

WHAT MAKES A GOOD HSC TEACHER? **

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Introduction

Throughout the mid-90s public attention in NSW became increasingly drawn to the Higher School Certificate, as the media focused on "league tables" of schools' results. What actually constituted success at the HSC and the kind of teaching that could lead to such success were dealt with in very simplistic ways, such as comparisons between the "top" schools of the number of students each had in the top ten per cent in subject results. Such reporting took little or no account of a number of factors potentially responsible for such "success" in these schools.

The then Department of School Education commissioned research from the then School of Teaching and Educational Studies at the University of Western Sydney Nepean into the identification of actual teaching strategies which potentially led to success at the HSC. The research was carried out by the authors.

Research literature on effective schools and teachers

Recent research into effective teaching suggests that most variance in performance between students is actually explained by differences between classes rather than between schools (eg Hill and Rowe, 1996, 1998). The suggestion is that it is teachers, not schools, that make the difference in student learning. Effectiveness within schools is not unitary, but variable from class to class and from year to year. Moreover, where public examinations have been used as outcome measures, there are typically large and substantial differences between classes and faculties within schools, and these are greater than differences between schools.

Research methodology

The methodology used in our research was to identify successful teachers, observe them teaching a HSC class, and follow up with an interview to both stimulate reflection and to compare teachers' and researchers' perceptions of what had been observed. In addition, for some teachers, groups of ex-students were interviewed.

Teachers were chosen by first identifying a number of subject departments in which students had, over a period of time, demonstrated significant (in the top 1%) success in a particular HSC course. These results were then put through a number of statistical "filters" designed to eliminate variables other than the teacher as the cause of success. (For example, faculties/courses were considered firstly because they exhibited superior performance when compared with other courses at the same school).

Thirty two schools, eighteen metropolitan and fourteen non-metropolitan, were identified through this "filtering" process. Schools were not automatically excluded because they were selective. Of the thirty-two subject departments identified, twenty-five were in comprehensive high schools and seven in selective high schools.

Twenty-five teachers were subsequently observed and/or interviewed. A total of twelve disciplines were represented in the interviews and/or observations across a number of course levels (Ancient History, Biology, Business Studies, English, Legal Studies, Mathematics, Modern History, Music, PDHPE, Physics, Society & Culture, and Visual Arts).

The teachers

As a group, the teachers were very experienced. 68% were female, 32% Head Teachers and a further 32% were, or had been, Year Advisers. Almost half had been HSC markers.

The teacher's mastery of content knowledge and their belief that this was a key factor in their success was one of the key findings of the study. Each teacher exhibited strong content knowledge in the lessons observed. "You've got to know your stuff" was probably the most common answer given in interviews and often the first in response to the relevant question(s). This was seen as a key factor in student confidence in the teacher, and in their own chances for success at the HSC. Along with this was the belief that a love of, or passion for, the subject was also a key to success, particularly in student motivation.

Personal approachability was the important trait most readily identified here by the teachers themselves. The teachers on the whole identified a willingness to relax and "be themselves" in the classroom and hence not to present a remote figure to the students.

Classroom climate

Interesting aspects of the classroom climate in these teachers' classes included:

- unspoken expectations that behaviour would be "on-task", yet acceptable "off-task" behaviour was tolerated.
- in-class face-to-face time as the central learning element, rather than home study or any form of private individual research. The very interaction of the community of learners was regarded as basic for each individual learner.
- teacher enthusiasm and energy
- teachers' reinforcement of students and recognition of their work and achievement
- a certain measure of repetition and routine in the management of the classroom
- the development of an ethos of co-operation, sharing and community.

Resources

Teachers overwhelmingly developed their own resources as a substitute for, or adjunct to, a textbook for the subject. Textbooks alone were seen as inadequate resources - in some cases, because the subject demanded topical material, but in others, because the material in particular books was not alone sufficiently challenging or innovative.

The faculties

The teachers identified the team nature of their faculties as important to their HSC success, particularly through:

- sharing programs, resources and teaching ideas;
- setting a certain climate for all individuals within the faculty;
- whole-faculty programming and
- through the Faculty having a particular identity in the school.

Half of the teachers identified their professional development as most importantly based in their own faculties - usually through formally organised staff activities such as reporting back from professional association meetings or giving demonstration lessons. Some teachers also nominated a mentor on staff, usually a Head Teacher, as an important source of their current or past development as teachers.

