means of both generating and representing its data. It is more akin to scientific method, starting with general truths (hypotheses) and predicting a specific observation, in this way moving from the general to the particular. Reasoning in this way is known as 'deduction'.

Qualitative research is based on experimentation, observation and experience rather than on theory, and predominantly uses words to generate and represents its findings. Qualitative research generates, rather than tests, hypotheses and as such its approach is inductive.

One possible answer to criticism of

qualitative approach would be to question where the theory is derived from that the hypotheses are then able to test. As noted above, the inductive approach of qualitative research *generates* hypotheses.

Case study is a methodology ('how one will go about studying an phenomenon)

Yin, suggests case study is suitable when

Research question is a 'how' or a 'why' question
Investigator has little control over actual behavioural events
Focus is on contemporary in a real life context

Case study often criticised for three reasons:

Lack of systematic and rigorous handling of data
No basis for generalisation
Lengthy studies resulting in long-winded and largely unreadable reports

The unit of analysis the case. Defining what is meant by 'case'. Often the case is the teacher or the lesson. S&C and Mehan both studying classroom interaction had the case as the lessons. Torrance and Pryor identified the 'assessment event' as the unit of analysis. Follow this approach – unit of analysis becomes the whole class discussion activity defined as 'an activity that has a clear beginning and end, and in which all students are required to play an active spoken role in order to learn, practice, apply, evaluate or in some other way respond to curricular content'.

Sampling: Sampling refers to the process of selecting which cases to study out of any given population. Sampling decision taken following a feasibility study. Began with convenience sampling but unsuitable – little regulation observed. Criterion was to identify experienced teachers as those who had taught for a minimum of five years. Began with two teachers at

current school and then extended this to another local school. Not about how a maths or English teacher regulates learning but about how teachers regulate learning.

Observation: difficult to see how it would be possible to identify the mechanisms that teacher use to regulate the learning process (i.e. the dialogue they actually use in the classroom) with anything other than the direct observation of their lessons.

The decision not to carry out interviews with the participants can be justified on a number of levels. First, it is believed that data collected through classroom observations will be robust in terms of both quality and quantity. Second, the research focuses on what teachers actually do to regulate the learning process; it is not interested in what teachers intended to do, their reasons for acting in the way they did, or what they think about what they are doing. In Marshall and Drummond's (2006) study the focus was on teacher's values/practice gaps and so interviews became necessary; this is not the case with this study. It is believed that the actual words of the participants will speak for themselves; the author is an accomplished teacher with many years of experience and as does not expect to be faced with insurmountable barriers to identifying examples of regulation. If there is doubt then the process of member checking will be employed. It is also possible that some teachers may find it difficult to verbalise what they have do in the classroom.

Teacher-student discourse was transcribed – inescapably selective, 100,000 words of transcribed text from the 18 classroom observation. Transcription choices should be determined by the research questions being addressed and the claims which will be made on the basis of the analysis'. Following this advice, it was not considered necessary to transcribe certain details such as the exact length of pauses of the speakers, nor was it considered necessary to attempt to record the speakers' intonation. Conventions were followed. Sent to the

participants as part of a validation process known as member checking – no replies

First stage of coding / data reduction involved locating the unit of analysis – Mehan talks about the phases of a lessons = opening, instructional and closing phase. But the boundaries between events are not discreet'

Additional difficulties with identifying the unit of analysis overcome by paying attention to the teacher's attempts to sign post the different phases of each lesson and the activities within these phases:

So the first question will be 'what's the difference between speaking and writing' OK.   Or Right, today we're going to look at, because that was my fun recap activity, the nineteen oh five revolution.

Same was done to sign post the end of the activity

Analytic induction: One approach to data analysis is known as 'analytic induction' and was first used by Znaniecki in 1934. In analytic induction, the social system under study provides categories and classifications, rather than these being imposed upon the social system (Znaniecki, 1934: 264). What this means in practice is that categories are not defined in advance of the research but emerge as the analysis unfolds – grounded in the data. This is the exact opposite of systematic observation which uses predetermined categories to deductively test hypotheses.

Presenting the materials upon which the analysis was made in this way effectively allows for readers to consider alternative interpretations. A small data set is then initially analysed and a provisional hypothetical framework emerges. The framework is then compared with additional data and continues to be modified until the researcher has developed a set of recursive rules that are able to comprehensively describe the phenomenon being studied.

Slide 17

2 stages to the data analysis

• descriptive
• interpretive

In order to achieve a comprehensive data treatment, it was considered necessary to first describe the structure of whole class discussion activities and then to identify the regulation that was present within that structure.

Refer back to setting up the activities and the subsequent adjustment of these activities.

Slide 18

Descriptive stage: the structure of whole class discussion activities

• Sinclair and Coulthard (1975)
• Mehan (1979)
• Mercer (1995)
• Black and Wiliam (2009)

Starting point:

Sinclair and Coulthard (1975, p.21)the structure of discourse can be described in terms of I-R-F sequences which comprise an 'initiation by the teacher, followed by a response from the pupil, followed by feedback, to the pupil's response form the teacher' whilst

Mehan (1979) identified similar patterns which he termed initiation-response-evaluation (I-R-F).

Mercer (1995, p. 25) examined teachers' guidance strategies, in particular how teachers 'elicit relevant knowledge from students' and how they then 'respond to things that students say'.

Black and Wiliam's (2009, p.9) definition of formative assessment which involves eliciting, interpreting and

using evidence of student achievement

Three sides to teacher-student discourse, two of which were teacher-initiated

Slide 19

The descriptive stage of data analysis began with the first set of subsidiary research questions.

Early analysis of the data immediately revealed that teachers made use of two moves: a questioning move to elicit evidence of student understanding, and a subsequent feedback move intended to use this evidence to move learning forward.

In an attempt to understand this questioning move, the regulation and formative assessment literature was revisited but this proved unsuccessful as the literature did not focus on the dynamic nature of classroom discourse in sufficient detail. Beyond the regulation/formative assessment literature much has been written about the use of teacher questioning and this literature was drawn upon to identify the use of open/closed questioning as a starting point for coding.

In order to understand the feedback move and validate the data analysis, again the regulation and formative assessment literature was re-examined. This literature, however, appeared to pay scant attention to the dynamic nature of interaction in the classroom it became necessary to broaden the perspective and to consider the more general research on classroom discourse. The work of Mercer (1995) was drawn upon as a starting point from which to understanding teacher feedback.

In order to reliably code a question as either open or closed it was necessary to look at the context within which the question was asked e.g. So what is the most important reason for the revolution of nineteen seventeen? Are people just hungry, fed up with terrible working conditions? What do we think? Is the teacher asking the students what they think is the correct answer or is the teacher genuinely asking the student what they think?

Slide 20
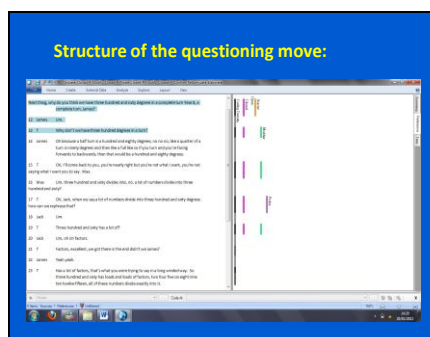
Slide 21
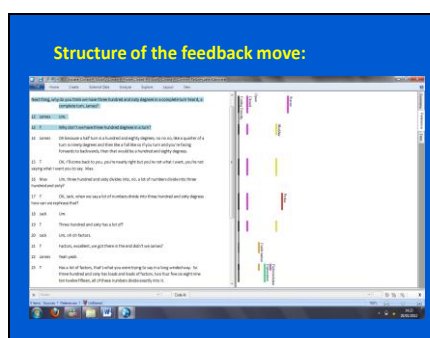
Teacher feedback move was comprised of six acts.

Had to adapt Mercer (repeat is an attempt to confirm) and added peer-prompt and answer

| Slide 22 | | Having identified the various acts that make up the questioning and feedback moves it became important to look at how these acts are organised given that they rarely occurred alone.

The combined structure of questioning and feedback moves is described in terms of three-part and extended question-response-feedback (Q-R-F) cycles. |

The second set of subsidiary research questions asked:

• How are the acts that make up the questioning move organised during whole class discussion activities?

• How are the acts that make up the feedback move organised during whole class discussion activities?

• How are the questioning and feedback acts used together to elicit and use evidence of student understanding?

Slide 23

Organisation of acts
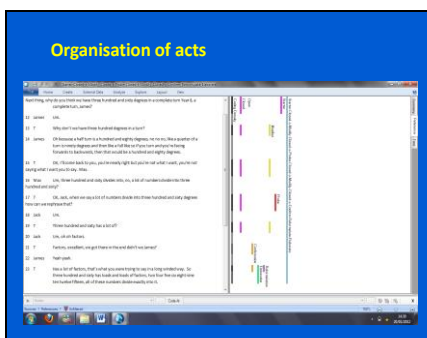
Slide 24

The third set of subsidiary research questions examines the regulation:

• To what extent is teacher questioning regulatory in as far as it involves the continuous adjustment of learning?

• To what extent is teacher feedback regulatory in as far as it involves the continuous adjustment of learning?

Interpretive stage of the analysis

Once the structure of whole class discussion activities has been comprehensively described it then becomes possible to look specifically at the regulatory aspects of teacher questioning and feedback within this structure. This is the second, more interpretive stage of data analysis, and one that allows for the development of a theory of regulation that was distinct from a more general theory of teaching and learning.

Regulation is the continuous adjustment of learning in order to attend to the needs and difficulties of students as they arise during that learning.

This interpretive phase of data analysis resulted in the understanding that regulatory questioning comprised the

acts of modify and probe (to the exclusion of initiate) whilst regulatory feedback comprised the acts of confirm, reject, reformulate, peer-prompt and answer (to the exclusion of elaborate). In tackling the three sets of subsidiary research questions that have been expressed in this introduction a better understanding of how teachers regulate student learning during whole class discussion activities begins to emerge.

