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Teaching composing as creative problem solving: conceptualising composing pedagogy

Rebecca Berkley

r.berkley@ioe.ac.uk

This article reports on a school-based research project into teaching composing at GCSE, setting this alongside a review of the literature. It suggests that research into cognition in composing in school students and teaching composing within a school context may be synthesised by understanding composing as problem solving. Composing is described as knowledge-rich, complex, multiple and creative problem solving, requiring the development of skills of hypothesis and verification in students. A series of case studies of individual teachers is analysed using Bernstein's framework for coding knowledge in the curriculum. Research data presented suggest that although there is significant variation in the practice of individual teachers, teaching composing is characterised in the main activities of instruction and training in composing skills and knowledge; management of a positive creative learning environment; and facilitation of ownership, autonomy and authority in students. The article concludes by suggesting that conceptualising teaching composing as problem solving enables music educators to rationalise the specific demands of the curriculum context in which they are operating by providing students with a framework for cognitive development in composing.

1 Introduction: The need for a coherent composing pedagogy

There is little published research that focuses on the teacher's role in teaching composing to school students. Hickey (2003) reveals the significance of promoting creativity in the learning environment, teacher talk in formative assessment and ways to analyse student compositions. Paynter (1992: 7) notes that in discussions of music pedagogy, teaching composing is often ignored. Younker and Smith identify a need to augment teachers' understandings of how to teach music composition effectively to students of all backgrounds and in all settings, and advise teachers to base their teaching on an understanding of creativity in composing (Younker & Smith, 1996: 26; 2002: 259). More recently, research has begun to focus on the significance of the teacher's conceptualisation of composing in determining their approach to teaching composing (Byrne & Sheridan, 2001; Younker, 2003). However, writers in the fields of cognitive development in composing and curriculum studies in music education have tended to avoid defining and analysing composing pedagogy.

In line with models of creativity presented by Dewey (1934), Mackinnon (1962), Ornstein and Carstensen (1990), Perkins (1989), Wallas (1926, 1945) and Webster (1987a, 1987b, 1989, 1990), case studies of classroom composing suggest that students work

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through an invariant series of stages chronologically when making a piece, whether composing in a single session or working over a period of weeks. Whilst working on a piece in draft formats, students may revisit earlier stages of this process, but must always progress in the order noted:

- recognising and identifying the composing problem which provides the initial stimulus;
- generating and realising initial ideas through interaction of logical and opportunistic thought, and manipulation of chosen compositional techniques;
- creating a draft form of the piece through developing, revising and modifying existing ideas and creating new ones in juxtaposition, and verifying and editing sections of the piece at a micro level;
- determining the final version of the piece through review, testing and rehearsal of the complete piece in order to verify and edit the work at a macro level.

However, research into cognition in composing generally avoids comment on the influence of the teacher on the rate and quality of development of composing cognition, or the impact of the school curriculum on the way learning in composing is structured. Swanwick and Tillman's (1986) pattern of development in musical cognition analyses children's compositions as if they are products of a musical environment which does not include teachers. The significance of the teacher in modelling answers in problem solving and scaffolding students' learning, as discussed by Bruner (1986), Wood, Bruner and Ross (1976) and Vygotsky (1978) is apparently overlooked. Case studies of teaching and learning summarised by Burnard and Younker (2002), Colwell and Richardson (2002) and Hickey (2003) also reveal that there are few longitudinal studies of students composing within a given school curriculum or of students aged 14–16, and few studies that focus on the influence of the teacher in determining the rate and quality of students' learning.

Current UK professional literature for music teachers (Bray, 2000; Spruce, 2002; Philpott, 2001) and popular classroom textbooks such as Metcalfe and Hiscock (1995), tend to bypass discussion of the interrelation of teaching and learning in developing composing cognition. Ideas for classroom activities and discussion of ways to manage learning in composing are presented without reference to the overall conceptualisation of teaching and learning in composing. Although well-meaning, these writers promote the culture of expediency common to many school music textbooks by focusing on ways to deliver the current UK curriculum with its emphasis on pastiche composing in chosen styles (QCA, 1999; http://www.qca.org.uk/ages14-19/subjects/music.html).

The radical changes to the UK music curriculum since the pioneering work of the composer-teachers in the creativity movement of the 1960s and 1970s (Dennis, 1970; Fisher, 1968; Paynter & Aston, 1970; Schafer, 1986) have promoted wide-ranging debate about the educational principles upon which the school music curriculum is based. Classroom activities now combine performing, composing and appraising, with increased emphasis on learning through guided discovery and active participation with musical materials as is now enshrined in the Music National Curriculum of England and Wales and school examination specifications (Pitts, 2000; Plummeridge, 1981, 1991, 1996; Rainbow, 1989).

However, academic debate has focused more on validating learning through creative music-making than on examining rationalisations and methodologies in teaching

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composing. Plummeridge (1981) suggests that the varied and sometimes haphazard development of music pedagogy in the UK since the Second World War has contributed to confusion in the minds of school teachers over the links between educational theory, philosophy and classroom practice. Research also indicates that many teachers still experience difficulties in teaching composing if they have not studied composing as part of their own training, and if composing was not part of the curriculum when they themselves were at school (Byrne & Sheridan, 1998, 2001; Reese, 1995: 214; see also the Teacher Identities in Music Education (TIME) project at http://www.roehampton.ac.uk/cirme/TIME/index.asp).

The teacher plays a central role in the student's development in learning to compose. However, teaching is only effective when driven by an explicit conceptualisation of what the experience of composing actually is, and what the experience of learning to compose entails (Regelski, 1975). To paraphrase Plummeridge (1981: 17), unless teachers have a clear understanding of *what* they are trying to achieve, they may teach composing on a regular basis but have only a vague idea of *why* they are teaching it, and *why* they have chosen to teach it in any particular way. As Regelski (1975) and Swanwick (1988: 10ff.) note, in this instance there is a danger that classroom practice becomes driven by a set of behavioural objectives derived from the curriculum model provided by government or examination board.

2 Investigating composing pedagogy: research in schools

This article draws on data from a larger project: *Cognitive Processes in Teaching and Learning GCSE Composition: Can Composing be Taught at GCSE?* (Berkley, 2003). This project investigated the teaching and learning of composing in a sample of students preparing submissions for the composing paper of the Music GCSE (General Certificate of Secondary Education) examination.