Focus on the HSC itself

In half of observed lessons, the researchers felt that the lesson was "HSC dominated". This determination was made based on a number of factors. Though the HSC, in obvious ways, provides the very *raison d'être* of the lessons, some of the observed lessons were more openly presented to the students as having their rationale in the HSC exam itself. Such lessons might typically be introduced by a statement such as "Today we're going to do X because you need to know/be able to do/practice this for the exam." In these lessons, there were almost constant references made to the HSC itself, or to the relevance of the material to the HSC, during the course of the lesson. Half of the teachers felt that regular practice on specific components of the exam was important and half of the observed lessons did contain a number of specific exam "tips". This was in the form of advice on examination "strategy" and/or specific reference to the kind of content students should stress when answering. Teachers, on the whole, created in their classrooms a culture in which the HSC was treated as a kind of game, not in any pejorative sense, but in the sense of it being a ritual with its own set of rules that had to be met and faced.

Yet, despite this HSC focus, half of the lessons were not considered to be "dominated" by the HSC, and, indeed, in some observed lessons there was virtually no reference to the HSC in any form. This was remarkable given the ever-present nature of the exam in Year 12 classes. In fact, a number of teachers made an issue of this at interview:

We do things not in the course.. we often teach beyond the HSC a little to aid their understanding and for them to learn to use the information.

I aim at understanding rather than the HSC, so I go beyond what the Syllabus asks.

I don't teach to the HSC; I teach for them to understand

Maths is more important than the HSC.

Such statements reflect a clear sense, expressed by almost half of the teachers, of a dichotomy between "teaching to the HSC" and "teaching for understanding". This was one of the clearest messages that came out of interviews. Teachers were making strong statements about not being "exam-driven" where such an approach might prevent deeper student understanding. Against what might be expected about what makes a successful HSC teacher, these teachers were not exam "crammers", despite the fact that, necessarily, the HSC provided the focus for their teaching. Certainly the HSC exam was a rationale for many of the lessons observed, but even these were not conducted as cramming content for the exams.

Teaching strategies

The ultimate aim of the research was to identify those teaching methodologies that successful teachers of successful HSC students were using. Clearly, the discussion below reveals much commonality amongst the teachers across the curriculum, but the research also revealed some key differences in subject-based methodology. These subject differences were manifested in two main ways:

- certain methodologies were more prominent in particular subject areas
- teachers in different subject areas attached different meanings to methodologies, the labels for which were nevertheless common across the curriculum - virtually all teachers, for example, believed in "classroom interaction", but this clearly meant different things to Maths teachers from what it meant to History teachers.

a) Building understanding

In terms of actually aiding students' understandings of the subject matter, we classified a large number of classroom strategies under the rubric of "Building understanding". This often referred to ways in which teachers helped develop students' understanding of subject matter through a series of sequential steps. However, sequentiality was not always a necessary ingredient in helping "build understanding" - for example, drawing together the ways in which the subject matter related to other content previously covered was a very common way of building understanding that depended on a breadth of view and a depth of knowledge rather than on a sequence of steps.

The inter-relatedness of areas of the subject

In over half of the observed lessons, drawing on the inter-relatedness of different areas of the subject was an important teaching device. Teachers did not proceed in a lock-step fashion through a series of demonstrations of new material, but rather continually tried to develop the "big picture" of what different areas of the subject meant for each other. This seemed closely tied to the general ethos discussed above of seeing understanding as more important than knowing the routine for the "right answer". This kind of inter-relatedness manifested itself in obvious ways such as quick reviews of previous material to lead into the current topic or simply building on a previous topic in a logical way.

As an exemplar, one of the most interesting and useful lessons observed was a Maths lesson in which students were asked to apply a new formula they had just learnt. Instead of proceeding to a series of activities in which students would simply practise using this new knowledge, as a first step after deriving the formula, this teacher required students to apply the formula to a series of particularly complex two-or-three-stage problems. These problems were initially completed as a whole class. In each case, at some point in the solution, material that they had learnt in the past needed to be applied. Moreover, as the solutions were occurring, the teacher would continually complicate the issue by asking, "But what if it had said ... ?" - the answers to which also depended on the application of some past knowledge.

In a later episode of the lesson, students were given a particularly difficult three-step problem to solve alone or in groups. The declared aim of this problem was to deliberately search out variety - the teacher wished to see students finding a number of ways of solving the problem, with a prize going to the most "elegant" solution. The teacher moved among the students as they worked on the problem, became satisfied that four students had four different solutions and had these students demonstrate their solutions on the blackboard. The point of this was, again, to display the variety of possibilities, since each solution was correct. Each solution drew on knowledge outside this immediate topic and, moreover, as each solution was demonstrated, the teacher would complicate it even further by asking, "Now at this stage, what if the question had said ... ?" In each case, the other hypothetical possibility also drew on past topics.