Slide 25

Slide 26
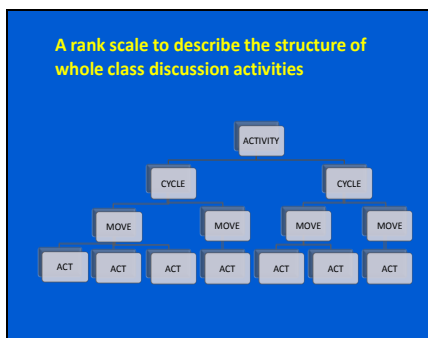
The structure of whole class discussion activities maybe described in terms of a rank scale.

Basic assumption of a rank scale is that a unit at a given rank (e.g. move) is made up of one or more units of the rank below (act) and combines with other units at the same rank above (cycle)

The top level of the scale is the discussion which may be described in terms of cycles. A cycle is described in terms of its moves, and the structure of moves is subsequently described in terms of its acts.

Slide 27	**Structure of the questioning move:**	Initially open/closed was identified

Slide 27

Structure of the questioning move:

Grammatical property and a functional property

Grammatical: open and closed
Functional: initiate, modify and probe

Combined: closed-initiate, open-initiate, closed-modify, open-modify, closed-probe and open-probe

Initially open/closed was identified

Then began to become clear that questions had a functional property (a purpose) in addition to their grammatical property. Initiate, modify and probe emerged inductively, resulting in modifications to the analytic scheme and a re-coding of the data set.

Slide 28

Structure of the feedback move:

- confirm
- reject
- reformulate
- elaborate
- peer-prompt
- answer

Teacher feedback move was comprised of six acts.

Had to adapt Mercer (repeat is an attempt to confirm) and added peer-prompt and answer

Slide 29

Three-part Q-R-F cycles

Response

Questioning
initiate (closed and open) /

Feedback
confirm / reject / reformulate / elaborate / peer-prompt / answer
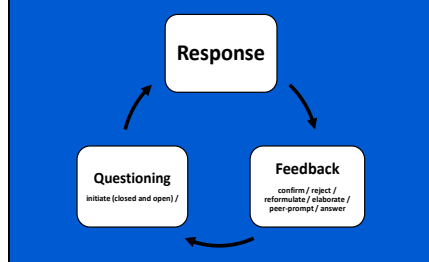
It was found that teacher – student discourse during whole class discussion activities proceeds by way of cycles in which a questioning move is mirrored by one or more feedback moves. At the very heart of these cycles are moments of contingency which Wiliam (2007) defines as 'points in the instructional sequence when instruction can proceed in different directions according to the responses of the student'.

A cycle begins with an initiating question and may continue with one or more modifying or probing questions until one or more feedback techniques are used after which point a new cycle begins.

Slide 30

Three-part and extended Q-R-F cycles

Response

Questioning
initiate (closed and open) /
modify (closed and open) /
probe (closed and open)

Feedback
confirm / reject /
reformulate / elaborate /
peer-prompt / answer
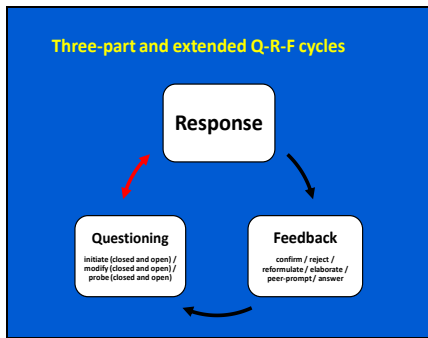
Slide 31

Regulatory questioning and feedback

Response

Questioning
initiate (closed and open) /
modify (closed and open) /
probe (closed and open)

Feedback
confirm / reject /
reformulate / elaborate /
peer-prompt / answer

Regulatory questioning – modify and probe

Regulatory feedback – confirm, reject, reformulate, peer-prompt, answer.

Initiate and elaborate are not considered regulatory.

Slide 32

So, how do teachers regulate student learning during whole class discussion activities?

• use of reject

• modifying from open to close question

• 'premature' modify

• hard to code cycles

'premature' modify suggests a deficiency in teacher questioning

Slide 33

So, how do teachers regulate student
learning during whole class discussion
activities?

• use of reject

• modifying from open to close question

• 'premature' modify

• hard to code cycles

'premature' modify suggests a deficiency in teacher questioning

Slide 34

So, how do teachers regulate student
learning during whole class discussion
activities?

• use of reject

• modifying from open to close question

• 'premature' modify

• hard to code cycles

'premature' modify suggests a deficiency in teacher questioning

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Appendix 4   Ethics protocol

Protocol, 15/10/10, Version 1

Study Title: An investigation into the interactive regulation of learning: an argument in favour of continuous adjustment throughout the learning process

Researcher: Andy Neil

Funder: The Pilgrims' School, Winchester, Hampshire.
Sponsor (if known):

Background:

The objective of this research is to bring a better understanding of how the regulation of the learning process takes place in the classroom. Building upon the work of Philippe Perrenoud (1989, 1991a, 1991, 1991c, 1998) this research asks how teachers regulate the learning process. Closely linked to the notion of the regulation of learning is formative assessment. The last decade has seen a resurgence of interest in formative assessment, largely due to Paul Black and Dylan Wiliam's substantial review 'Assessment and Classroom Learning' published in 1998. Since the Black and Wiliam review, schools have been encouraged to implement formative assessment across the curriculum but much of this effort has been met with seemingly disappointing results. OFSTED (2009) for example note how formative assessment 'is still not consistently embedded across phases and subjects and it remains a comparative weakness in provision'.

This research begins by arguing that the reason for the under-development of formative assessment in schools may be due to the way in which it has become conceptualised. Essentially, it has come to be identified with four procedures: rich questioning, feedback through marking, peer- and self-assessment, and the formative use of summative tests. As a result however, there now appears to have developed a time for teaching and a time for formative assessment; the one has become separated from the other.

Three main research questions will be addressed:

- How do teachers implement formative assessment in the classroom?

- How does the interactive regulation of learning take place?

- How does the choice of activities impact on the way teachers regulate the learning process?

Method:

A multiple case study design will be adopted to investigate the phenomenon that is the regulation of learning. A case study methodology will be adopted as it will enable the detailed description and analysis of practice. Data will be collected through classroom observation and semi-structured interviews. During the classroom observations, spoken interactions between teacher and students will be audio recorded and additional field notes will be written to describe the classroom context and behaviour of the teacher and students. A transcript of each observation will be produced (see Appendix 1 for an example taken from a feasibility study). Semi-structured interviews using the classroom observation transcripts as a prompt will be carried out with teachers. The purpose of these interviews will be to co-construct with the teachers the 'regulation event'. The regulation event will be the study's unit of analysis.

Participants:

The sample group will be teachers practicing in schools in Hampshire and Dorset. The teachers will be experienced practitioners with ten or more years of experience. Teachers with less than 10 years of experience will not be considered. Seven teachers from three schools have already been approached and an 'in principle' agreement has been given by each. Each teacher will be asked to read a Participant Information Sheet and to sign a Participant Consent Form.

The schools taking part are The Pilgrims' School in Hampshire (a small boys' preparatory school), Ringwood School in Hampshire (a large mixed comprehensive school) and Bournemouth School for Girls in Dorset (a medium sized girls' grammar school). Two teachers from the first two schools, and three from the third have been identified.

A letter will be sent to the Head teacher of each of the three schools outlining the nature of the research and asking for formal permission to carry out the research.

Procedure:

All classroom observations and interviews will take place between 1st November 2010 and 1st April 2011. Each teacher will be visited twice: the first time to carry out classroom observations, and the second time to carry out a semi-structured interview. For each teacher a minimum of three lessons will be observed. Interviews are likely to last up to 60 minutes. In total, 21 lessons will be observed and approximately 7 hours of interview data will be collected.

Statistical analysis:

Two strategies will be used to analyse the data: categorical aggregation direct observation. The NVivo software will be used to code the data initially. A number of worksheets will be used to facilitate the cross-case analysis (see Appendices 2a – 2f).

Ethical issues:

All participants will be well informed about the nature of the research, and steps will be taken to ensure that participants take part freely and voluntarily. Each teacher's right to withdraw from the research at any time will be made clear through the Participant Information Sheet and Participant Consent Form. No teacher will be identified in the research, nor will any of the three schools taking part be identified by name. Pseudonyms will be used at all times to protect the teacher's anonymity. Participants will be informed of the outcome of the study and will receive a summary of the research if they wish.

With the objective of the research being to investigate how *teachers* regulate the learning process, the students involved are considered as participants only in an indirect way. As such, students will be given verbal information about the research and the opportunity to opt out if they so wish. The inevitable 'power relationships' between researcher, teacher and students will be managed in such a way that the students are able to give informed consent rationally, knowingly and freely. It will be made clear to any student(s) that decides to opt out that nothing that they say or do will be included in the research.

Data protection and anonymity:

Issues of privacy will be addressed through the anonymous treatment of participants' data. Classroom observation and interview data will be stored and analysed on a password protected computer. Pseudonyms will be used to preserve the participants' anonymity. The anonymous treatment of data will ensure that it no longer falls within the Data Protection Act's definition of personal data.

> **Insurance and Research Governance Application for Projects Requiring Approval by Ethics Committee and Involving Research on Human Subjects, their tissues, organs or data, by Staff and/or Students of the University of Southampton**

The project must not commence until insurance, ethics approval and sponsorship are obtained

PART A - PLEASE COMPLETE ALL QUESTIONS

	Ethics Submission
1.	Title of Study: **An investigation into the interactive regulation of learning: an argument in favour of continuous adjustment throughout the learning process** Start (22/11/2010) End (01/04/2011)

	Researcher's Details
2.	Title: Mr Name: Andrew James Neil University School: School of Education **University** Tel: 01202 715260 Email aneil@pilgrims-school.co.uk

3.	Are student researchers involved with this project?	Yes

4.	Is the study based solely on questionnaires, or other research **not** involving invasive techniques or medicinal products?	Yes

Please estimate numbers of volunteers participating in the study:

	Adults	Minors *
Patients		
Healthy human	7	200

* Minors under 18 years of age

Is this a Multi Centre Trial?   No

If yes and the trial is sponsored by UoS or SUHT, or managed by UoS, please estimate numbers of volunteers participating in the study overall:

	Adults	Minors
Patients		
Healthy human		

6.	Does the study involve invasive techniques?	No

Does the study involve the use of a medicinal product or the testing of a medical device?	No
IF AN INVESTIGATIVE MEDICINAL PRODUCT IS INVOLVED Please indicate which phase category the study falls into	Phase 1, 2, 3, 4

8.	Who is the Research Sponsor? n/a	

9.	Who is the Funder? The Pilgrim's School,	

10. **For Commercial trials only**, is an ABPI Indemnity being given?	Yes No
IF YES: the ABPI Indemnity form, preferably in triplicate, should be forwarded with this form for signature by an Authorised Signatory on behalf of the University.	