GCSE Music: the research context

In England, Wales and Northern Ireland, students take GCSE examinations at the end of compulsory schooling in Year 11, aged 16. Music is an optional subject at GCSE taken by approximately 9 per cent of the Year 11 population (Joint Council for General Qualifications, www.jcgq.org.uk). Those taking GCSE Music are non-naïve students with prior training in performing, composing, listening and appraising, but many are learning to compose autonomously for the first time. Students are assessed in performing, composing and listening, the first two by submitting a portfolio of coursework, the third by written examination.

Students present a portfolio of compositions for assessment, combining free compositions with pastiche pieces created using a given brief or stimulus for the composition drawn from the Areas of Study in the examination specifications.[1] Areas of study are drawn from music from the past and present, from Western and other world cultures. Students are assessed on the extent to which their composition demonstrates their composing skills in creating and developing musical ideas in relation to a given or chosen brief (Qualifications and Curriculum Authority for England and Wales GCSE Music criteria:

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http://www.qca.org.uk/ages14-19/subjects/music.html; see also Council for Curriculum Examinations and Assessment of Northern Ireland: http://www.ccea.org.uk).

Investigating composing pedagogy: the theoretical framework

The research project mapped the influence of the teacher on students learning to compose at GCSE and identified reasons for the relative success of different teaching methods and ideas. It explored how students learned to compose at GCSE; how composing ability and competence could be defined in these students; the significance of variations in patterns of personal development in students; and how the teacher could influence, direct and manage learning in composing. This article draws on the data relevant to this final point, focusing on how teachers' conceptualisations of composing influence their classroom practice.

An initial survey of teachers' opinions of teaching composing (Berkley, 2001) led to further investigation of the ways that teachers in the project determined methodologies for teaching composing as part of GCSE Music. The GCSE specifications list the expected outcomes of students' work but do not provide a curriculum for the teacher to follow. Teachers must, therefore, determine their own composing curriculum, which is in turn dependent on their conceptualisation of composing and their personal tastes in music (Hargreaves, 1986: 179ff; Hargreaves & North, 1997). The teachers observed demonstrated considerable variation in lesson content, the structure of their lessons and the time they devoted to the composing paper. But, as Olsson (1999: 294–5) points out, local variation in classroom practice is significant in understanding the social episodes in classroom teaching and learning that make up the normative rules in the curriculum for social inclusion and control.

Bernstein presents a framework for analysing the codings of educational knowledge that make visible the social assumptions on which pedagogic practices are based (Bernstein, 1971, 1975, 1996; Sadovnik, 1995). He suggests that the curriculum punctuates the delivery of knowledge into units of content chosen by the teacher which communicate the particular cognitive and motor skills and subject-specific knowledge they deem to be significant. Even within a prescribed assessment scheme like the Music GCSE, teachers are at liberty to select a significant proportion of these units of content to make up their own composing curriculum, and to determine the relative values placed on selected units of content as emphasised in their favoured teaching methodologies (which Bernstein terms *pedagogy*) and further validated through assessment. Within the study of 11 schools (see next section for details), learning to notate compositions using staff notation was a significant unit of content in the composing curricula of teachers 5 and 7. Teacher 7 devoted lesson time to teaching students how to notate different elements of their compositions, and his students' dexterity in using notation was assessed in both draft and finished compositions. Students at school 7 became reasonably fluent in writing scores with at least three instrumental lines, and could read and understand both bass and treble clefs. Teacher 5 told students of the importance of using notation accurately, but focused more time on teaching students how to operate score-writing software than on understanding the accurate use of the symbols themselves. Consequently, throughout the period of observation at school 5, there

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were many examples of students misunderstanding the notation they were using in their compositions, such as writing a bass part as if it were in the treble clef and then being unable to identify why it did not sound as they had intended.

The assessment of chosen units of content validates the social and cultural values the teacher believes to be important (Ross, Radnor, Mitchell & Bierton, 1993: 70). Assessment is a powerful motivational tool, and is one of the main behavioural controls the teacher wields. As teacher–examiner[2] the teacher may arbitrate between right and wrong in a student's work, influencing the final grading for the composing paper. The manner of assessment employed by the GCSE boards also exerts control over the way the teacher structures and manages students' learning (Hiskett, 1988; ILEA, 1986) and defines the social and political goals of the curriculum (Murphy & Torrance, 1988).

Using Bernstein's framework to analyse the way individual teachers in the project determined the principles of their own composing curriculum, pedagogy and assessment proved a profitable mechanism for drawing out an understanding of how they conceptualised composing pedagogy. As discussed in section 4, this framework enabled me to make sense of the wealth of local variation that existed in the ways that individual teachers in the project influenced, directed and managed learning in composing in their students, and draw some conclusions about conceptualising composing as problem solving which could be of relevance to those teaching composing outside the GCSE classroom.

The research methodology

The research methods employed sought to present an anti-positivistic, subjective description of teaching and learning in composing based on evidence collected in qualitative surveys of different classrooms (Bannister, 1992; Krueger, 1987). The approach to data collection borrowed some elements of ethnographic survey in that subjects were studied in everyday contexts (Gubrium & Holstein, 1997: 6); data were collected from a range of sources of which observation of subjects was the most significant; and there was an unstructured, although not unsystematic, approach to data collection (Hammersley, 1998). My intention was to explore the relationship between teacher and student in composing at GCSE in the naturalistic setting of the classroom (Strauss & Corbin, 1990) and to understand the attitudes and perceptions of students and teachers by using idiographic processes of collecting and analysing data (Walker & Adelman, 1990). The methodology was akin to what Freebody (2003: 76) describes as ethnography in education: 'seeking what counts as knowledge and learning in classrooms to students and teachers'.

As Webster (1988) notes, this qualitative methodology preserves the integrity of teacher–student interactions in creative music-making without unduly influencing classroom events. My role was as a participant observer. I was interested to chart the detail of classroom events, discourse and actions and identify discrepancies and conflicts between the views of the participants and the outcomes of their work. In discussion, I questioned the teachers' perceptions of their students only to ask for clarification of their opinions, not to attempt to change them. The teachers' values, attitudes and beliefs were always allowed to govern what they did in the classroom.

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Data collection and selection of sample

Three principles governed the methods used for collecting data in the larger project from which material for this paper is drawn:

- that the data should be collected in a naturalistic setting, hence the choice of weekly classroom observations throughout the academic year as the main method for collecting data;
- to recognise that lessons occur within the structure of the school year and to use the framework of internal teacher assessments to impose rigour on the collection of weekly observational data: hence the inclusion of records of work in draft and finished formats, and joint assessment of compositions made with the class teacher;
- to explore the dynamics between teaching and learning further in formal interviews, group discussions and questionnaires with both students and teachers.

