Introduction: Tasks, Concepts, and Subject Knowledge

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Douglas Barnes (1976) prefaced his aptly titled book *From Communication to Curriculum* by pointing out that orthodox curriculum theory analyses curriculum process from the teacher's objectives rather than learners' understandings. Engaging students in learning about their subject is a central concern for all teachers and teacher educators. The issue of task design in secondary education, how teachers view and use the pedagogic potential of different tasks to engage pupils with knowledge in different subjects, is a central to this endeavour. Subject task design relates to the ways teachers translate the curriculum into the tasks and activities that they ask their pupils to do in order to facilitate developmental or higher-level understanding of curriculum content. This involves the goal or purpose of the task, the resources available in a given setting, and the forms of instruction and intervention that allow pupils to process the information as they negotiate the task activities.

The background to this book on task design is that for the past 25 years the curriculum in the UK, and subsequently teaching, has been dominated by the introduction and implementation of government national strategies. In the secondary school environment this has often led to teaching through narrow and restrictive versions of 'teaching objectives' and patterns of assessment that focus on product and external examinations rather than process and student development. This pattern of curriculum imposition is not unique to the UK of course and educators in many other settings and contexts will recognise the same pressures on teaching and learning. The danger is that pedagogic practices that promote students' learning and

knowledge transformation through active participation can be largely shelved (or hidden) in favour of a passive form of knowledge acquisition through transmission assessed by recall of knowledge gleaned from others or the mastery of technical skills.

One of the aims of this book is to help re-professionalise teachers and question approaches to curriculum imposition. The emphasis is on enhancing students' learning, and prospective and experienced teachers' practice, through a focus on curriculum design, classroom subject knowledge, subject task design, classroom organisation, assessment, student engagement, and questions of agency in the learning process. We aim to help to develop an understanding of task design as a pedagogic tool that will provide insights for teacher training and teacher development in enhancing subject understanding and student engagement.

The focus on task design stems from many years of conversation: in the Department of Education at the University of Oxford (OUDE); in our innovative internship initial teaching education (ITE) programme (Benton 1990: McIntyre 1997); in sessions of our Master's in Learning and Teaching course; and in talks with both prospective and practicing teachers. The Oxford Internship scheme was set by OUDE in 1987 in collaborative partnership with the Oxfordshire Local Education Authority and its local secondary schools. The commitment to school based and research led teacher training was underpinned by 'sustained critical dialogue between the different kinds of expertise which teachers and university lecturers could bring as equal partners to considerations of teaching expertise' (Hagger and McIntyre 2006: 15). The educational landscape may have changed, particularly in school governance and the role of local educational authorities, but the collaborative partnership between OUDE

and Oxfordshire schools remains strong in both initial teacher education and in educational research.

Subject Knowledge and Concept Acquisition

Mercer (2000) identifies three features that good teachers do when they teach well:

1. They use question-and-answer sequences not just to test knowledge, but also to guide the development of understanding;
2. They teach not just ‘subject knowledge’, but also procedures for solving problems and making sense of experience;
3. They treat learning as a ‘social, communicative process’ (Mercer, 2000, p.160).

In other words good teaching is as much to do with the processes of pupils’ learning as it is to do with the outcomes of that teaching. The act of learning for the secondary school student takes place within a constructed classroom zone (Newman, Griffin, and Cole 1989): instruction and learning within this zone involves both mediated activity and the participants’ cultural contexts and past histories. Pedagogy, in this definition of learning, has to attend to both the cognitive and affective processes involved in learners' development. Teachers, to borrow Vygotsky's metaphor, have to conduct the classroom environment whilst attending to the following questions regarding task design in the different motives and varied sub-practices of school subjects:

- What matters in my subject?

- How does task design relate to subject knowledge?
- What is meant by task demand?
- How do tasks/activities help students conceptualise?

Viv Ellis characterises subject knowledge ‘as a form of expertise that exists amongst people who engage in the same kind of practice' (Ellis 2007: 167). Ellis rightly warns against a potential pitfall involved in using metaphors of subject knowledge or pedagogical content knowledge:

> The effect of such metaphors (intended or otherwise) is to distinguish between certain high-status kinds of knowledge that are fixed and universal (subjects or disciplines) and lower status forms of (albeit valued and valuable) 'professional' knowledge that depends on 'use-value' and context. (Ellis 2007: 167).