Will any part of this study take place outside the UK?	No
If Yes, in which	

PART B - PLEASE COMPLETE QUESTIONS AS APPLICABLE

For Student   Student status: PG

Supervisor's Details
Title: De   Name: John Woollard
University School   School of Education
University Department
Tel
023   Email   j.woollard@soton.ac.uk
8059

For multi-site studies

How many sites are involved?	3
Is Southampton the lead site?	No
Are any sites outside the UK?	No
Are contracts/site agreements in	Yes (agreement in

For studies involving the NHS Patients, staff or resources

Is the study approved by the NHS Trust R+D office?	Yes No Pending
Is the study approved by NHS ethics committee?	Yes No Pending

For Clinical Trials involving drugs, devices or clinical interventions   **Reference Number**

Is the study registered with the	Yes
Is the study registered on the	Yes
European Clinical Trials (EudraCT)	No
Is the study registered on the	Yes
National Research Register (Clinical	No

For studies using tissue samples

Are the tissue samples accessed via a licensed	Yes
Are you seeking ethical approval for your	Yes No

For all studies, will the Applicant be responsible for:

Reporting amendments to the protocol	Yes
Reporting adverse events and significant	Yes
If No, who will be responsible?	

Appendix 6   Permission letter for carrying out school-based research

Dear …………

Now that I have been upgraded from MPhil to PhD, I need to turn my attention to the actual research component of the course. As such, the purpose of this email is to request permission for the initial stage of data collection to take place at The Pilgrims' School.

The focus of my research is on how teachers implement formative assessment in the classroom. I am defining formative assessment as '....'. I have already approached ………… and ………… both of whom are amenable to me carrying out some observations in their classroom. With your agreement I would very much like to begin these observations at the end of this week.

The plan is to carry out a maximum of five classroom observations with each teacher over the next five weeks. Data will initially be collected using a digital voice recorder. Transcripts of the spoken dialogue between teacher and students will be produced and subsequently analysed. My presence in the classroom as researcher will be on a strictly non-participant basis; there should be no negative or undesirable effects on the student learning.

Both teachers will receive a written Participant Information Sheet (attached to this email) and will be required to sign a Participant Consent Form before taking part in the research. The purpose of the research will be explained verbally to students prior to the research commencing. Students will be given the opportunity to 'opt-out' in which case nothing of what they say or do during the observations will be contained in the research report. Anonymity for the school, the teachers and the students is part of the research design; pseudonyms will be used throughout and as such neither the school nor the teacher/students will be identified or identifiable.

As I have said above, both ………… and ………… are agreeable to taking part in this research and as such I am asking you as Headmaster for official permission for this to take place. If you feel that in this email I have omitted any information that you need to make an informed decision, please do not hesitate to ask.

I look forward to hearing from you.

Regards.

Andy Neil.

Appendix 7   Participant information sheet

Date: 21/10/10

Version: 1

Study Title: An investigation into the interactive regulation of learning: an argument in favour of continuous adjustment throughout the learning process

Researcher: Andy Neil.

Ethics number:

Please read this information carefully before deciding to take part in this research. If you are happy to participate you will be asked to sign a consent form.

What is the research about?

It is the intention to present this research in the form of a thesis as part fulfilment of a PhD degree.

The purpose of this research is to explore how teachers regulate the learning process. The regulation of learning concerns the adjustments that teachers make to keep the learning of their students on track. One aspect of the regulation of learning is formative assessment (also referred to as assessment for learning) which has come to be identified with four procedures: rich questioning, feedback through marking, peer- and self-assessment and the formative use of summative tests. The last decade or so has seen a revival of interest in formative assessment, largely due to the publication in 1998 and subsequent widespread dissemination in schools of Paul Black and Dylan Wiliam's pamphlet 'Inside the Black Box'. Formative assessment, however, remains to date largely undeveloped in schools. In 2009, OFSTED remarked that formative assessment 'is still not consistently embedded across phases and subjects and it remains a comparative weakness in provision'. Whilst encompassing how teachers implement formative assessment, this research also focuses on other ways that regulation occurs in the classroom. Such regulation, for example, may involve the teacher explaining something more simply, at greater length or perhaps in a different way.

This research will attempt to answer three main questions. First, it asks what formative assessment procedures teachers employ in the classroom. Second, it asks what, apart from these procedures, teachers say and do in the classroom to regulate the learning process. Third, it asks about the nature of the activities that are set up by the teacher and how these activities either restrict or facilitate the potential for the regulation of learning.

Why have I been chosen?

I am asking if you are willing to participate in this research because you are an experienced and accomplished teacher of your subject. This research does not focus on behaviour management; its

purpose is to observe closely the ways that teachers regulate the learning process and as such it is important that teachers involved are confident both in their subject and with the students they teach.

What will happen to me if I take part?

With your agreement, I would like to make two visits to your school. The first would be to carry out some classroom observations (between 3 and 4) and the second would be to conduct an interview with you (lasting from 30 to 60 minutes). Two methods of data collection will therefore be used: classroom observation and semi-structured interviews.

During the classroom observations, I hope to record the spoken interactions that take place between you and your students using an audio voice recorder. I would also expect to be making written notes that describe the classroom context, the activities on which the students are engaged and the actions of both teacher and students. For each lesson observed, a transcript will be produced that features the words and behaviour of teacher and students, together with a description of the classroom context.

On the second visit, I would like to conduct an interview with you which will be based on the transcript from the classroom observations carried out during the first visit. The purpose of this interview will be to identify the moments when you have been engaged in regulating the learning of your students. It is important in this research that you are involved in the identification of these 'regulation events' as it is not my intention to confer meaning on observed interactions without the direct participation of you as the principal actor. Again, it would help me very much if you would agree to the interview being recorded using an audio voice recorder.

Are there any benefits in my taking part?

There is currently a need to better understand the complexity of classroom teaching and learning in general and of formative assessment in particular. This research will add to current knowledge in this area through the detailed description of classroom practice.

As teachers, we are continually aware of the need to be reflective practitioners as we strive to do the very best for our students. This research may offer you a window from which you are able to reflect on your practice in ways that are beneficial.

Will my participation be confidential?

Neither you, your school nor any students will be identified in the research. Your participation will be anonymous; pseudonyms will be used at all times. Lesson observations and interviews will be transcribed and stored on a password protected computer.

What happens if I change my mind?

You have the right to withdraw your participation at any time without giving any reason and without any consequence. Furthermore, I will not use either the lesson observation or the interview data if you do not give your consent now or you withdraw your consent at any point up to the final publication of my thesis.

What happens if something goes wrong?

If you have any questions or concerns about this research, please contact me directly by email at aneil@pilgrims-school.co.uk. Alternatively, you may contact my PhD supervisor John Woollard at jwoollard@soton.ac.uk.

If you have any concerns about the conduct of the research, please contact Melanie Nind at m.a.nind@soton.ac.uk who is acting in an independent position.

Appendix 8   Member checking letter

Dear

First of all, please accept my thanks once again for allowing me to carry out observations in your classroom; I do hope that you did not find my presence too intrusive. For me the experience was hugely valuable, not only for my research but also for my own classroom practice. I have now completed the task of transcribing the lessons observed and these are now attached to this email (at the bottom of this email you will find a list of transcript conventions that were used). I have also posted to you a CD that contains a copy of the original sound recordings of your lessons.

Although I have taken great care in producing accurate transcripts, it is possible (even likely) that they still contain errors. Some of the students' names may well have been misspelt, however this is not a major problem as all students will be made anonymous in the research. More importantly, there may be other details that I have transcribed inaccurately or that I have not been able to transcribe at all. As such, if there is anything contained in these transcripts that you feel I have got wrong, misunderstood or omitted, please do say and I will correct accordingly. Likewise, if the transcripts contain *anything* that you feel uncomfortable with please say and the section(s) causing concern will be removed. I am not, of course, asking you to proof read these transcripts for me however all of the teachers that I have been working with have found the transcripts useful and not a little amusing at times!

Also in connection with the transcripts, the sound recorder picked up a very small number of exchanges between us (i.e. between teacher and researcher). Although originally it was not the intention to transcribe this naturally occurring conversation, in some cases what the sound recorder did pick up may well prove useful to my research. As such, I have taken the liberty of transcribing these exchanges and am now asking for your permission to use this data in my research. These exchanges, where they occur, have been transcribed in bold type to enable you to locate them easily. Again, if you are uncomfortable with this do say and these exchanges will be deleted from the lesson transcripts.

For me, the next stage in my research is to begin the data analysis. This will involve identifying sections of the lesson transcripts that correspond to the area that I am interested in, namely how teachers implement Assessment for Learning (AforL) in the classroom. Ideally, and again only if you are willing and able to help, I would be interested in carrying out an unstructured interview with you. The interview will be based mainly on the examples of AforL that I have been able to identify in the transcript, although again it is likely that there are other elements of your lessons that I have missed and which you feel represent practice in AforL. The interview is likely to last between 30 minutes to one hour and, if you are happy for it to take place, will be scheduled entirely at a time to suit you.

It is very important to me that you feel totally at ease with the research that I am carrying out. As such please do feel free to notify me of any errors that I may have made in the transcripts or of anything else that you feel should not form part of my research.

With your agreement, I will be back in touch shortly to arrange a convenient time for an interview.

Regards.

Andy.

Appendix 9   Transcription conventions

The following is a list of transcription conventions that were used in this study.