Data on the teaching and learning of GCSE composing were gathered from a sample of students and teachers in a longitudinal study of teaching and learning processes at GCSE between 1997 and 2001. The schools studied in this project represented the full range of ability in GCSE Music and provided a non-probability sample of a range of teaching styles, learning environments and demographic profiles. The sample included several examples of matched groupings of these characteristics to facilitate comparison between schools. Figure 1 summarises the school types and numbers of students and teachers observed in each school. In total, 251 students from 11 schools were studied, 43.8% (*n.*110) males and 56.2% (*n.*141) females, compared to the gender distribution of 42% male and 58% female students taking GCSE Music nationally between 1997 and 2001 (QCA, www.qca.org.uk). Fourteen teachers were studied, 7 males and 7 females. National statistics about the gender distribution of music teachers in England are not currently available. 465.42 hours of classroom research was undertaken between 1997 and 2001. Figure 2 summarises the pattern of school research. The two sets of schools, schools 1–6 and 7–11, are geographically separated. The data comprised transcripts of classroom observation; examples of student work including compositions, scores and commentaries; teacher and student questionnaires and interviews; and teachers' planning documentation. Collating this information enabled the researcher to create profiles of different examples of teaching and learning in composing through a series of case studies of individual teachers. Later comparative analysis of this material sought to understand that the 'uncertain, complex, messy and fleeting' properties of teachers' practices and experiences were significant indigenous factors in understanding their intentions and motivations in teaching composing (Freebody, 2003: 81).

Classroom observation

Both participant and non-participant observation techniques were used in the project to record significant verbal and musical activities, collected as audio and video recordings and contemporaneous notes (Peshkin, 1984; Spradley, 1979, 1980). The protocol created of classroom teaching and learning in composing (Sloboda, 1985: 136ff.) included verbatim records of teacher discourse, students' self-appraisal, and dialogues between

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	Teachers		Students						School
School	*n*	Gender	Total		Males		Females		
1	1	M	16	6.4	16	6.4	0	0	11–16, Comp, Boys
2	2	F, F	26	10.4	8	3.2	18	7.2	11–16, Comp, Mixed
3	1	M	17	6.8	7	2.8	10	3.9	11–16, Comp, Mixed
4	1	M	14	5.6	8	3.2	6	2.4	11–16, Comp, Mixed
5	2	M, F	13	5.2	0	0	13	5.2	11–16, Comp, Boys
6	1	F	20	7.9	20	7.9	0	0	11–16, Comp, Girls
7	1	M	60	23.9	20	7.9	40	15.9	11–18, Comp, Mixed
8	2	F, M	19	7.6	7	2.8	12	4.8	11–16, Comp, Mixed, RC
9	1	M	44	17.5	17	6.8	27	10.8	11–16, Comp, Mixed
10	1	F	2	0.8	0	0	2	0.8	3–16, Ind, Sel, Girls
11	1	F	20	7.9	7	2.8	13	5.2	11–16, Comp, Mixed
Totals	**14**	**7M, 7F**	***n* 251**	**100%**	***n* 110**	**43.8%**	***n* 141**	**56.2%**	

Key

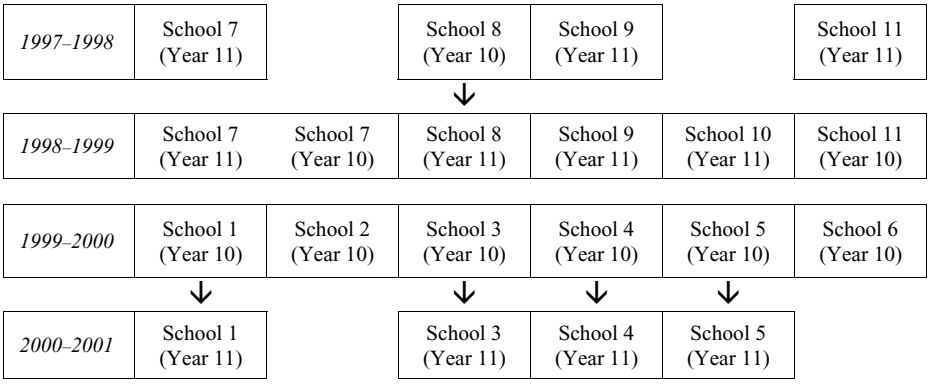
Comp Comprehensive, no selection for ability on entrance of pupils to the school. All comprehensive schools in this sample were state funded
Sel Selection for ability on entrance of pupils to the school
Ind An independent, fee-paying school
RC Roman Catholic School where pupils were selected according to religion

Fig. 1 School types and numbers of students and teachers observed

student, teacher and researcher. Taken in conjunction with records of draft and finished compositions, this material provided a cumulative, chronological record of episodes in teaching and learning in each school.

Non-participant observation was used to observe whole-class teaching and activities; to make time and behaviour analyses of students working alone and in groups; and to study teachers' interactions with students, including both brief interactions and longer one-to-one sessions. In participant observations, the researcher questioned the subjects about their perceptions, opinions, feelings and the reasoning behind their actions (Torrance, 1993). Informal interviews with subjects included contemporaneous reports on work in progress, more reflective accounts of previous work and progress, and aspirations for future work (Ericsson & Simon, 1980). During dialogue with subjects, the researcher sought confirmation and further explanation of actions, but did not attempt to direct or influence subjects towards any particular course of action.

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Key

Year 10	First year of GCSE, students aged 14–15
Year 11	Second year of GCSE, students aged 15–16
↓	Continuous observation of the same class of students

Fig. 2 Pattern of school research and school types

Researching teaching: tracking the teachers

The first year of exploratory research investigated activities and behaviours relating to the development of composing ability and patterns of learning in students. An initial analysis of data provided an outline of modes of learning in composing in GCSE students, and revealed the central place of problem solving in composing cognition. Analysis of the data relating to teaching methodology indicated what influence teachers could have on their students over the course of one academic year, and how the nature of the relationships they set up with their students affected the overall quality of learning, with particular reference to the ways students gain an informed understanding of the making of musical structures and the use of musical conventions.

Research in the following three years provided a larger sample of students and teachers and created matched subsets of school types, gender and school demographic for comparative analysis of individual subjects within the sample. This phase of the project focused on a systematic review of teaching and learning in composing through persistent tracking of a focus group of 42 students and 9 teachers. Emphasis was given to the ways that the teachers within the focus group created positive learning environments for composing with particular reference to encouraging independent learning in students; managing the use of time and resources within lessons; and the extent to which they facilitated the development of hypothesis, risk-taking and decision-making among their students.