Using students' responses

A noteworthy number of teachers across the curriculum had their observed lessons proceed by using student responses as the building blocks towards new knowledge. Typically, this would take the form of building up a set of blackboard notes from student responses or leading students through a series of questions towards some moment of insight.

Facilitating thinking through applying knowledge and solving problems

The most common interview response entered in the general category of "Building understanding" was the response which emphasised the importance of having students apply knowledge, often through solving problems. This element was usually contrasted with copying notes and with being told the answers too readily. It was also linked closely to maximising the use of in-class time and to the inter-relatedness of areas of the subject. The stress on applying knowledge was also commonly observed. It was common for Maths teachers on one particular staff to have the students derive formulae for themselves using inductive reasoning. Reasoning and independent thinking were stressed by teachers across the curriculum during interviews.

Interpretation

Related to the idea of application, problem-solving and thinking was the emphasis on interpretation, rather than simple reproduction, of knowledge. In an Ancient History lesson, students were supplied with pictures of the Palace of Knossos and asked to deduce the purpose of the palace before any information was supplied. In another, students were issued with a list of "Sayings of Greek Women" and asked to deduce the values inherent in the society that produced such a list.

b) DARTS

In 1984, Lunzer and Gardner coined the acronym "DARTS" ("Directed Activities Related to Texts") to refer to a set of activities designed to have students engage with the meanings of whole texts. The point of these activities (also known as "new model comprehension") was to move away from traditional ("old model") comprehension work in which students were asked to complete a series of usually over-literal or irrelevant questions about passages taken out of context. These DARTS were designed to have students actively engage with whole texts with the emphasis on meaning and meaning-construction. DARTS include activities such as:

- cloze (filling in missing sections of text)
- prediction (using prior knowledge to predict up-coming sections of text)
- having students ask the questions of texts instead of the teacher ("What is it you need to know to make sense of this?")
- categorising and labelling (supplying headings for sections of texts, or nominating the theme of a section)
- sequencing (taking jumbled texts and, through discussion and close reading, restoring their original order).

A number of teachers in the study were observed using DARTS in some form. One of the teacher-made resource books in Ancient History included a number of cloze exercises. In another Ancient History lesson, students were to categorise pieces of evidence by matching sets of pictures to their likely locations in a palace. In a Legal Studies lesson, students were asked to "Look for and underline all the bits that refer to X" - a typical DARTS "labelling" activity. One Maths teacher said that she often used sequencing activities, while another described commonly having students set problems for others to solve by applying some new learned formula.

c) Note-making

If one were to draw a distinction between what might be termed "note-taking" (the teacher writing up, dictating or otherwise producing notes for the students to directly copy) and "note-making" (the production of notes by the student through means other than copying the teacher's), the latter was by far the most dominant mode in this study.

Building notes

It was not unusual for teachers to demonstrate how to build a set of notes. Strategies used by these teachers included:

- building a detailed set of notes from combining previously-made student notes, usually on the blackboard
- recording the main points of student discussion
- directing the note-making of students and facilitating the development of student summaries ("Read X and underline or highlight all evidence about Y to develop your own set of notes")

Most of these elements were perceived as ways of assisting independent note-making.

Independent note-making

While a few teachers were observed quickly distributing typewritten notes for students to read later or from which students were to extract information to solve a problem, nevertheless, little class time was spent with students "taking notes". In fact, the distribution of notes by teachers was always seen by them

as a way of supplying necessary information quickly in order to move to having students do something with the information. Teachers, moreover, displayed a variety of ways of encouraging independent note-making by students. The key theme here was "student independence" - either in the decision about what notes to make and/or in the methods used to make them. This was one of the key findings of the research. Teachers continually found ways of encouraging students to make their notes "their own". This tied directly to the general theme discussed above of wanting students to think independently about the issues/problems and not wanting to "spoon-feed" information:

I hand out notes to cover formulae, examples etc, but class time is to be spent in applying the knowledge. I'm not a great note-giver because I'm more concerned that they understand, which doesn't necessarily happen when they're copying notes.