Speech in bold type	Naturally occurring conversation between teacher and researcher
T	Teacher
S	Student
Ss	Students
R	Researcher
(*)	Inaudible (probably one word)
(**)	Inaudible phrase
(***)	Longer inaudible passage (e.g. sentence)
(*Tuesday)	Inaudible word, 'Tuesday' suggested by researcher
(Silence)	Non-verbal contextual 'stage directions'
,	Short pause
.	Longer pause
09:00	Time reading on digital audio recorder
…	A few seconds of transcript omitted (e.g. interruption by another pupil)
COME HERE	Words said with particular emphasis

Appendix 10   Completed transcription of classroom observation BE8_1

Case Study: BE8_1	Subject: English	Gender of teacher: Female	Ages of pupils: 12-13 (Year 8)
Date: 25th November, 2010	Learning objective: how do we adapt, change or modify our language to suit the audience we talk to?	Experience of teacher (in years): 23	Number of pupils: 26
Location: Bournemouth	Time of lesson: 09:00	Position of teacher: Head of English	Gender of pupils: Female

1	T	You are going to need your English books out and just while you're waiting for everybody else to arrive you could just very quickly write the learning objective down in your books, yep, 'how do we adapt, change or modify our language to suit the audiences we talk to?' *(Ps are getting themselves ready for the beginning of the lesson)*
2	T	Put in context what we're going to be doing (**) where language originates from and also a little bit using thinking skills really, and looking at a thousand AD language and looking at it and comparing it to 1975, and two other extracts as well, the same type of text, the same content of text but written very differently, and you had to see how the language had changed (**) OK. What we're going to do today is linked up a little bit with what we were doing on place names, where place names originate from and also the Egyptian Hieroglyphics and we're going to have a little look about how we modify our language when we talk and not when we write. So the first question will be 'what's the difference between speaking and writing' OK. *(T writes on board 'difference between speech and writing' and then below this 'less formal' connected by a line to 'speech')*. (*) have you got a question?
3	P	What's the title?

| 4 | T | Title will just be, um you could actually put, um what could you call it, you could just call it 'Speaking' this time, because last time it was largely to do with writing and if you want to use a title, just use it as speaking. Whilst you write down the learning objective, Mr Neil do you want to introduce why you're here? |

(At this point in the lesson the researcher introduces himself to the pupils and explains the purpose of the classroom observation)

04:57

| 5 | T | So you've got the learning objective written down, the first question then for today, OK, the first question for today really is 'what's the difference between writing and speech?' What's the main difference then Sophie? |

| 6 | Sophie | Well when you're speaking you use, it depends who you're speaking to, 'cos if you're speaking you tend to use less formal, um... |

| 7 | T | OK, so we've got straight into some of the detail, talking about less formal, so if we put down *(T writes on board)* the difference between speech and writing, we're suggesting that we're less formal, so less formal, OK, and that's a possibility because what we're going to do today is try to look at some examples and actually try to put you into role play and get you to actually try and consider different formal and informal situations or one situation dealt with formally and informally with very different results. So that's one of the things that we're going to try to do. Another point Naomi. |

| 8 | Naomi | Er, when you speak to someone you tend to (*) look at them. |

| 9 | T | OK, good, and actually when you speak to somebody it isn't just the words that you say, it's the eye contact, it's your body language, it's the whole package isn't it, it's not just the words that you say. *(R, ELABORATE)* So visual communication as well, so it is actually really important, it's not just oral is it, it's not just aural either, you're not hearing it and you're not just picking up the words but you're watching it too. So we would make gesticulations, we will move our arms around all over the place, we |

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would show, and I can do this with Lucy quite often, I can frown at her and she'll know that I'm not particularly pleased or something. So a facial expression I actually don't need to say anything, so we can communicate like that, OK, and in fact that's how we start as communicators isn't it, when we're all babies and let's face it, we're not born with language we get language, we learn to use language quite quickly on because we need to learn how to get our own way 'cos that's what babies do, they cry, if they cry they get attention, if they get attention then they can actually be dealt with. Now we soon quickly learn that if we start to speak we soon get our own way and we can then soon become difficult. So as a parent you always want your children to talk as much as they can and when they become teenagers when they become stressy and difficult you want them to talk less, because you don't want them to be answering you back! So there is never quite that happy moment, boys in my family tend to speak less and (**) more than girls who will speak much more. But it's actually about language and how we use language. The point you were going to make Poppy?

10   Poppy   If like you wrote down a conversation and then went to somebody and started reading it out and like talking to them about it and what you wrote, then it's probably going to change from what you wrote (**) stuff and their reactions.

11   T   Absolutely, good, it's actually very difficult to do that, if you go back to look at your Latin and Greek root of the word, origin of the word, you've got a word for that, the writing bit, we're actually found the root of the word, and what Poppy's just said if you take from speaking into writing and you try as much as you can to take what is spoken to a written format you take out all of the body language, you take out all the intonation of the voice as well, so you don't pick up the tone and the pitch and the sarcasm, the explanations or anything else, um, what do we call it when we try to turn speech into writing, we call it a? *(No answer is forthcoming from Ps)* You've used it. Have a little look. (**) down to the origins of the word. If I say 'script'. (R)

12   P   Transcript.

13   T   It's a transcript, OK, and script because you know it ends in 't' must come from Greek or Latin ? (R, choice)

14   Ps   Latin.

15	T	It's Latin, OK, so we've got transcripts, so it means going across and it's writing, OK, and what we're trying to do is if you put speech into writing it loses something in the translation, it always will do. What else do we know about speech then compared to writing? What do you have to do normally when you sit to write?
16	P	You normally have to keep looking down.
17	T	Yeah, you have to keep looking down, what else do you have to do? Why is it so much easier to speak than write?
18	P	Um, if I'm talking I'm hesitating, in this you have to know exactly what you're going to say otherwise (**).
19	T	OK, so Katy's just put in that idea that you can hesitate, you can 'um', you can 'ah', there's actually a special word for that, we're learning a little bit about language today, it's called a 'filler' or a 'hedger'. When you 'um' or you 'ah' or you're not too sure, OK, and these are sort of the things that if you were going to do a transcript of a speech you'd have to put in. So if you think about how you talk on the telephone in particular there's probably a lot of 'ums' and 'ahs' and 'likes' and all sorts of things expressions that you use and you'd have to put it in absolutely accurately to be a proper transcript, OK, but it will still lose something. Right, is there anything else you want to say about speech?
20	P	Um, speech will show emotion.
21	T	Excellent, yeah, speech will show emotion in a different way, you can show emotion in writing, of course we can, we all read literature and poetry and we can read emotion into it, we usually read it through the characters and the way it's been written, speech does it differently. Grace?
22	Grace	Um, you don't have to worry about spelling or like grammatical things.
23	T	Absolutely, (*) in terms of grammatical correctness we know when something sounds

right when somebody speaks compared to if it sounds wrong, but we can get away with it, why, what do we call it if we talk grammatically informally I suppose, Grace?

24   Grace   I've forgotten.

25   T   I'll give you that word and we'll come back to it a bit later, it's 'slang', yeah? Slang, and I'll give you another word actually which, um, we've all got but we've probably never ever thought about it, we've certainly never had a label for it either, and that is, and I'm not being rude, we all have an 'idiolect' OK. An idiolect is simply, well can we work it out with 'lect' where does does the word originate from then?

26   P   Latin.

27   T   From Latin as we know because there's the 'ect' and 'idio' any ideas where that comes from? We're not going to break it down so that it becomes 'idiot'. *(To a pupil)* You were going to say that were you? If we say 'idiom', has anyone heard of an idiom before? Hannah?

28   Hannah   Is it a habit?

29   T   It's a habit, absolutely spot on, it's an individual habit, it's how you actually talk, we've all got an idiolect, we all have a particular way that we talk and we all have a particular way that we write as well, so in some ways, speech and writing then is similar, OK? So that starts us off, is there anything else that we want to say?

30   P   Um, punctuation.

31   T   Yeah, do we speak in sentences? Do we think that we're going to finish with a full stop or a comma, we don't do we? So punctuation rules don't matter when we speak. Um, do we sometimes speak and then regret what we've said?

32   Ps   Mm, yeah.

33	T	Can you take it back?

34	Ps	Yeah.

35	T	Can you take it back in writing?

36	Ps	No.

37	T	So that's something that's different too isn't it? Because although speaking isn't permanent, it's not a permanent record of what we say, sometimes we don't often think necessarily before we speak, but we always think before we write and there's a different thing going on there, OK.

38	P	When you're listening to a conversation with somebody it's so much faster.

39	T	Yes, OK, so much faster, and actually if you think of how many words a minute we can speak compared with how many we can write it's a big difference. You know, I don't know how many words we can speak in a minute, I've never thought about it.

40	P	We should try it.

41	T	We could try it, I think it depends how quickly you do things, and actually we could do something like that, we'll do that because not next week but the week after we're going to do our start our work before Christmas on speaking where you actually have to talk to time for two minutes for certain parts of speech, and you have to stand up and present a speech to the rest of the group. We'll time it then, we'll work out how many words a minute we speak because that's a perfect time to do that, but that will be a proper way of talking about something that you'll become an expert about, OK? Rose.