The influence of teachers' conceptualisations of composing on their choices of curriculum, pedagogy and assessment were further investigated by a TTA (Teacher Training Agency) funded research group in 1998–9.[3] Teachers from schools 7–11 met to discuss

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their teaching methodologies. Discussion centred on long- and medium-term planning and on specific approaches to teaching skills and knowledge in composing, including promoting students' confidence in independent learning, decision-making and hypothesis. The group also created profiles of the composing and social behaviour of selected Year 11 (16-year-old) students of different ability levels, and assessed samples of compositions in draft.

3 Conceptualising composing as problem solving

Collating the data on the teachers' approaches to teaching composing from the classroom case studies encouraged me to determine what commonalities could be identified in the diverse range of classroom activities and management strategies that I had observed in the schools studied. Analysing the teachers' schemes of work[4] proved to be particularly illuminating. A discussion of how this sample of teachers' opinions of composing was actualised in the curricula they devised is given in Berkley (2001). Revisiting this analysis of schemes of work at the end of the research in schools project, cross-referenced with evidence drawn from classroom research and review of literature concerned with modes of learning associated with composing, suggested that conceptualising composing as problem solving was a profitable way of understanding the development of cognition in composing and thus composing pedagogy.

This section will present a discussion of composing as problem solving with an overview of the literature, focusing on problem definition, hypothesis, being adaptive as a problem solver, and developing autonomy and authority in tackling composing problems. Section 4 will outline an approach to teaching composing as problem solving, highlighting the significance of the teacher's role in training and instruction in compositional tools and devices, management of the learning environment, and facilitation of independent creativity in students. A detailed examination of data from the research project is not feasible within the confines of this paper, but references are made to material collected in the schools research throughout sections 3 and 4.

Defining composing as problem solving

Composing requires the student to tackle creative, knowledge-rich problem solving (Kuzmich, 1987; Sloboda, 1985). Guildford and Hoepfner define problem solving as requiring evaluation, convergent and divergent production of solutions, memory and cognition, and note that in open-ended problems:

> The greater the need for novelty, the more signs there are of creative functioning. This means a greater dependence on divergent-production abilities [generation of logical alternatives from given information, where the emphasis is on variety, quantity, and relevance of output from the same source: ibid.: 20], or upon abilities involving transformations [changes of various kinds, e.g. redefinitions, shifts, transitions or modifications, in existing information: ibid.: 21], or upon activities that involve both. (Guildford & Hoepfner, 1971: 31)

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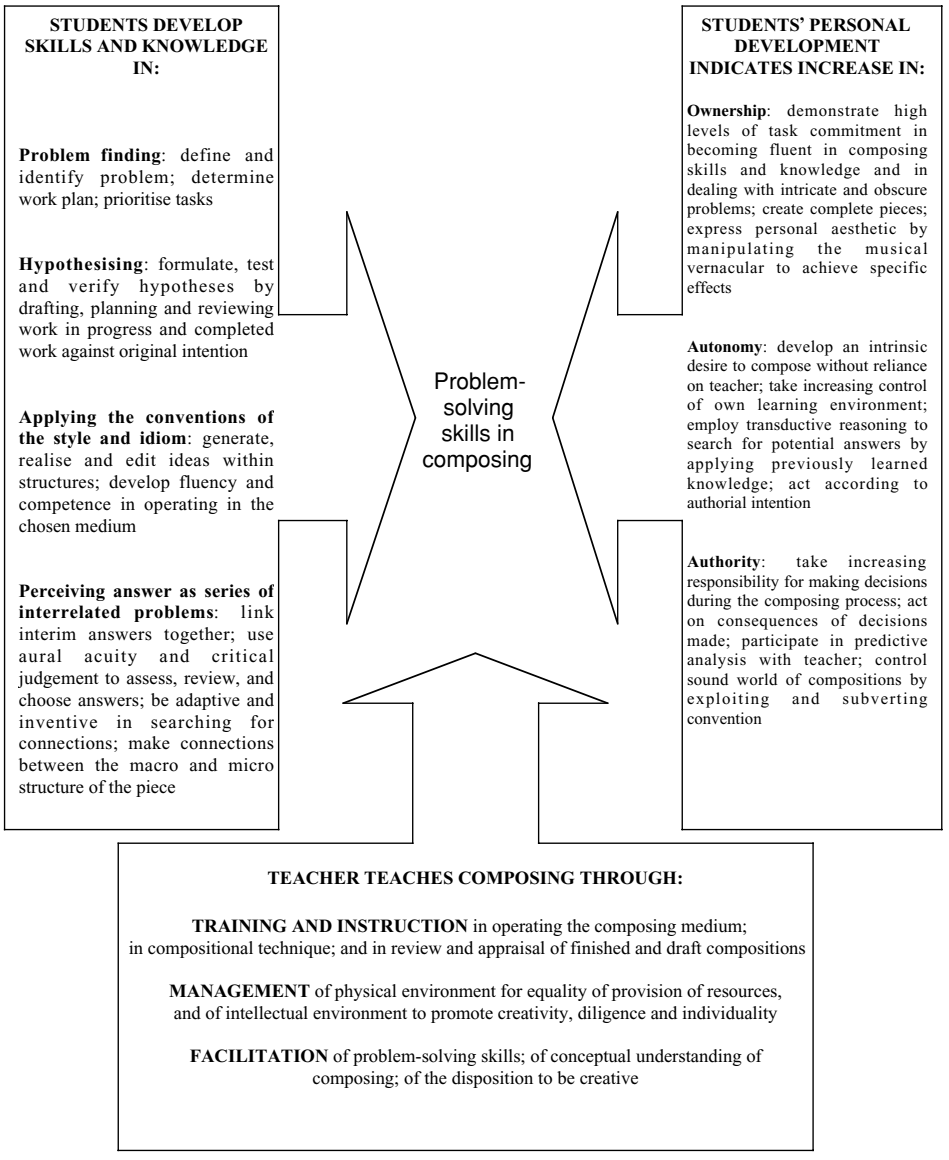


Fig. 3 Teaching and learning in problem-solving skills in composing

DeLorenzo (1989) notes the importance of an understanding of composing as problem solving in a student's capacity to perceive the problem structure, to search for a musical form as they compose, and in their capacity to sense musical possibilities. As Figure 3 indicates, as students engage with the creative process of constructing their pieces they become increasingly competent in the skills and knowledge associated with problem solving

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in composing. They develop specific cognitive abilities in problem finding, hypothesis, applying the conventions of the style and idiom in order to achieve specific musical effects, and perceiving answers as series of interrelated problems (Bunting, 1987; Colley, Banton, Down & Pither, 1992; Davidson & Welsh, 1988; Mellor, 1999; Scripp, Meyaard & Davidson, 1988; Younker & Smith, 1996). Students create unified musical structures by devising answers to a series of interdependent interim composing problems (Elliott, 1995: 64). They formulate hypotheses about possible solutions for the problem in hand, which may be aesthetic or technical, and test out these hypotheses by devising a series of draft versions of the piece. Dewey (1910: 106–9) notes the value of observation, hypothesis and reflection in determining a solution to a problem. Through enactive play, where ideas are trialled and manipulated, and transductive reasoning, where existing knowledge is applied to new situations, students validate answers to interim problems against their original intentions (Hargreaves & Zimmerman, 1992: 385). Answers must conform to the logic of the style in which the student is working, and thus the extent and fluency of the solutions the student devises will be indicative of the extent to which they can manipulate and challenge the conventions of the musical idiom of choice.