A number of methods for encouraging such independent note making were observed. These included:

- making a brief beginning to a set of notes, such as through dictation, and telling students to complete the notes themselves through research or based on the discussion that was about to ensue
- directed note-making as discussed in the previous sub-section ("Building notes"). Here, the teacher indicated areas to which students should attend ("Read... underline and make notes on any aspect of the document that suggests why Russia would have trouble sustaining a war"). This was an especially prevalent strategy in History lessons.
- allowing time for systematic student note-sharing, such as by breaking a topic into sub-themes and having groups become "experts" on each sub-theme, followed by sharing of their findings. Student seminar presentations also fell into this area. Generally, teachers would follow this up by having examples of student presentations or assessed tasks or groupwork copied for the whole class.
- allowing a fair degree of latitude for students to decide what notes to record. This was quite common across the Humanities and HSIE areas.. At one point in a Legal Studies lesson, the teacher used an overhead transparency with a series of summary notes on it, but began with it covered up. The teacher then asked a series of questions, and when he had the answer he wanted, he would reveal part of the transparency containing that answer. But he insisted that students only copy what they needed and to leave room for further filling-in during the discussion if something came up that they thought was important. He then gave the students time to make such notes.
- having the students review "in their own words" what was covered in class.
- students making their own notes which the teacher later checks and fills in OR
- selected students read their individual notes back during the lesson and teachers cover any neglected areas.

This combination of independence with guidance led to students developing a set of notes that were "owned" (and thus easily comprehensible) by them, and also obviated the need for later exam summaries to be made.

d) Writing essays and organising information

At interview, teachers spoke about the kinds of emphases they placed on essay writing as exam preparation.

The Modern History teacher, who had marked the HSC at both 2Unit and 3Unit levels for 10 years, said that she eschewed use of the "big practice essay", seeing it as worthless in terms of exam preparation. She did, however, spend quite a lot of time on writing essays in the time-scale allowed by the exam itself. Ex-students of the Legal Studies teacher stressed the importance they saw in their work on essay technique, highlighting the importance that had been placed on particular plans and structures for essays. These same students also felt that an important part of learning to write successful essays was the teacher's provision of positive essay examples from past students. This provision of positive models was an important theme in a number of student interviews in a number of subject areas.

e) Answering problems

Half of the teachers pointed to the importance of "stretching" or "challenging" students, and especially to having high expectations and carrying these through. Teachers in this study tended to stress that students should not be "taught down to" or even "led by the hand" to too great a degree. This attitude was spread across the full cohort in the study. Teachers who refused to supply ready-made answers to students outnumbered those who did in observed lessons. Problems were given and challenges presented in a variety of ways. For example, 2/3 Unit Maths teachers were observed:

- encouraging students to seek a variety of solutions to a problem.
- complicating solutions by reversing the elements of a question ("What if it had said....?").

- spending time having students face the particularly difficult aspects of a problem.
- using practical problems from which students discovered concepts.
- having students induce formulae from specific examples.
- beginning with difficult problems rather than simple ones to work on a new concept.

f) Questioning

Whole-class questioning, not unexpectedly, was one of the most frequently used teaching devices observed. Douglas Barnes' (1974) study of teacher questioning in schools argued that "open" questions (those to which there were a number of possible answers) were more likely to promote discussion and maximise student involvement and learning than were "closed" questions (to which there was only one answer). Barnes further found that closed questions predominated in schools and that teachers were forcing their students into playing a game of "guess what's in the teacher's head".

This research confirmed Barnes' findings about the predominance of closed questions. Across the curriculum, lessons were dominated by closed questions of a "give-back-to-me-the-information-I-want" type. This might seem a contradiction of the description given above of teachers emphasising reasoning, understanding, thinking and interpretation - were it not for the fact that these latter elements were so often observed.

The clue to solving this seeming contradiction was that teachers displayed different behaviour according to whether students were working alone (or in groups) or whether they (the teachers) were teaching to the whole class. The former was dominated by a thinking, interpretative, problem-solving, application set of approaches, while the latter was dominated by closed questions during question-answer sessions. Whole-class question-and-answer sessions, then, seemed to be seen by these teachers as more suitable for assessment and for linking different aspects of a topic, especially with past material.

Questioning, then, is used as step-by-step building. It is not used by teachers for applying and interpreting in the same way as are activities which students complete independently - either alone or in groups. In the question-and-answer sessions, the teachers were making links to previous knowledge and assessing what students knew. Students' own interpretations were encouraged in groupwork episodes.

g) Groupwork

Small group work in HSC classes occurred in a third of observed lessons. In these lessons, groupwork was largely confined to the Humanities and English, but, in interviews, two-thirds of the teachers spoke of using groupwork as a way of reaching understanding of the material - and this represented a range of KLAS. Different reasons were given for this widespread use of group activities. These included:

- allowing opportunities for simply using the English language (in a uniformly ESL English group).
- wanting students to make deductions from source material, "which is preferable to the teacher telling them".
- wanting students to learn from what they each bring to the subject matter (including in mixed ability situations, such as where a number of different Ancient History courses were represented in the same class, or in a course with only one class, such as Biology).
- wanting students to find for themselves the key problems to be solved.
- wanting students to solve problems, such as by using "hands-on" concrete materials or by finding alternative solutions, as in Maths.