Pedagogy involves both knowledge about subject and knowledge about how to learn the subject. If the teacher or teacher educator as subject specialist is the all knowing master, then the apprentice could be viewed as being merely a spectator in their own learning. Learning is more complex and requires the learners active involvement in the dialectical relationship of appropriation and internalisation. At the same time, it would be dangerous to ignore the importance of teachers' knowledge of their subject and the ways in which to teach what Schwab (1978) described as the substantive (key concepts) and syntactic (ways of knowing and representing) knowledge required in a particular subject. Egan argues that the task of teaching is to help learners to engage with the symbolic representations of knowledge that remain hidden without the acquisition by learners of the cultural and social tools needed to translate them:

> The educational task, then, involves the resuscitation of knowledge from its suspended animation in symbolic codes. The task is to convert, reanimate, transmute the symbolic codes into living human knowledge in students' minds. (Egan 2005: 95)

Designing classroom tasks to enable learning involves requires the teacher to attend to both the design of the learning environment and to conceptual design (see Derry 2013). Vygotsky (1997) and his colleague Shif extended Vygotsky's (1988) theories of scientific and spontaneous concept development to the field of education. Vygotsky argued that scientific concepts have their origins in the structured academic activity of classroom instruction. Schools introduce scientific logically defined concepts to students. Spontaneous concepts, on the other hand, emerge from the student's own reflections of everyday experience. The relationship between the two types of concept formation is dialectical: spontaneous concepts develop upwards towards greater abstractness just as scientific concepts develop downwards towards greater concreteness. Only when both concepts merge do students develop mature understanding.

Barnes (1976) argues that: 'Many of the tasks set in schools do not make it easy for pupils to utilize their everyday knowledge' (Barnes 1976:29). Barnes describes everyday knowledge as 'action knowledge' as opposed to 'school knowledge' rather than spontaneous or scientific knowledge but the interrelation between the two forms of knowledge are the same. In setting the activities for classroom tasks, teachers need to attend to the following questions:

- How are students' everyday understandings used in the learning?
- What part does talk and language play and what is the role of the teacher in relation to this classroom talk?

- What areas of substantive and syntactic knowledge are learners engaged with?
- What kinds of support are built into different activities in the task sequence?
- What are the different support demands on the teacher, peers, or other adults?
- What are the different assessment demands?
- Do the activities allow opportunities for formative assessment so that support can be adjusted?
- Does the assessment of outcome allow assessment of the teaching objective?

Classroom Task Design

One of the first questions for teachers to ask when designing a classroom task is what is the educational function of the task and how should its design maximise the learning potential? Alexander (2000) makes the following distinction between *task* and *activity*.

> The 'task' dimension of a learning assignment is concerned with cognitive demand, ways of knowing and kinds of learning while 'activity' connotes the ways these are packaged for teaching purposes. (Alexander 2000: 535)

Task design, involves both elements of teachers' understanding task demand and a focus on the design of the activities and classroom organisation in which the task demands are played out. Vygotsky's followers Davydov (1990) and Elkonin (1999) used the phrase 'learning activity' to describe the design of activities that address the development of students' grasp and use of higher order theoretical concepts. The students in this sort of classroom are active agents in their own learning through social collaboration with their teacher and peers. It is in

this same context that Vygotsky described the teacher as the conductor of the social environment: both integral to the activity but reliant on social interaction for the symphony to be played.

Doyle and Carter (1984), building on Doyle's (1979) earlier conceptual framework of task analysis for integrating the academic and managerial aspects of classroom activity, argue that an academic (school) task has three elements: (a) a goal or product; (b) a set of resources or "givens" available in the situation; and (c) a set of operations that can be applied to the resources to reach the goal or generate the product. Doyle (1983) 'task is more than just content. It also includes the situation in which content is embedded' (Doyle 1983: 162). Doyle goes on to argue that task accomplishment has two consequences:

> First, a person will acquire information—facts, concepts, principles, solutions—involved in the particular task that is accomplished. Second, a person will practice operations—memorising, classifying, inferring, analysing—used to obtain or produce the information demanded by the task. (Doyle 1983: 162)

It is important to add that the situation in which these operations take place is a social one-the classroom environment. Shavelson and Stern (1981) argue that task design should consider the following:

- content-the subject matter to be taught;
- materials- the things that learners can observe/manipulate;
- activities- the things the learners and teacher will be doing in the lesson;
- goals- the teacher's general aim for the task (these are more general and vague than objectives);

- students- their abilities, needs and interests are important;
- social community-the class as a whole and its sense of 'groupness' (Shavelson and Stern 1981: 478)

The question remains does the design of linked tasks clearly highlight what is to be learnt – both substantive and syntactic knowledge? In considering what is to be learnt, we need now to consider how that learning is supported by task design.