Problem finding and problem definition

In composing, students deal most frequently with emergent and potential problems which require definition before they can be tackled. Colley *et al*. (1995) note that students apply constraints to the overall problem according to the style in which they are working and the artistic choices they wish to make: 'A complex task is therefore decomposed into a series of well constructed problems that can be solved' (p. 125). The composing process is, in effect, an analysis of the composing problem, where decisions are validated by testing the hypotheses devised by the student against the compositional outcomes that emerge as the piece progresses. Schafer (1975: 24) points out that in creative problem solving, posing questions is the first stage to finding answers. When seeking to define an open-ended problem, solutions will be found through exploration, where answers are found both from divergent thinking, like brainstorming, and from procedural, situated thinking which restricts choices (Hickey, 2003: 34).

As Bunting (1987) and Barrett (2003) argue, a combination of trial and error learning and guided discovery in aesthetic decision making will encourage students to conjecture and imagine alternative solutions to the piece in draft. When operating within the constraints and freedoms of composing, students are not seeking a single right answer to the composing problem, but are constructing a cogent response that communicates its own logic. Classroom observation indicated that teaching that focused around discussions of how the student had interpreted and defined the composing problem made the student aware of the observable quality of the consequences of their actions and encouraged the fundamental behaviours of perception, comprehension and identification. These discussions between student and teacher identified the potential significance of an interim solution in the final version of the piece, and resulted in the teacher providing models for future developments to scaffold further learning (Wood, Bruner & Ross, 1976: 90). This process of coaching and review, which is termed here *predictive analysis*, is an important teaching tool, and is discussed further in section 4 below.

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Hypothesising, drafting and planning

Students formulate, apply and test hypotheses in composing, and by so doing illuminate the internal logic of the musical structure that is being created. These measures of internal coherence enable students to judge the success of the solutions they have devised against their original intentions. Kratus (1994a), Van Ernst (1993), Webster (1992) and Whitaker (1996) note that challenging students to engage in reflective thinking during composing encourages them to develop skills in decision making and increases the quality of the judgements they make, as they are both assessing the consequences of the decision made and reflecting on their approach to composing.

By engaging with hypothetical solutions the student can pre-select possible routes towards successful composing solutions in advance of creating them, especially when using composing tools drawn from other works. The composing grammar (Lerdahl, 1988: 233) or superordinate plans (Sloboda, 1985: 118–23) created by drafting and planning hypothetical answers provide a work plan for students, enabling them to determine possible routes towards an overall solution, and can be used as a yardstick against which to review work in progress.

As the models of creativity in classroom composing discussed above in section 1 indicate, the interplay between generative processes and verification when working through superordinate plans is the means by which the internal logic of the composition becomes evident to students as they compose. Bamberger (1991) argues that working through draft plans and sketches offers the student the opportunity to learn, gaining 'significant new insight only over a long period wherein he has time to test, to explore, even to play, and in that process to restructure, to risk cognitive disequilibrium, and to struggle with the incongruities that inevitably arise' (p. 102). Dealing with the incongruities that arise in the development of a composition is part of developing skills in hypothesis and verification. Standard compositional methods are not applicable to all composing situations (Perkins, 1989; Plummeridge, 1991; Vernon, 1970), which mitigates against rigid problem-solving strategies being successful as models for either teaching or learning in composing (Parnes, 1985, 1992a, 1992b). Sloboda reiterates this point:

> In ill-defined problem solving situations such as musical composition, where the composer is at liberty to change the nature of the problem as he proceeds, algorithms (foolproof solution generators) are of limited value, even if discoverable. Because heuristics are not perfect, there has to be a process of verification whereby trial solutions are tested against criteria for success. (Sloboda. 1985: 115ff.)

As students develop a conceptual understanding of composing, they become more able to think strategically in their hypothesising and decision making (DeLorenzo, 1989; Regelski, 1975: 207–11ff.; 1981: 285ff.; Younker & Smith, 1996). Students become better able to predict possible uses of musical ideas and validate the decisions they have made by applying the 'pay-off matrix', which compares outcome with intention (Bruner, Goodnow & Austin, 1956: 233–4ff.). The long-term consequence of the 'pay-off matrix' is that students are able to gain freedom from the immediate stimulus control imposed by the teacher and devise their own long-term goals that are subjective, personal and more redolent with meaning (Bruner, 1973; Bruner & Anglin, 1973). Hargreaves & Zimmerman (1992)

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note that, in composing, this leads to students operating with increased autonomy from the teacher, and expressing personal meaning through their compositions with greater facility.

Applying the conventions of style and idiom

As noted in Figure 3, students must comply with the rules of the musical style in which they are operating in order to be successful, and cannot solve composing problems through purely rhapsodic and random methods of working. They use aural acuity and critical judgement to assess the craftsmanship of their interim answers, as noted by Byrne (1996), Hindemith (1952: 90), Lefanu (1979) and Plummeridge (1991). Development of this aspect of composing knowledge in the students observed was facilitated largely through study of models drawn from existing works which were then used as exemplars for further work of their own. Davidson and Scripp (1992), Madura (1996) and Paynter and Aston (1970) note the value of using exemplars drawn from other composers' work, but emphasise that modelling should increasingly become the basis for reflection and revision of the students' own work rather than a standard to be copied.

Adaptive problem solvers: tackling multiple potential answers

Composing problems are complex and obscure, and finding an overall answer requires the fitting together of a series of interim answers which, taken together, form a coherent whole. The final answer may not become apparent until the composing process is well advanced, and the appropriateness and veracity of possible answers to a composing problem may only be revealed as the interim answers are put together (Younker & Smith, 1996). Sloboda (1985: 102ff.) suggests that the two key cognitive processes in composing are the formulation of unconscious, superordinate plans which govern the working out of the composition; and the creation of conscious provisional plans, sketches and drafts which are readily changed according to the working out of a piece. Answers are found by exploring novel and illogical ideas by suspending logical thought at the same time as applying compositional techniques and stylistic conventions through structured, focused activity. The experience of composition is an interplay between constraints and invention, what Bamberger (1977: 310) calls 'the known, the unknown and the knowing' and Walker (1987: 184) describes as the interaction of magic and fantasy with rationalism and empiricism.