One crucial aspect of work completed in groups -or individually by students - was the behaviour of teachers while students were working independently. In almost every lesson observed, when students were working alone or on groups, teachers spent their time moving among students providing one-on-one assistance. This in itself is not remarkable, but of interest is the forms which this monitoring took - which tended generally (and paradoxically) to emphasise student independence. Two Ancient History teachers did tend to provide direct answers to student questions on the material they were working on in groups, but other teachers did not. In a Biology lesson, while the teacher moved among students to clear up problems, she refused to supply answers to the task-questions. One Maths teacher would explain concepts and ask questions of the students, but avoided supplying answers to problems. A Modern History teacher would prompt students and ask further questions, but supplied no answers, while an English teacher gave students answers to questions about the form of a poem, but assiduously avoided providing any answers on themes or issues in the poem being studied.

h) Assessment

In lessons observed, the most notable set-task assessment item was the use of short tests and quizzes on subject knowledge. The particularly interesting thing about this was the instantaneous nature of teacher feedback in each case. In an English lesson, students were asked to answer questions on a

poem and the answers were read and discussed during the lesson. The same pattern occurred in a Biology lesson. Perhaps most interesting in this respect was an Ancient History lesson which began with a quiz, which the students had returned to them by the end of the lesson with a teacher commentary on how they had achieved generally. This had been marked while the students had been working in groups, even though the teacher had still had time to move among the groups for individual assistance.

In interviews, teachers provided a range of perspectives on assessment. The most common strategy mentioned was the use of a full lesson to evaluate or follow up the assessment of previous work. This took a number of forms. One Business Studies teacher provided a print-out for the class after every assessed task about what they'd done that needed improvement. A lesson was spent discussing this. Providing a lot of feedback was generally seen as important, as was making this feedback as immediate as possible - all in the context of checking each student's progress.

Concluding Comments

An important element in assessing teaching methodology in the HSC is to determine the degree to which the classroom activity is dominated by the HSC exam itself. In a very obvious sense, the curriculum is entirely determined by the subject content laid down for the HSC. But given that constraint, the study was partly interested in observing the extent to which classrooms as a result of this content-focus then became "exam factories" dominated by simply practising exam routines and exam answers, or whether teaching practices were still as concerned with having the students engage the material with interest and understanding as one might expect in the teaching of, say, Years 7-10. Did the nature of the curriculum and its assessment drive a particular set of teaching methods in the classroom?

The research was partly interested to discover whether "teaching and learning" gave way to "exam-ing" and cramming". In the event, what was observed were teaching practices that attempted to continue the kind of engagement and understanding one would expect from enlightened educational practice. Only three observed lessons were entirely devoted to specific practice of components of the exam - and in two cases, these were listening tests, the format of which the teachers believed necessary for more intensive student rehearsal (the third was a post-Trial-exam de-briefing). Certainly the HSC exam was a rationale for many of the lessons observed, but these were not conducted as cramming content for the exams. Exam "pointers" were commonly relayed by teachers and there was a general culture that though the HSC was their dominating constraint/ *raison d'etre*, nevertheless, it was not going to get in the way of trying to generate interest and genuine understanding about the subject.

While teachers used a wide range of teaching strategies to build student understanding, a key common factor was an emphasis on having students think, solve problems and apply knowledge. Simply reporting back knowledge or practising formulae outside of the context of application was unusual. Teachers strongly saw their role in the classroom as challenging students, rather than "spoon-feeding" information. They demonstrated ways of building notes and assisted in this process, but were never observed dictating a complete set of notes or having students simply copy notes without a context developed or a lead-up involving student responses. Instead, teachers demonstrated and discussed a variety of ways of helping students to become independent note-makers.

While questioning in the whole-class situation was dominated by closed questions, this contrasted to the strategies teachers used when having students work alone or in groups. In fact, groupwork was more prominent than might have been expected in HSC classes and was used for a variety of reasons, particularly activities oriented towards problem-solving. The closed questions that teachers used in the whole-class situation tended to be used to carefully build understanding of the material in layers and to make links to other aspects of the content. In effect, it served to both look back and look forward in the subject.

The teachers themselves were clearly genuinely expert in their subject area, felt that subject expertise was extremely important and enjoyed their teaching of, and association with, their subject and their students.

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