Designing Contingent Support for Concept Development

One of Vygotsky's (1998) key theoretical points is that we learn through mediated activity. As Wertsch states of Vygotsky:

> In his view a hallmark of human consciousness is that it is associated with the use of tools, especially ‘psychological tools’ or ‘signs.’ Instead of acting in a direct, unmediated way in the social and physical world, our contact with the world is indirect or mediated by signs. (Wertsch, 2007, p.178)

But our contact with the world is also mediated through our interaction with more 'expert' others: more expert in their use of socially, culturally, and historically acquired and developed psychological tools. From the work of Wood, Bruner and Ross (1976), the concept of 'scaffolding' developed as a metaphor to describe the wide range of strategies such as modelling, suggestion or structuring by which an adult or more expert peer could help an

emergent learner. The concept of assisted learning through scaffolding has been extensively discussed (e.g. Langer and Applebee, 1986; Tharp and Gallimore 1988) in attempts to identify the type and nature of assistance that may usefully be provided through scaffolding.

However, scaffolding as a concept has been criticised by Vygotskian and other sociocultural researchers as a potentially reductive way of viewing learning as being merely the supported transference of knowledge from teacher to learner rather than a collaborative act of learning between teacher and pupil. Newman, Griffin and Cole (1989) argue that the scaffold metaphor suggests a 'unilateral action' by the teacher rather than the 'the notion of a social distribution of the task' in the ZPD (Newman, Griffin and Cole 1989: 153). There is division of labour within the task, but the 'task- in the sense of the whole task as negotiated between the teacher and child- remains the same (ibid). Some Vygotskian theorists (e.g. Newman and Holzman 1993; Valsiner and Van der Veer 1993) position the ZPD as a symbolic space for emergent interaction and communication. Nevertheless, both Chaiklin (2003) and Edwards (this volume) go back to Vygotsky's own writings in order to warn against the simplification of regarding the ZPD as simply a property of the child alone or a metaphoric space for learning. Rather, the ZPD is an indication of students' emerging psychological functions that can be the basis for useful pedagogic interventions that focus on leading development. Assisted performance, needs to be seen as one of the strategies within task design rather than the whole point of teaching.

Harry Daniels (2007) suggests an inherent danger in the lack of theoretical clarity in the use of the term 'scaffolding' that can render the term meaningless in the context of teaching.

Daniels identifies four essential task design features for assisted support in the context of mediated and reciprocal learning:

1. The recruitment by an adult of a child's involvement in a meaningful and culturally desirable activity beyond the child's current understanding or control;
2. The 'titration' of the assistance provided using a process of 'online diagnosis' of the learner's understanding and skill level and the estimation of the amount of support required;
3. The support is not a uniform prescription-it may vary in mode (e.g. physical gesture, verbal prompt, extensive dialogue) as well as in amount;
4. The support provided is gradually withdrawn as control over the task is transferred to the learner. (Daniels, 2007, p.323)

It is interesting that Daniels uses the scientific term 'titration' for assistance suggesting that the assistance given needs to transform the learner's conceptual development. Assisted performance should not be seen as a prop to hold up current development but as one of the mediational tools through which students develops their ability to engage with tasks at more complex levels. As Edwards (2010) argues:

> Resourceful teaching for resourceful learning is therefore more than curriculum delivery and teaching for successful test performance. It involves guiding the agency of the learner to actions that strengthen their understanding of tasks and their impact on them. That in turn means emphasising decoding alongside encoding so that the

> complexity of tasks is revealed and the potential for artefacts and ideas is recognised. (Edwards 2010: 73).

An Overview of the Chapters

The chapters in this book take different perspectives on task design although all share a concern with the social and cultural aspects of learning. Most of the authors work in initial teacher education (ITE) either at the University of Oxford or in the USA. Chapter one has a strong theoretical basis and explains some of the key concepts to be drawn on in the chapters that follow. Chapter 2, written by a former Qualifications and Curriculum Authority (QCA) advisor, addresses the politics of a crisis in curriculum design. Chapter 3-9 are subject based chapters from each of our curriculum areas on our ITE courses at OUDE. However, these subject chapters are not written exclusively for subject experts as they are part of the general argument about curriculum and classroom task design, student learning, subject knowledge, and classroom engagement. There is much to learn from the different sub-practices and varied motives for task design of other subjects. The final chapter presents a model for conceptual unit design.

In Chapter 1 Anne Edwards poses the questions what kinds of learners do we need for what kind of society and what kinds of teachers do we need to help develop them? Her argument is that the learning processes that underpin the move from partial understanding to confident use of ideas involve careful task design. It will be argued that task design not only includes enabling a grasp of key ideas and of ways of thinking and acting in a knowledge domain; but also sustaining student engagement and self-regulation or metacognitive awareness. From a

Vygotskian theoretical perspective she introduces a quadrant model of task design as a heuristic device that enable teachers to focus on the Vygotskian emphasis on internalisation and externalisation alongside the demands of mastery of a subject.