Effective student composers are adaptive in their problem solving, speculating about multiple answers to a problem, linking answers together and evaluating a variety of possible solutions to achieve chosen goals (Cropley, 2001: 148). They look for similarities and contrasts in ideas, think analogically and strategically, and are prepared to consider changing both goal and process in the search for effective and successful answers. Their cognitive style is flexible and complex, allowing for openness to new ideas and risk taking (Webster 1987a, 1987b, 1988, 1990). Adaptive learners also demonstrate a greater sense of determination in seeking answers to problems where the solution is not immediately apparent, but adaptive behaviour is directly linked to technical mastery. Where students' mastery of the skills and knowledge related to generating, realising and editing ideas are

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limited, and most especially when they have only limited operational skills in the medium of choice, it is likely that their progress will be frustrated (Berkley, 2001).

Personal development: developing autonomy and authority in tackling composing problems

As Cropley (2001: 148) points out, in problem solving, students should be given opportunities to be imaginative, adventurous and become open to new ideas; demonstrate autonomy, independence and ego-strength; and learn to cope with complex and ambiguous problems in composing. In case studies of school students composing, many writers note the significance of authority and autonomy as an indicator of success, competence and confidence in composing. Authority is demonstrated in students' intrinsic motivation to take increasing responsibility for the consequences of the decisions made during the composing process (Burnard, 1995), and in the way they manipulate musical concepts such as structure and form (Longuet-Higgins, 1987; Davies, 1992) by rationalising, critiquing and resolving the particular challenges of the task in hand (Davidson & Scripp, 1992; Younker, 2003). As Younker and Smith (1996) note, 'independence in decision-making must also be at the heart of the compositional experience' (see also Byrne & Sheridan, 2001: 182ff.). Authority is developed through reflection, critical thinking and revision of work, but is dependent on students gaining sufficient mastery of composing skills to be able to operate with increasing autonomy (Kratus, 1989, 1994b). The individualistic nature of creativity in composing (Mackinnon, 1962) emphasises ownership as students work to create pieces according to their own artistic sense (Burnard, 1995). Figure 3 summarises the personal development of ownership, autonomy and authority that emerges as students become more competent in the skills and knowledge associated with composing as problem solving.

4 Teaching composing as problem solving: a review of research findings

We have established a definition of composing as problem solving that tackles knowledge-rich, creative, multiple and complex problems. Classroom observation indicated that effective composing teaching makes these aspects of problem solving explicit through the units of content in teachers' composing curriculum, their favoured pedagogic styles and assessment. Teachers did not necessarily use the term *problem solving* in discourse with students, but emphasised the significance of different aspects of a composing problem through their teaching methodology and choice of lesson activity. Thus teachers emphasised the knowledge-rich aspects of composing problems through teaching that focused on using compositional tools and devices to achieve specific effects within the chosen idiom. The creative aspect of composing problems was emphasised in teaching that encouraged students to be flexible, innovative and imaginative in using their composing craft. The multiple and complex aspects of composing problems were emphasised in teaching that gave students models in drafting and planning ideas in order that they could determine a means of fitting together interim solutions, and in encouraging students to experiment with a range of different solutions, including changing the nature of the problem when appropriate.

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Predictive analysis

The verbal feedback given to students by teachers following appraisal and assessment of draft compositions was extremely significant in developing students' confidence and competence in creative, multiple and complex aspects of problem solving in composing (Webster, 2003). I describe this kind of reflective conversation (Ross *et al*., 1993: 39ff.; Schon, 1983) or diagnostic formative assessment discourse as *predictive analysis*. As Murphy and Torrance (1988: 15–20) report, diagnostic assessment reveals what the student knows, understands and can do, and how the progress towards each goal was made. As noted in section 1 above, predictive analysis seeks also to provide the student with a plan for future stages of the composing process by providing accessible models for the student to imitate and be guided by (Bruner, Goodnow & Austin, 1956; Wood, Bruner & Ross, 1976). It is a process of coaching based on dialogue between student and teacher (Edwards & Mercer, 1987). Discussion in predictive analysis focuses on critical statements (Bennett, 1996: 9ff.; Schoenberg, 1951: 147) that seek to make students' original and new intentions apparent and evaluate the quality of their aesthetic judgements (Bunting, 1987; Byrne & Sheridan, 2001; Mellor, 1999; Ross, 1986: 37–9; Self, 1986: 16–17).

Classroom observation indicated that predictive analysis was the main mechanism for communicating units of content through discourse between teachers and individual students. When following the advice offered in predictive analysis, teachers would offer students a range of hypothetical outcomes for their pieces. Students chose which to use depending on personal taste, ability and motivation. Teachers were observed to approve, disapprove and correct, and to model and cue potential future answers; by these means they encouraged and directed students towards profitable goals.

However, what teachers deemed profitable or appropriate varied according to their own values. A student who presented a guitar solo in a rock idiom at the start of Year 10 was praised by teacher 4, who demonstrated ways in which the student could develop the piece further by adding parts for bass guitar and drums. He showed the student how to use a multi-track recorder to construct an ensemble piece, and suggested ways that the structure of the piece could be developed further by the addition of verse and bridge sections. The student developed his initial ideas into a complete piece, and then tackled a second one in similar style. However, a similar piece presented by a student to teacher 8 was rejected as being inappropriate for the task set (creating a mood piece) and not imaginative in its use of instrumentation as it had only one instrument in it. Teacher 8 also commented privately to me that she did not feel that rock and pop pieces were really appropriate as examination compositions. Needless to say, the student at school 8 was disheartened by this reception of his piece and became increasingly less engaged in composing as the year progressed. Predictive analysis appears to be a significant tool in encouraging or frustrating the personal development of student composers in their progress towards authority, autonomy and ownership.

Teacher activity in composing lessons

Time analysis indicated that teaching composing comprised three categories of teacher activity: training and instruction, management of the learning environment, and facilitation

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of problem-solving skills, as summarised in Figure 3. Each teacher activity had associated teaching methodologies and classroom activities.