42	Rose	You know when they say speech isn't permanent, I think it can become permanent if you record it or something.

43	T	Exactly, so if you then, if you want to record something, um, that's when you get politicians into a lot of trouble, isn't it, because if they've said something and they don't think it's going to be recorded or it's not going to be pinned down and suddenly it's all exposed. Do you remember this in the General Election?
44	Ps	Gordon Brown.
45	T	Gordon Brown and he got in a car and he said something really rude about an old age pensioner didn't he and it was a real problem. Now he would have thought, it's just talk, I'm just talking to somebody, and as I've said, if you record it, you're on record for saying it. Sorry?
46	P	The microphone was still on.
		(The activity begins)
47	T	Yes, the microphone was still on and realised after that, so that wasn't a bright moment for him. Right, what I would like you to do, you can do this in pairs if you wish, (R, peer) you do not though Chrissie and Katy for this exercise need colour pens, you just need your biros, I will send around these little sheets and some glue, you're going to stick these in and I want you to notice we're talking about formal and informal, and we're talking about adopting and adapting language to suit audiences. Can you identify the words in this tiny little bit of text that are not suitable for the context, OK, and it has got a political theme about it, and you'll read it and you'll realise that actually it's not a suitable, and I'm going to use a word that we haven't used yet, register. *(T writes the word 'register' on the board)* OK, it's not a register that we take in school, register is how we talk to people (**) and you're going to stick it in your books, and you'll circle around the word that you think is inappropriate.
16:30		
48	T	Girls, how I would imagine you doing it is if you've stuck it in your book, you circle around the word, OK, so for instance register is in there, circle around it and then do an arrow off into your exercise book and then annotate it. Don't worry if it doesn't really make sense, but, an added complication, um, an added complication girls is

could you think how you would replace the word that is not appropriate with a more appropriate word. The example that I'm going to give you is an obvious one so you'll have to look for the more subtle one, is 'mickey', right, so if you look at the word 'mickey' it's an inappropriate word for the context. Now talking to your mates, talking to your friends it may be just spot on but it doesn't seem right for the context we've got so could you try and think of a more formal word that you would use instead. And this will hopefully lead us into the role play. There are lots of them, so if you can pick them up that would be brilliant. (**) working with your pair think of a better word for the (*) it doesn't mean to say it's wrong, it's just not right.

(Ps begin the activity)

49   T   OK, not very long for this, we're going to finish by twenty five past which is plenty of time, OK, the difficult thing that you've got to do (*) please girls is recognise and identify what sort of language it is, you've got to think about the context, so try and work out the context for the speech and then once you've worked that out you can work out why actually it's not an appropriate register. Find the words that aren't right and then write the improved word for the context, OK.

(Ps continue the activity)

21:43

50   T   OK, one minute to go girls.

51   T   OK, right then girls, if you're still adding to this it doesn't matter, we can share ideas, you can add anything that you may not have already, (R, peer) OK, sh, girls, the first one, Heather, Heather what was the first one? First of all, let's go back a bit, context, why does this language seem totally inappropriate for the context, what's the problem?

52   P   Um, formal speech about an important person.

53   T   OK, it's supposed to be a formal speech, why do you think it should be formal?

54	P	Because I think it's kind of like, um, a report.

55	T	Absolutely spot on, it's like a news report isn't it? It's like a BBC news report, I wonder if anyone picked that up actually, and for that reason we wouldn't expect it to be this informal, yeah? And given the nature of the subject, that it's politics, we wouldn't expect to have the expressions that you've got in this tiny extract. So back to Heather and Polly and Christine, what did you pick up as your first point?

23:30

56	Ps	Um, 'bust-up'.

57	T	'Bust up', so what do you suggest would be more appropriate for the context?

58	P	'Political argument'.

59	T	'Political argument', or 'argument', excellent. OK, that starts us off nicely then, Katie, your little group, what did you put for the second one?

60	P	Um, for a 'row', 'argument' or something.

61	T	OK, is that for 'terrific bust-up'?

62	P	No, for 'row'.

63	T	Oh for 'row', sorry, what did you put?

64	P	'Argument'.

65	T	OK, so that would work if you hadn't already put 'argument' for 'bust-up', all right,

Amy.

66	P	Instead of putting 'political argument', we put 'political disagreement'.

67	T	OK yes you could, 'debate' or 'disagreement', you can find alternatives but you're absolutely spot on with keeping them very formal, OK, what's the next one then Jazz that you picked up?

68	P	Um, 'bananas'.

69	T	'Bananas', we skipped a bit but that's OK. So if we go to 'bananas' what did you put instead, how did you make that formal?

70	P	Dunno.

71	T	So you've identified that that's not right, Anne-Marie?

72	P	'Mad'.

73	T	'Mad', OK, any...

74	P	'Worked up',

75	T	'Worked up', possibly, I'm not sure if that's still a little bit informal.

76	P	We got rid of the, um, 'then went wild, completely bananas' bit that whole bit because (*) it was also saying more or less.

77	T	OK, so, it is or it isn't, and that tends to be what the news does isn't it, it's either one thing or it's the other, it's not necessarily such a speculation, OK, so you could get rid of the whole phrase altogether and say look the whole phrase isn't appropriate.

78	P	For 'bananas' you could put 'insane'.

79	T	You could put 'insane', that of course takes it to a very different thing if you start to use 'insane politics' and 'politicians', what does that suggest? *(Ps laugh)* Then you might go down a different sort of (* route) *(Ps laugh).* But 'bananas' does mean that kind of thing, it's about going nutty isn't it, you can't put 'nutty' in there. *(Ps laugh again)* Katy?

80	P	Um, I've got, um, I've got 'peeved'.

81	T	'Peeved', yeah what, does anyone else say 'peeved'? Because I'll be a bit peeved sometimes, so, what does it mean? Christine, have you got something for peeved?

82	P	'Annoyed'.

83	T	'Annoyed', yeah, a little bit annoyed, it's not really being really annoyed, but it's just being mildly annoyed.

84	P	'Irritated'.

85	T	Yes, 'irritated' is a good word.

86	P	'Drew blood', um 'got hurt'.

87	T	OK, so 'drew blood', now what did you think about that Alex, did you think that that was informal or did you think that that was actually inappropriate for the context?

88	P	The Prime Minister's not like (**) so getting hurt.

89	T	OK, so we're actually suggesting that this report is in no way what we expect to find in a formal report, on the BBC news about politics. So even if we don't know we

know it, we know what's formal and what's the right context for something, and what actually is too informal and is the wrong context. We know even if we don't think about it all the time, we instinctively know, Rose?

90   P   Where it says 'all's well that ends well, I suppose' as a newsreader you wouldn't really get their opinions about things, and maybe interviewing people about their opinions and not stating your own.

91   T   Absolutely spot on, they have to report in a detached way don't they? They shouldn't show their emotions about that, and actually 'all's well, that ends well', I don't know if anyone knows where that's a title from, has anyone heard that title? Rose?

92   P   Is it a Shakespeare play?

93   T   It's a Shakespeare play, so it's actually the title of a Shakespeare play, and it's become a sort of cliché as well, so it's, again, it's just not right, it's not quite right. OK, so what are we going to say then, are we going to add anything to the scruffy notes that we've got? Which I did, I'm going to persevere with the interactive whiteboard, I'm not the best at it. *(T laughs, then projects a resource onto the whiteboard)* See, it all goes to pieces. Right, so formal and informal, can we very quickly just summarise what we've got here, what can you take out of this tiny little extract that we're now going to try and (* immediate) improvisation to put together in two different situations? OK, so I want to try and work out what features we've got from here and then we're going to do a role play. Alex.

94   P   No slang.

95   T   Sorry?

96   P   No slang.

97   T   So, no slang.

98	P	Should we be writing this down?

99	T	Yes please, it would be really useful, OK, so no slang. Are we quite happy with slang because these are words that we'll actually use more of next lesson and lessons next week? OK, so no slang, what else can we say? Yes.

100	P	You've got to address the person you're talking to.

101	T	So to address the person or not to address.

102	P	To address formal?

103	T	To address the person, OK, and here we can of course put 'slang', OK, with the formal bit, we've got a bit of idiolect haven't we really, and Rose picked that up at the end of it, where you've got 'I suppose', that's a common expression that people would use, so if you're being formal you have to try as much as you can to perhaps keep some of that idiolect out of it, all right, so perhaps we'll have idiolect in that one, but we don't have it in the other one. OK, if we're really formal, what else are we doing?

104	P	You don't shorten words like 'couldn't'.

105	T	OK, so no abbreviations. *(T writes 'no abbreviations' on the board)*

30:00		

106	T	Now that's an important one actually Katy, is that just in speech or in writing? Can we abbreviate in speech if you're speaking formally?

107	P	Um, yeah.

108	T	We could do, if we're writing formally would we abbreviate?

109	Ps	No.

110	T	No one of the things that you're doing, you're doing (**) , one of the things that you might pick up is you don't want to put abbreviations in there because we keep it formal because most of the writing you do is formal, OK?

111	P	Is that like 'can't'?

112	T	Yes, 'can't', 'won't', yes, 'don't', contractions, all right, contracted words, OK, so what else then, is there anything else we want to say? We've got to say something about register, OK, register is important for both. *(T writes on the board the word 'register' under both formal and informal speech)* OK, when we said about the idiolect, it's the formality needs to be so that we don't show little expressions. If you think about how you talk, how many of you know that you use the word 'like' after most things, like? *(This comment from the teacher ignites some discussion amongst the pupils)* Now is that formal or informal?

113	Ps	Informal.

114	T	It's very informal, you can't help it sometimes, OK, so, so, OK, sh. *(T quietens the pupils)* What else would we say, what else could we do?

115	P	With informal you could have, um, fillers.

116	T	Yes, informal we can have fillers, good and I love the fact that you're already using the words you've been introduced to, (R, evoke) and if we can use fillers we can also use?

117	P	Hedgers.

118	T	Hedgers, OK, where we can um and ah and all sorts of things, and we can get away with it informally because when we talk informally who do we tend to be talking to?

| 119 | P | Our friends, our parents. |

| 120 | T | Yeah, so people who know us. Would you talk informally to me or formally to me? |

| 121 | P | Formally. |

| 122 | P | Informally. |

| 123 | P | In the middle, in the middle. |

| 124 | P | I'd put both. |

| 125 | T | It's interesting, because (**) you'd be talking formally. |

32:19

| 126 | P | Yeah, but... |

| 127 | T | How would you talk to Mr Bryant? |

| 128 | Ps | Formally. |

| 129 | P | Informally. |

| 130 | T | Really? So you'd say 'hiya mate'? *(Ps laugh)* Right, OK, so, we've got slightly different things then, formally, this is where we're coming into it, OK, we're going to need to have really three guinea pigs, you don't know what you're going to do but you're going to be, right, Amy come on up. |

131	Ps	Whooo!
132	T	Get a chair, OK, you're going to sit in front of the board, right, OK, who else am I going to go for, Holly come and have a go, Annie come and have a go without giggling, all right and we'll se how we do. You're going to be facing this way, OK, and you're going to be behind your table, OK, you might like to guess what these two people are going to do, Amy you're going to have to do this at the top, just from the top of your head, OK, um, right. *(Ps quieten down)* Amy's going to be interviewing, Polly is going to be using very formal language and she's obviously very keen to get the job, we've got to decide what job application it is, it could be for a teacher couldn't it? Shall we do it for a teacher?
133	Ps	No!
134	T	Shall we do a teacher? An English teacher, right so, sh, right, formal, informal, all right, can we give a bit of advice before one of them goes outside the door to come in, Katy.
135	P	Um, which one?
136	T	Formal, what would you suggest that she has to do?
137	P	Talk very poshly.
138	P	Talk slowly.
139	T	Talk slowly, what does 'poshly' mean?
140	Ps	(**).
141	T	Sh, hang on a minute.