In Chapter Two Mark Chater argues that task design and curriculum design are political issues. The chapter critically examines the discourses and structures that thread between classroom learning and national curriculum policy. Using the English educational system as a case study and a warning, the chapter shows how neo-liberal policy approaches have given contradictory messages to a national system by combining a strategy of marketization and centralisation with a discourse of collaboration and autonomy.

In Chapter 3 Gabriel Stylianides and Anne Watson describe their work with prospective secondary mathematics teachers in which they encourage an interplay between mathematical and pedagogical ideas. Task design and implementation is at the core of their approach to this issue. Stylianides and Watson illustrate the role of tasks in promoting the interplay between mathematics and pedagogy with two examples of task sequences from their work with prospective teachers. They argue that helping these students to explore connections between mathematics and pedagogy facilitates the development of a deeper understanding of the complexities of mathematics teaching.

In Chapter 4 Roger Firth explores task design that takes into account the epistemic nature of disciplinary knowledge in geography. The chapter explores ways in which the epistemic can be brought more explicitly into view and made an object of consideration through

instructional planning. To set the scene Firth discusses the limitations of current constructivist conceptions of geography pedagogy (teaching, learning and assessment) before considering an approach to task design that is not only concerned with the learner, the learning process and the subject content (what is known by geography) but also how the discipline of geography has come to arrive at such knowledge. It emphasises the need for a more disciplinary constrained approach to subject pedagogy.

In Chapter 5 Ian Thompson addresses the question how do students acquire the conceptual understandings that allow them to engage with and act on the cultures of literate practices? The chapter argues that task design in the English classroom can often focus on the teacher's objectives for task completion produced under the pressure of teaching to examinations rather than the developmental demand for learners. Conceptual learning in the English classroom involves a task design focus on both the theories and practices of communicative activity. The challenge for English teachers and teacher educators lies in designing demanding classroom communicative tasks that create the conditions for learning to occur through social and cultural interaction. This challenge is addressed with two examples of collaborative learning tasks for writing and reading.

In Chapter 6 Ann Childs and Jane McNicholl focus upon task design in relation to explaining concepts in science and the kinds of tasks which might be used in such science explanations. The chapter begins by looking at an important body of literature in science education on pedagogical content knowledge (PCK) to look in detail at the knowledge teachers have to design appropriate tasks to facilitate pupil learning of important concepts in science. The

chapter then examines the process of practical theorising in the contexts of an initial teacher education programme through which prospective science teachers develop their knowledge and understanding about how to explain science to learners and to build a repertoire of tasks in order to do this.

In Chapter 7 Trevor Mutton and Robert Woore argue that the design of language learning tasks for the foreign language classroom must draw on knowledge from a wide range of sources. The chapter develops the ideas that language learning differs from the learning which takes place in some other subjects in important respects and that the knowledge sources that inform task design should include an understanding of how languages are learnt. Designing effective tasks for the languages classroom is viewed as an intellectual exercise rather than imitating experienced practitioners or implementing pre-existing tasks. Beginning teachers need opportunities to engage with the complexities of task design for language learning.

In Chapter 8 Jason Todd argues that prospective history teachers need to draw knowledge from different quarters in order to design tasks in the classroom. This includes knowledge about history as a discipline, knowledge about how pupils learn, and knowledge about specific forms of history subject pedagogy. Todd argues that unhelpful binaries, such as the debate between knowledge that is contingent and knowledge that is evidence based, can distract teachers from a central focus on the importance of the context of children's learning both within and outside of school and of the disciplinary tradition with history. This chapter explores how the concept of phronesis might help reconcile this dualism and help prospective teachers negotiate the complex processes involved in task design in the history classroom.

In Chapter 9 Nigel Fancourt makes the point that in many countries religious education has moved from a mono-religious focus to the study of several world religions. Students are asked to understand different belief systems, such as Christianity or Buddhism, which may not be theirs, and with which they may disagree. This chapter explores an important distinction between insiders and outsiders that raises some challenges for task design in religious education. These challenges are examined using Vygotsky's distinction between generic and everyday concepts.

Finally, in chapter 10 Peter Smagorinsky presents a case for prospective teachers learning the skill of designing instructional tasks through conceptual units. His structured process approach is founded in the idea that students learn well when actively engaged with things that interest them. In this chapter Smagorinsky exemplifies the long-term, process-oriented, workshop-based he has developed to serve the needs for prospective learners in learning the task of designing instructional tasks. The design of conceptual units typically includes the following: a rationale, goals, assessments, lessons, activities, discussions, texts, tools, and compositions. Smagorinsky's argument for the instructional, task-based design of a learning structure and appropriate activities is based on almost 40 years of experience and thought as an English teacher, teacher educator, and academic in the United States.

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