Training and instruction in operating the composing medium, in compositional technique within given styles, and in review and appraisal of finished and draft compositions included:

- the use of sequencing and score-writing software (schools 3, 4, 5, 9, 10 & 11);
- using instrumental performance skills to generate and develop musical ideas (schools 2, 4, 7, 8, 10 & 11);
- the use of notation (schools 4, 5, 7, 8 & 10);
- the use of specific compositional devices within chosen styles such as blues and jazz improvisation (schools 1& 4), programme music (schools 5, 6 & 11), and aleatoric music (school 2); and
- techniques for formal review and editing of draft compositions (schools 4, 7 & 11).

Management of the physical environment for equality of provision of resources, and of the intellectual environment to promote creativity, diligence and individuality, included:

- rotas for the use of equipment out of lesson time (school 5, 6 & 10); and
- computers with music technology software (3, 4, 5, 9, 10 & 11) and multi-track recorders and sequencing keyboards (schools 3 & 4).

Facilitation of problem-solving skills in composing, conceptual understanding of composing and the disposition to be creative included:

- students completing composing diaries (school 7);
- drafting of ideas in picture or graphic score format (school 3);
- peer appraisal of compositions by previous students against examination assessment criteria (school 8);
- class performances of draft compositions with peer review (schools 1, 4, 7, 11); and
- review of progress in personal tutorials with teachers (all schools).

Analysis also revealed that teachers varied in the amount of time they spent on these activities, indicating that they awarded different importance to the units of content associated with them. As noted in Berkley (2001), teachers who adopted a formal approach to teaching composing emphasised the knowledge-rich aspects of composing problems and spent the majority of classroom time on training and instruction in rules and conventions, whereas teachers who adopted a more creative approach to teaching composing emphasised all aspects of composing problems and devoted more lesson time to explicit teaching of the skills and knowledge associated with tackling the creative, complex and multiple aspects of composing problems. Significantly, these teachers used a wider range of techniques to facilitate their students' authority as composers, and the majority of students in these classes demonstrated the ability to work with increasing autonomy earlier in the course than those being taught by teachers who favoured a formal approach. In discussion, the 'formal' teachers recognised the value of creative, complex and multiple aspects of composing problems, and some asserted that this was a significant part of their overall objectives in teaching composing, but this was not borne out in their teaching.

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Training and instruction

In the teachers observed, training and instruction mainly focused on providing composing skills and knowledge to manipulate musical devices within musical structures. As noted in section 1 above, students are assessed on their ability to create pieces in selected styles and idioms in the GCSE composing specification. Training in the use of compositional tools and devices contributed to students' overall musical development by encouraging the development of aural acuity, analysis and judgement both of students' own work and of the music of others, as has often been noted (Byrne, 1996; Hargreaves, 1986: 92; Hindemith, 1952; Kratus, 1994a: 126–7; Lefanu, 1979; Maxwell Davies, 1963; Plummeridge, 1991; Swanwick, 1996; Tovey, 1949). Observation indicated that training in operating the chosen medium for composing was situated and domain-specific, and that students needed to be trained in how to transfer knowledge learned in one area to another. For example, students who could read staff notation fluently as a result of prior instrumental training in keyboard and orchestral instruments were not necessarily able to write their compositional ideas using staff notation without specific instruction. Training in composing skills led to increased artistry and creativity, as students gained a wider repertoire of compositional devices through which they could express themselves creatively. Training facilitated the speed at which information was encoded, resulting in improved aural memory and perception of organisational strategies and an increased facility with musical perception tasks.

Management

Classroom observation indicated that learning in composing at GCSE was affected by the total environment of the learning situation. The physical and intellectual learning environment each teacher created promoted a particular set of values around learning to compose, and was a fundamental influence on the quality of the students' learning. Research indicated repeatedly that it is imperative that a teacher provides a learning environment conducive to creative music making for the student composer to thrive. Positive learning was only observed to result from classrooms which were positive cognitive and social learning environments.

It was in the physical environment that students learned the skills that provided the basis for future development. The intellectual environment supported students as they learned about composing by encouraging their disposition to be creative through facilitation of divergent and exploratory modes of learning. The most effective learning environments observed promoted students' self-confidence to explore new and obscure ideas when their skills and knowledge were still being developed and could only be expressed intuitively and in non-verbal ways. In these examples of good practice a brisk pace of learning was maintained through reward and demonstrable progress in skill acquisition, placing trial and error learning in a framework where potentially successful choices were celebrated.

Facilitation

Analysis of the teaching methodologies observed indicates that the key goals in teaching composing – that students should achieve ownership of their pieces and compose with

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increasing autonomy and authority – were difficult to achieve through instruction and training but were easier to achieve through influence and facilitation. By providing a constant resource of predictive analysis and formative commentary for ways of developing, extending and modifying ideas into structures, teachers were observed to guide students towards profitable goals whilst enabling them to retain their independence as composers.

Facilitation focused on fostering students' cognition, personality and motivation to be creative in composing. By the end of the GCSE course, the most successful students demonstrated flexible and complex cognition which allowed for openness to new ideas and risk taking. However, these students had been consistently challenged by their teachers to analyse and synthesise ideas, make remote associations when recognising and defining problems, and evaluate and plan their own learning. Observation suggested that students needed an intrinsic motivation to compose in order for them to cultivate the commitment needed to tackle obscure and complex composing problems and develop sufficient ego-strength to take authority for decisions made during the composing process; and this came most commonly in the form of teacher comment about expectations of attitudes to work at this level. Teachers were observed to facilitate risk taking and constructive self-evaluation in students by acting as coach, advisor, and informed critic. Effective teachers were receptive and sympathetic to the students, both as learners and as musicians, and were prepared to make an emotional communication with their students' musical creations even when they did not admire the musical style in which the students were working. As illustrated in Figure 4, the teaching activities of training and instruction, management and facilitation can be located along two intersecting axes: between open and closed content, and high and low teacher control (Walker & Adelman, 1990: 47). In practice, teachers shifted between these activities continuously throughout lessons (Odam, 2000). Classroom observation repeatedly indicated that teachers used methodologies from one area to promote learning in another – for example, facilitating a student's skills of hypothesis in predictive analysis of a draft piece ('I like this opening idea, but what do you think would happen if . . . ?') by modelling potential developments of a draft piece through training and instruction in the use of a chosen compositional device.