142	P	Is it like saying, people say 'what', say 'what', pronounce your ts.
143	T	OK, good, sh, if you can listen, right, is there any more advice that you can give to Holly? Katy.
144	P	Good pronunciation.
145	T	Good pronunciation, we haven't said anything about pronunciation which is actually really important as well isn't it? And it is, of course, for both, all right, sh, what else?
146	P	Don't slouch.
147	T	No, body language absolutely important, so one of the big things, we can actually do the two extremes can't we, so we can have the very formal occasion where Holly is really desperate for the job, and Annie who is a little bit sloppy *(Ps laugh)* about how she sits, and you can take it in whatever extreme you like. Alex.
148	P	Um, I think Holly should not talk loads and loads, she should stop after a little while.
149	T	Good, OK, so when Amy asks the questions, so there will probably be in Amy's questions something like 'why do you want this job?' and the kind of things that you would do, and why you want to teach a class like this Year 8 class etcetera and those kind of things. Holly will have to know when to stop and when not to talk too much. In the informal one we're going to look at extremes what kind of answer might she give? Annie.
150	P	'Cos it's fun.
151	T	You might do, you might do. Becky.
152	P	'Cos I wanna like get money. *(Ps laugh)*

153	T	So you've got to show the extremes. Let's try it then.

154	P	Is that how I need to be like, or Becky?

155	T	Could do. Holly and Annie if you want to come out, and you need to knock on the door and when Amy says 'come in' (*).

156	P	Holly don't knock.

(Holly and Annie leave the room)

157	T	Right, are you ready for them? Have you got a few questions? OK.

(There is a knock on the door)

158	Amy	Come in.

(Ps laugh)

159	Holly	Hello, I've come for the job interview.

160	Amy	Oh yes.

161	Holly	It's very nice to meet you.

162	Amy	It's nice to meet you.

(Ps laugh)

163	Amy	So, and your name is?

164	Holly	My name is Madame Holly Hutt.

(Ps laugh)

165	Amy	(**).

166	Holly	I would love to be teaching Year 8 English.

167	Amy	And why would you like to be teaching Year 8 English?

168	Holly	Because they seem like a very nice class from what I've heard, and I'm an English teacher and I would like this job.

169	Amy	So what experience do you have then?

170	Holly	I have worked in Parkstone Grammar School.

171	Amy	Oh, OK, why have you chosen to switch to BSG?

(Holly pauses, Ps laugh)

172	Holly	Because the students there were not very pleasant.

(Ps laugh. Amy pauses, thinking of a question to ask)

173	T	Would you ask her something like, 'what qualities do you have as a teacher'? It's a really difficult thing to do because you're thinking about things that are years ahead of you. Could you ask that question? Or what kind of personality has Holly got that you think would be good in the classroom. (R)

174   Amy   What qualities do you have that you think would be good in the classroom?

175   Holly   I would be able to get the children interactive in the lessons, I would be able to teach them things that they have not been taught before.

       (Ps laugh)

176   Amy   The children at Parkstone Grammar you said were not very well behaved, is this because of your own personality?

177   Holly   No, it's because of the teacher before me.

178   Amy   Oh, and why weren't you able to sort it out?

179   Holly   I tried very very hard but they laughed whenever I walked in the door.

       (Ps laugh)

180   Amy   How long were you there?

181   Holly   About two years.

182   Amy   Do you think you could go on from Year 8?

183   Holly   Possibly.

184   Amy   What other years do you think you could do?

185   Holly   I might be able to teach Year 9s and maybe Year 10s or sixth form.

(Ps laugh)

186   T   Girls can you just listen for a minute, a couple of questions for both of them before Annie comes in. What makes this so difficult?

187   Holly   I don't know why.

(Holly laughs)

188   T   Right, OK, so actually what are we doing here, when you've got a formal occasion and actually you don't always know what you're going to say and how you're going to react to something that becomes really difficult. Now it would have been a much easier context if I'd said that it was going to be for a Saturday job in a newsagents, OK, but it's a very typical formal occasion where you have to actually say things just as (*) to say but also, Grace, there's an expectation in certain circumstances where the person interviewing will expect the interviewee to be a particular type of language, a particular body language and they'll actually be looking for it. Was Holly all right?

40:00

189   Ps   Yeah.

190   P   I wouldn't give the job to Holly.

191   T   You wouldn't.

192   P   She was there for two years and she didn't even sort out the class.

(Ps laugh)

193	T	So she actually didn't do herself any favours in the interview then.
194	Ps	No.
195	T	So, sit yourself down.
		(Ps applaud Holly, Annie knocks on the door and enters)
196	Amy	And your name is?
197	Annie	Annie.
198	Amy	And and what section would you like to teach in?
		(Ps laugh)
199	Annie	English.
200	Amy	Why?
201	Annie	'Cos it looks fun.
202	Amy	Is there a particular year that you'd like to teach?
203	Annie	Year 8 I suppose, like they're funny.
		(Ps laugh)
204	Amy	Would you be able to teach other years as well?

205 Annie   Er, depends, it (* might) be really clever, work hard, but if they're not too clever they're OK.

206 Amy   What are your experiences?

207 Annie   Er, I'm not sure.

208 Amy   Have you worked in any other schools?

209 Annie   No.

210 T   Sh.

211 Amy   What GCSEs and A-Levels do you have?

212 Annie   I've got some GCSEs, I've got two Cs in English, no in Science, three Cs in Science, one C in English and a B in Maths.

213 Amy   OK, what was your second (**).

214 Annie   Um (*).

215 Amy   What qualities would you have in the classroom?

216 Annie   Like, um, I would be able to make them do their work.

217 Amy   Right.

        (Ps laugh)

218	Annie	Teach them how to write.

219	Amy	And what holidays do you want?

220	Annie	Well I'd like to take Fridays off so that I can go out.

(Ps laugh)

221   T   OK, can we stop there, what would you like to say about Annie? Would you give her the job Grace?

222   Grace   Yeah.

223   Ps   Yeah.

224   T   Yeah? OK, so, Lottie what were you going to say? Girls, I can't hear Lottie, sh.

225   Lottie   At the beginning she wasn't that informal, she kind of did it but it wasn't, she didn't want to be rude.

226   T   But that's quite interesting isn't it? Why is Annie too p... well to be fair it doesn't say you have to be rude does it?

227   Ps   No.

228   T   But what does that suggest, in an interview situation, what would you suggest happened Annie, even though that's just a role play?

229   Annie   What do I think?

230   T   Yeah. What stopped you from being completely and utterly informal and going in there and slouching in your chair and putting your feet up on the table?

231   Annie   Because I know it's not, I don't know, I know it's not very polite.

232   T   Right, so what have we got about the conventions of language? What have we learnt about it? Poppy?

233   Poppy   That you only do it in certain situations.

234   T   Yeah, we have from a very early age a very clear recognition of when, of when we use certain types of language and when we don't girls. What are you doing Lottie?

235   Lottie   Moving my chair (*).

236   T   You stay there then. Um so we've got a very clear way of doing that, who teaches us that?

237   P   You.

238   T   Me? *(Ps laugh)* What happened before I knew you? Lottie?

239   Lottie   (*).

240   T   Hang on, sh.

                    (Ps talking amongst themselves)

241   Lottie   Parents.

242	T	Parents, yes exactly. How many occasions can you remember meeting all sorts of people and your parents used to do a little pep talk for you, as if to say just make sure you say 'please' and 'thank you', or you know how to (**).
243	P	(**).
244	T	Very recent, sh, but you learn the conventions of when you speak formally and when you speak informally. Do we consciously walk into a situation and think like that? Do we think right I'm going to talk formally now?
245	P	Yeah.
246	P	Yeah.
247	T	Do you? It just happens most of the time, doesn't it, Annie what were you going to say?
248	Annie	Does it also depend on like the people you are with?
249	T	Yes, absolutely.
250	Annie	Because you pick up their habits and then start doing the things they do.
251	T	Brilliant, so one of the things that we find we do, girls, is that when we meet with a particular group of people, if they have a particular way of talking, and they are talking informally, we will then adapt and modify, use our language in the way that they will, so we'll match their language. We often match their body language too, don't we, not just their language but how they react too. And how many of you feel that the friends that you mix with like the same music as you, read the same sort of stuff, wear the same kind of fashions? We tend to have people that we mix with and we know, sh, girls can you listen. Rose, what were you going to say?

252	Rose	We're talking about how we learn language from the parents, I think that you can also maybe copy their accents if you've been with them a lot when you're growing up.
253	T	Brilliant.
254	P	So how we're talking with our parents now might be different if we had Sheryl Cole as our mum or something.
255	T	Yeah, absolutely, so our parents are going to not just give us the formal and informal language, they're also going to give us accent, and if we have accent, I'm also going to give you that other word as well which you probably already know, but I'm going to put it on the board just in case, and that's dialect. And again, where does it come from? You'll notice that there's...
256	P	Latin.
257	T	Latin, and you can see that an awful lot of how we use language about language comes from Latin, OK, probably no surprises there because language and the way we shape it is going to be formed by the language that shaped it in the first place, if that makes sense. Yes, go on Amy.
258	Amy	You know when you were talking about the accents, well if you moved somewhere quite young, like when you were two and you were moving somewhere else where they talk differently you pick up their accents as well (*) just beginning to speak.
259	T	Absolutely, does anybody here have that experience, has anyone moved from one place to...
260	Ps	Amy.
261	T	...another, from one country to another. Amy where did you come from?

262	Amy	America.

263	T	You came from America.

264	Amy	I went to England, I was born in England then I moved to America when I was two and I came back.

265	T	So what age were you when you came back?

266	Amy	Two and then when I came back I was four.

267	T	So in that time a lot of your language learning between the age of two and four was being formed, did you come back with an accent?

268	Amy	Very, very, very bad accent.

(Ps laugh)

269	T	A bad accent, and what has happened to that accent?

270	Amy	It's kind of gone away but I kind of had, when I came back it was a really high pitched American accent.

271	T	OK.

272	Amy	And then I managed to get (**).

273	T	OK, and do you go back to America?

274	Amy	I want to but I'm not allowed to.

275 T But if, do you think if you spoke to an American person your accent that you used to have when you were much younger would come back again?

276 Amy Yeah, I've had that experience.

277 T Good, OK, that tends to be what happens isn't it? Has anyone got, I've got parents, a parent, I've only got mum left now but my mum is a West Country girl, she comes from Glastonbury and whenever she meets with her relatives she goes into a broad West Country accent. She doesn't have it normally, but it's almost, it's going back to this idea that you match your language and you match your accent to the people that you are with. So if we looked at the learning objective on the board again, we're kind of answering the question all the time aren't we? We know we modify our language and we change what we do all the time, um, but we're not always conscious of it, we don't walk into a room thinking right informal today, or formal now 'cos what we're going to do, we know that. Um we're going to need to just find a couple of things that we can jot down, just to say what we think we've learned, OK. Katy what are you going to say? (R, objective)

278 Katy I was just going to say about accents.

279 T What were you going to say about accents?

280 Katy Just that when my friend first moved here she had the strongest Aussie accent ever, you just couldn't understand what she was saying.

281 T And has it changed?

282 Katy Yeah it's completely gone, her dad's still got it and I still can't understand what he says.

283 T But do you find that when your friend talks to her dad with a strong accent, does her accent become stronger with him than with you?

284   Katy   Yeah, her tone starts to go up at the end, she goes 'good day mate' it goes right up at the end. (*Katy says 'good day mate' with rising intonation*)

285   T   Right, OK, 'cos that tends to be what happens as well, you have an ear for language and you can pick up accents as well. Some people can actually copy accents really well, I'm rubbish at it so I can't talk in an American accent, I can't talk in an Irish accent, but there are people, you probably know friends that can, and it is really entertaining, but you have to have the right ear, sh, OK.

50:00

286   T   Girls if you can listen, a couple more hands up and then we'll finish with just a couple of things that we need to write down just to capture what we've tried to do today.

287   P   My cousin's parents speak like my family but then my cousin they all live in um Manchester she speaks like all her friends but the parents don't, she's got like a Manchester accent kind of thing but her parents don't.

288   T   So it's Manchurian isn't it? Manchurian. (*Ps giggle, possibly at the word 'Manchurian'*) OK, Annie, sh.

289   Annie   My mum says that, um, when she goes to Spain she has this Spanish accent and (*) now but she's lived here fourteen years.

290   T   Right, OK, and when she goes back to Spain it just becomes stronger again and it becomes just quite natural. OK so how are we going to summarise this girls? Can you go back to your places, thanks very much. We might do a little bit more role play when we do accent and dialect. OK, right girls, sh sh, OK as a group are you listening? Sh, let's see if we can, let's see if we can write something down as a group here. (R, objective) If we look at the learning objective again, and we've kind of been trying to have a thing about the difference between speech and writing, and basically in a nutshell speech is spontaneous and it doesn't often get prepared or thought about in advance, it just kind of happens, um, and writing it is contemplated, it can be redrafted, it can be changed and modified, um, and speech once you've

said it, it's gone, you've said it. OK and you could argue too that it's transitory until it's pinned down in a transcript, OK. But very difficult to get everything about the speech that was intended, because you don't have tone, you don't have pitch, you don't have pronunciation. So, if we go back to the learning objective, how do we change to modify our language, what kind of statement can we make before we leave this room then, as a group, what can we say about language? Katy.

290   Katy   Um, I would say that, um, we adapt our language when we're speaking with friends.

291   T   OK.

292   Katy   We make ourselves sound quite informal and we use slang and everything, when we're talking to someone that's quite, when we're talking to Mr Bryant or someone that's quite important, um, we speak quite formally to them, stand up quite straight, make ourselves and try and make a good impression.

293   T   Actually that's important isn't it, language does form an impression immediately. If you see a beautiful person and then this big accent comes out of the voice as a voice that you don't expect, what does it do? How do you think, when you hear the voice, compared to the person, do you think anything?

294   P   Sometimes.

295   T   Sometimes, sh, sh. You associate a voice with a person, you can do, and should we?

296   P   No.

297   T   Are any accents better than others?

298   Ps   Yes.

299   T   Do you think so?

300	P	Originally where do accents even come from?

301	T	Accents are our regional languages so every, we've all got accents, you've got an accent.

302	P	But originally, why are there different accents?

303	T	Because, I guess it's about, if we go back to language and change and how, girls if you think about how, now we're very mobilised as a country aren't we, we can jump in cars, we can go on planes, trains and everything else, and we can move around. If you think about accents before, you would have been located in one little area, you wouldn't have moved out of your regional area, and regional areas used to have regional dialects and accents and they got locked into a place. We've got probably less accent than we used to have although there seems to be a much stronger campaign to keep accents. If you think about the newsreaders, do they always have very strong Queen's English or do they have accents?

304	Ps	Accents.

305		They have accents now, they didn't used to have, OK, and actually that's another thing that I haven't put down, I've digressed again. I'm just going to put down RP, which is 'received pronunciation' and if you're being very very, this is what, um, I think it was Katy I think Katy said what (**) about talking posh. If you talk posh it tends to be that you have a received pronunciation, and it used to be the only accent on television, when it came to the news, where you have news broadcasters they always had what you call Queen's English and it was always the same accent, the same way of communicating formally, um, and now we've got much more regional accents. And if you go home and you watch the news today everybody's accents will be different according to the different channels, OK, but we still haven't quite got to that. Katy's point, before we go, because we've got about two minutes can we please write down that, if you agree with Katy's statement that is, that you change your language to suit the audience. (R, choice) Now we know that OK, how do we do it, we don't do it consciously but we do it because we've been trained to, we've got a conventional way of knowing that you use formal language for respect and for particular occasions and I like the idea that it kind of has an impressive quality about

it too, we know that. And actually Annie in her role play proved actually that's it's really difficult to be informal and you know that the situation requires a degree of formality. So even though we wanted her to be informal, she was actually still too polite, too good to do that. Now informally we learn (* structures) don't we, because of, the other thing that we haven't done too is the idea of listening to each other, now we actually always make sure that we take turns at talking, that's a convention, we don't interrupt each other, that's another convention that's laid down very early on, and probably laid down at home where you've had mums and dads saying 'don't interrupt' and we learn that we take turns when we talk, OK. Um, Katy can you just make sure, because I've just rambled on again, um, can you just make sure that we've captured what we want to say. We know we change our language, what else? We change it for different audiences, that we'll talk informally to our friends but we'll talk more formally if we meet somebody for example like Mr Bryant the Head Teacher, OK, or in an interview situation. Amy?

306   Amy   Our language changes with the people that we grew up with.

307   T   OK, good, if we have an accent, or if we have a family that has accents, we may well change our language and our accent when we're with our families. And there may be particular expressions that we use in our families that we don't use anywhere else.

(*The bell rings to signal the end of the lesson*)

57:54

Appendix 11   The guessing game

208	T	Yes, good, you've got the arguments for and against appeasement in your book, in your folders rather, with the pictures and your explanations of them. So Mandy has kindly explained how appeasement helped cause the war because it encouraged Hitler to take more risks. Can we think of an example of appeasement because people often write it and they don't give an example? There's one that's really really really good. Gisele.
209	Gisele	Um, when he marched his troops into the Rhineland.
210	T	That's at the beginning of appeasement because we do nothing and we think it's only Germany but there's a really reallyreally good example *(silence from the Ps)* in nineteen thirty eight, a bit of paper, peace in our time, *(silence again)* Neville Chamberlain British Prime Minister. Jade.
211	Jade	Sign (**).
212	T	Yeah and what, no?
213	Mandy	Is it something about how they invade? Germany invades somewhere and then Britain and France stop...
214	T	They don't invade anywhere.
215	Mandy	Yeah, oh, no, I've forgotten.
216	T	There's a gap in our knowledge.
217	P	Does it begin with 'l'?
218	T	No. The area begins with 's' and the agreement begins with 'm'. Grace.
219	Grace	Sudetenland.
220	T	The Sudetenland, which is part of which country? Beginning with 'c'.
221	P	Czechoslovakia.
222	T	Czechoslovakia. Hitler wants it because there's Germans in the Sudetenland, the agreement which is signed by Chamberlain and Hitler which basically says yeah you can have the Sudetenland, we're not going to consult the Czechs is called the 'What Agreement'? Beginning with 'm', city in Germany.
223	P	Munich.

224 T   The Munich agreement, that's the best example of appeasement, because Hitler just basically is given it by Britain and France without consulting the Czechs and then he just marches his troops in. So appeasement, a policy of giving in to Hitler to avoid war, we don't want to go to war over Czechoslovakia, but in the end we have to stop, but it encourages Hitler to take more risks. Do you remember he starts off with the Rhineland, just within Germany and then he unites with Austria and he has a bit of Czechoslovakia, and then in March thirty nine he invades the rest of Czechoslovakia but we still do nothing. And then when he invades Poland in thirty nine then we decide to act. So the next one is the Nazi-Soviet Pact of nineteen thirty nine, who would that be between, can we remember?