Observation revealed that open teaching styles that allowed students time and space to experiment were profitable in teaching composing (as also noted by Paynter & Aston, 1970: 7). This self-directed work promoted initiative, spontaneity, sensibility, flexibility, divergent thinking and experimentation without fear of sanctions against incorrect solutions, errors, or mistakes; and it encouraged students to evaluate their progress (Cropley, 2001; Cropley & Urban, 2000; Loane, 1984; Urban, 1995, 1996). However, classroom research also indicated that open content teaching was only effective when placed in a predetermined framework built on developmental and sequential transfer learning, where units of closed content derived from experience and activity led towards identified goals in personal development. Students appeared to be unlikely to develop authority and autonomy as composers without their teachers' dedicated guidance and support. Even though the GCSE specification imposes a time frame on teaching composing – compositions must be submitted in the specified format by the Easter vacation of Year 11 – teachers in the project varied in the effectiveness with which they were able to make students aware of this sense of progression. In the most effective teachers, learning activities with clearly defined technical or expressive aims were systematically combined with activities where more freedom was

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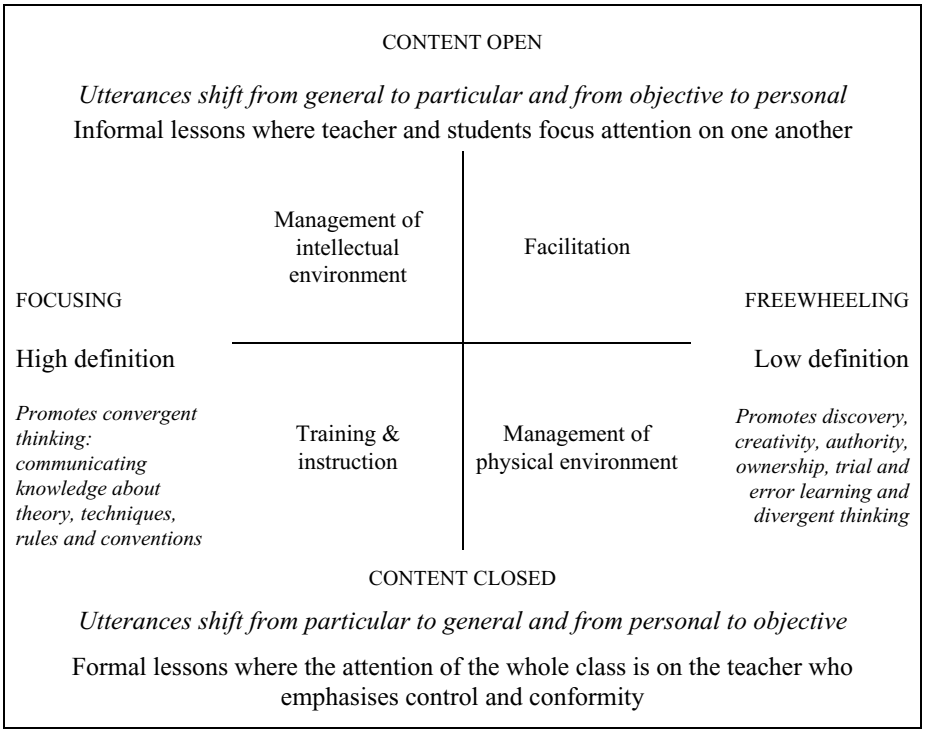


Fig. 4 The range of teaching strategies for teaching composing as problem solving

allowed and students were challenged to make decisions for themselves. Students were able to work rhapsodically but within a framework that facilitated development of their ability to recognise and repeat the lucky fluke when it occurred, or to work systematically with initially unpromising ideas.

5 Conclusion: Conceptualising composing pedagogy

This article argues that composing can be conceptualised as problem solving, where composing problems are knowledge-rich, complex, multiple and creative. From this standpoint, existing research into composing cognition in school age students can be synthesised as a process where students come to understand that the total composing problem comprises interrelated interim problems with multiple potential answers which require them to combine systematic application of designated knowledge of compositional technique with more rhapsodic and opportunistic creativity. Students use skills of hypothesis and verification to explore, predict and test potential solutions as they compose.

Understanding teaching composing as teaching problem solving also facilitates evaluation of the range of teaching methodologies, lesson activities and assessment procedures observed in the teachers engaged in the research project from which data

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for this article were drawn. Other case studies of classroom composing have also noted the great local variation in teachers' classroom practice, but as suggested in section 1, few researchers have undertaken a comparative analysis of a cross-section of composing classrooms in order to establish some basis for a common understanding of teaching composing. A composing curriculum built on the understanding of composing as problem solving recognises the instability and opportunity inherent in teaching composing to school students. Placing composing competencies which transcend styles and genres at the heart of the composing curriculum provides a framework for developing rationales and methodologies for assessment and pedagogy in composing.

Teaching is designed to educate, to nurture, to communicate norms and conventions and to deliver effective learning strategies. Teaching composing should facilitate students' discovery of the phenomena used to make a composition through problem solving in order to promote a working conceptual knowledge of musical principles and elements. Students need to become familiar with both verbal, formal knowledge and non-verbal, informal, situated knowledge in composing. Teaching composing as problem solving is, therefore, concerned with creating a balance between the promotion of objective knowledge of theory, technique, rules and conventions transmitted by the teacher and the promotion of the student's subjective creativity, authority and ownership.

Placing problem-solving skills at the centre of the composing curriculum promotes the creativity, originality, dedication and application of technique and knowledge required for school students to move towards becoming competent autonomous composers, and gives the teacher a way of thinking about the long-term development of composing skills and knowledge across the whole school curriculum. As noted above, although composing has been part of the school music curriculum in England and Wales for students aged 14–16 since 1986, and for students aged 5–14 since 1992, it is an area of the curriculum that still engenders mixed feelings from classroom teachers, a significant number of whom express low confidence and lack of knowledge in teaching composing. The research presented here focused on GCSE (14–16 year old) students and their teachers, but it is hoped that encouraging teachers and researchers to understand composing as problem solving will provide a basis for all music educators to feel more confident in devising and teaching composing curricula.

Notes

1 The term *specification* has replaced *syllabus* in the literature published by examination boards.

2 Teachers mark the completed portfolio of compositions and submit a sample of compositions to the examination board for moderation.

3 As a serving school teacher at the time, the researcher was eligible for a Teacher Research Grant from the TTA (Teacher Training Agency). These grants provided monies for short-term small-scale research projects into issues directly related to pedagogy, with an intention that the research should inform the classroom practice of the teachers involved. For further information on this project see http://www.canteach.gov.uk/research/grant/index.htm.

4 *Scheme of work* is used here to mean a medium- to long-term plan of teaching which specifies the aims and objectives, assessment procedures, expected outcomes of students' work, and lesson content of a sequence of lessons, typically 6–12 weeks. The term *scheme of work* is commonly used in England and Wales owing to its inclusion in the National Curriculum for Music.

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