Appendix 12   Identification of Q-R-F cycles and feedback and questioning structures

Split by three-part and extended cycles

Three-part Q-R-F cycles (137)	
closed- initiator followed by feedback (93)	**open-initiator followed by feedback (frequency = 44)**
closed- initiator-s-answer (4/6) closed- initiator-s-confirmation (10/40) closed- initiator-s-confirmation-elaboration (13/25) closed- initiator-s-confirmation-reformulation (6/8) closed- initiator-s-confirmation-reformulation-elaboration (4/4) closed- initiator-s-elaboration (1/1) closed- initiator-s-peer (1/1) closed- initiator-s-reformulation (2/2) closed- initiator-s-reformulation-elaboration (1/1) closed- initiator-s-rejection-answer (2/2) closed- initiator-s-rejection-s-confirmation (2/2) closed- initiator-s-rejection-s-confirmation-elaboration (1/1)	open- initiator-s-answer (2/2) open- initiator-s-confirmation (7/11) open- initiator-s-confirmation-elaboration (4/11) open- initiator-s-confirmation-reformulation (7/8) open- initiator-s-confirmation-reformulation-elaboration (7/12)

Extended cycles (135)

initiator / modifier (41% 56)	
closed- initiator / modifier (34)	open- initiator / modifier (22)
closed- initiator / closed-modifier (34 of which 7 have a rejection and 4 have x)	open- initiator / closed-modifier (17 of which 10 have x and 2 have rejection and x)
closed- initiator / open-modifier (0)	open- initiator / open-modifier (5 of which 1 with rejection)
closed- initiator-s-closed-modifier-s-answer(1/1) closed- initiator-s-closed-modifier-s-confirmation(6/10) closed- initiator-s-closed-modifier-s-confirmation-elaboration(1/1) closed- initiator-s-closed-modifier-s-confirmation-reformulation(1/1) closed- initiator-s-closed-modifier-s-confirmation-reformulation-elaboration(1/1) closed- initiator-s-closed-modifier-s-closed-probe-s-reformulation(1/1) closed- initiator-s-closed-modifier-s-closed-probe-s-confirmation-reformulation(1/1) closed- initiator-s-closed-modifier-s-closed-probe-s-closed-modifier-s-confirmation-reformulation-elaboration(1/1) Vignette closed- initiator-s-closed-modifier-s-closed-probe-s-<u>rejection</u>-closed-modifier-s-confirmation-elaboration(1/1) closed- initiator-s-closed-modifier-s-<u>rejection</u>-closed-modifier-s-confirmation(1/1) closed- initiator-s-closed-modifier-s-<u>rejection</u>-closed-modifier-s-confirmation-elaboration(1/1) closed- initiator-s-closed-modifier-s-<u>rejection</u>-	open- initiator-s-closed-modifier-s-answer(1/1) open- initiator-s-closed-modifier-s-confirmation(1/2) open- initiator-s-closed-modifier-s-confirmation-elaboration(2/2) open- initiator-s-closed-modifier-s-closed-probe-s-confirmation-reformulation(1/1) open- initiator-s-closed-modifier-s-closed-probe-s-open-probe-s-confirmation(1/1) open- initiator-x-closed-modifier-s-confirmation(3/3) open- initiator-x-closed-modifier-s-confirmation-reformulation(1/1) open- initiator-x-closed-modifier-s-confirmation-reformulation-elaboration(3/3) open- initiator-x-closed-modifier-s-closed-probe-s-confirmation(1/1) open- initiator-x-closed-modifier-s-<u>rejection</u>-closed-modifier-s-confirmation(1/1) open- initiator-x-closed-modifier-s-<u>rejection</u>-closed-modifier-s-confirmation-elaboration(1/1)

closed-modifier-s-elaboration(1/1) closed- initiator-s-closed-modifier-s-rejection-s-confirmation(1/1) closed- initiator-s-closed-modifier-x-answer-elaboration(1/1) closed- initiator-s-rejection-closed-modifier-s-confirmation(3/3) closed- initiator-s-rejection-closed-modifier-s-confirmation-elaboration(1/1) closed- initiator-s-rejection-closed-modifier-s-reformulation(1/1) closed- initiator-s-rejection-closed-modifier-s-closed-probe-s-confirmation(1/1) closed- initiator-s-rejection-closed-modifier-s-closed-probe-s- elaboration(1/1) closed- initiator-x-closed-modifier-s-confirmation(2/2) closed- initiator-x-closed-modifier-s-confirmation-reformulation-elaboration(1/1) closed- initiator-x-closed-modifier-s-closed-modifier-s-confirmation-reformulation-elaboration(1/1)	
closed- initiator-p-open-modifier (0)	open- initiator-s-open-modifier-s-confirmation(2/2) open- initiator-s-open-modifier-s-confirmation-reformulation(1/1) open- initiator-s-open-modifier-s-confirmation-reformulation-elaboration(1/1) open- initiator-s-open-modifier-s-rejection-

	closed-modifier-s-confirmation-elaboration(1/1)
initiator / probe (59% 79)	
closed- initiator / probe (44)	**open- initiator / probe (35)**
closed- initiator / closed-probe (39 of which 2 have a <u>rejection</u>)	**open- initiator / closed-probe (8)**
closed- initiator / open-probe (5)	**open- initiator / open-probe (27)**
closed- initiator-s-closed-probe-s-confirmation(6/11) closed- initiator-s-closed-probe-s-confirmation-elaboration(7/11) closed- initiator-s-closed-probe-s-confirmation-closed-probe-s-confirmation-elaboration-reformulation(1/1) Vignette for confirmation-probe closed- initiator-s-closed-probe-s-confirmation-reformulation(3/4) closed- initiator-s-closed-probe-s-elaboration(1/1) closed- initiator-s-closed-probe-s-closed-modifier-s-confirmation(1/2) closed- initiator-s-closed-probe-s-closed-modifier-s-confirmation-elaboration(2/2) closed- initiator-s-closed-probe-s-closed-modifier-s-closed-probe-s-confirmation(1/1) closed- initiator-s-closed-probe-s-closed-modifier-s-closed-probe-s-closed-modifier-peer-confirmation-reformulation(1/1) Vignette closed- initiator -s-closed-probe-s-reformulation(1/1) closed- initiator -s-closed-probe-s-<u>rejection</u>-s-confirmation(1/1) closed- initiator-s-<u>rejection</u>-s-closed-probe-s-	open- initiator-s-closed-probe-s-confirmation(2/3) open- initiator-s-closed-probe-s-confirmation-elaboration(2/3) open- initiator-s-closed-probe-s-reformulation(2/2)

confirmation-reformulation(1/1) closed- initiator-s-<u>rejection</u>-s-Confirm-closed-probe-s-confirmation-elaboration(1/1)Vignette	
closed- initiator-s-open-probe-s-confirmation(2/2) closed- initiator-s-open-probe-s-confirmation-elaboration(2/2) closed- initiator-s-open-probe-s-confirmation-reformulation(1/1) closed- initiator/ <u>rejection</u>/ probe open (frequency = 0)	open-initiator-s-open-probe-s-confirmation(5/6) open-initiator-s-open-probe-s-confirmation-elaboration(4/7) open- initiator-s-open-probe-s-confirmation-reformulation-elaboration(5/9) open- initiator -s-open-probe-s-elaboration(1/1) open- initiator -s-open-probe-s-open-modifier-s-confirmation(1/1) open- initiator -s-open-probe-s-closed-probe-s-confirmation(1/1) open- initiator -s-open-probe-s-reformulation(1/1) open- initiator -s-open-probe-s-reformulation-confirmation-elaboration(1/1)

Feedback techniques only (262)

answer (10)

     answer-elaboration (1)

confirmation (100)

     confirmation-elaboration (54)

     confirmation-reformulation (26)

     confirmation-reformulation-elaboration (33)

     confirmation-closed-probe-s-confirmation-elaboration-reformulation (1)

elaboration (3)

reformulation (7)

     reformulation-elaboration (1)

     reformulation-confirmation-elaboration (1)

peer (1)

rejection (0)

     23 rejections

     rejection-answer (2)

     rejection-s-confirmation (4)

     rejection-s-confirmation-elaboration (1)

     rejection-closed-modifier-s-confirmation (5)

     rejection-closed-modifier-s-elaboration (1)

     rejection-closed-modifier-s-reformulation (1)

     rejection-closed-modifier-s-confirmation-elaboration (4)

     rejection-closed-modifier-s-closed-probe-s-confirmation (1)

     rejection-closed-modifier-s-closed-probe-s- elaboration (1)

     rejection-closed-modifier-s-confirmation-elaboration (1)

     rejection-s-closed-probe-s-confirmation-reformulation (1)

     rejection-s-confirmation-closed-probe-s-confirmation-elaboration (1)

peer-confirmation-reformulation (1)

Questioning techniques only

closed-initiator (93)

    closed-initiator-s-closed-modifier (20 of which 4 had x)

    closed-initiator-s-rejection-closed-modifier (5)

        closed-initiator-s-closed-modifier-s-closed-probe (2)

            closed-initiator-s-closed-modifier-s-closed-probe-s-closed-modifier (1)

            closed-initiator-s-closed-modifier-s-closed-probe-s-rejection-closed-modifier (1)

        closed-initiator-s-closed-modifier-s-rejection-closed-modifier (3)

        closed-initiator-s-rejection-closed-modifier-s-closed-probe (2)

    closed-initiator-s-closed-probe (29)

        closed-initiator-s-closed-probe-s-confirmation-closed-probe (1)

        closed-initiator-s-closed-probe-s-closed-modifier (4)

            closed-initiator-s-closed-probe-s-closed-modifier-s-closed-probe (1)

                closed-initiator-s-closed-probe-s-closed-modifier-s-closed-probe-s-closed-modifier-peer (1)

    closed-initiator-s-rejection-s-closed-probe (1)

    closed-initiator-s-rejection-s-confirmation-closed-probe (1)

open-initiator (44)

    open-initiator-s-closed-modifier (12 of which 7 x)

        open-initiator-s-closed-modifier-s-closed-probe (1)

        open-initiator-s-closed-modifier-s-closed-probe-s-open-probe (1)

    open-initiator-x-closed-modifier-s-closed-probe (1)

    open-initiator-x-closed-modifier-s-rejection-closed-modifier (2)

    open-initiator-s-open-modifier (4)

    open-initiator-s-open-modifier-s-rejection-closed-modifier (1)

    open-initiator-s-closed-probe (13)

    open-initiator-s-open-probe (25)

        open-initiator-s-open-probe-s-open-modifier (1)

        open-initiator-s-open-probe-s-closed-probe (1)