Learning Curves: Meeting student needs in an evolving qualifications regime – key findings from the first stage of a longitudinal study

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Introduction to the research

1. Background

A number of factors impact on each secondary school's ability to meet its senior student needs related to subject choice. These include a range of interrelated aspects such as the availability of adequate resources, which in turn tend to be related to school size and location, and local community and societal expectations of what an education ought to provide. The six case study school in our research had similar roll sizes but they also had variation in the number of subjects they offered. Matters of government policy, especially with respect to the national qualifications regime, are an important influence, at least in part because national testing regimes give powerful messages to teachers about the nature of curriculum, and of acceptable pedagogy (Gipps 1994). Thus the controversial introduction in New Zealand of a new senior secondary qualifications regime, beginning with Level 1 of the National Certificate of Educational Achievement (NCEA) in 2002, provides a rich context for this study of the dynamics of change in six secondary schools. The manner in which the NCEA changes are interpreted via the subject choice dynamics in each of the six schools is the focus in the study.

The NCEA is part of an ambitious series of reforms that began a decade ago with the intention of developing a single National Qualifications Framework (NQF). Consequently the NCEA reforms have occurred in an environment of existing debate about the relative merits of standards-based and norm-referenced methods of assessment (Dobric 2000). A multiplicity of aims has been suggested for the NQF development as a whole. These include: the creation of an open credit transfer system; the breaking of the academic/vocational divide; the removal of a "time-served" requirement for gaining qualifications; the creation of an outcomes-based assessment model; recognition of prior learning; and the development of a comprehensive quality control system Peddie (1998). Many of these aims represent considerable shifts from traditional practice, and so the resultant changes were, and are, bound to generate controversy. Additionally, where at least some aims of policy-mandated educational change remain covert, tensions are exacerbated and teachers struggle to reconcile the conflicts that arise (Hargreaves, Earl and Schmidt 2002). The possibility of this sort of conflict sits in tension with suggestions that the reforms intend to protect teacher professionalism through encouraging teachers to rethink curriculum goals and assessment approaches in flexible ways (Peddie 1998).

The focus on meeting student needs with respect to subject choice in this research also has the potential to highlight the manner in which students and their parents interpret and respond to this aspect of the reforms. Previous research in this area indicates that New Zealand students and their parents make their choices according to theories of preferences that are shaped over time and "constructed" by many factors (Fitzsimons 1997b). However most students report little help from the careers guidance system in their schools in relation to choices of study and their thinking about future employment (Fitzsimons 1997a). Other researchers have reported

similar findings, asserting that "activities that identify students' interests, strengths, and skills should be an earlier and continuous priority" (Boyd, Chalmers and Kumekawa 2001).

2. The research questions

Six questions informed the initial design of this longitudinal study. In this paper, we have focused mainly on the first questions.

- How do schools' assessment regimes, course structures, and selection practices reflect the intention of the national curriculum, in particular the principle of providing for "flexibility, enabling schools and teachers to design programmes which are appropriate to the learning needs of their students"?
- Do students perceive their choices in the same manner as their teachers?
- Do students perceive their choices in the same manner as their parents?
- Are there any patterns in student subject choice in relation to subject-clustering, socio-economic status, ethnicity, and gender?
- Are schools assessing and reporting on a wider range of student abilities than they were prior to the introduction of the NCEA?
- Have school subject choice policies been changed as a result of the NCEA? If so, how?

Another recent paper has more to say about the second and third questions on student, teacher, and parent perceptions of subject choices (Hipkins and Vaughan 2002b). The remaining three questions require ongoing data collection before we begin to address them

3. The research method

Data is being gathered in six case study schools. Because the range of subject choices that a school can offer is influenced by school size, we attempted to control this variable as far as possible within the practical constraints that arose. The six schools have rolls of between 590 and 950 students – neither small nor large by New Zealand standards. They were selected to represent a diversity of student groups and contextual settings. Three are city schools and three are in rural towns. Four are co-educational, two are single sex (one boys' school, one girls' school). They range from decile 2 to decile 8. Four are in the North Island and two in the South Island.

Data gathered at first visit
Initial visits to each school were carried out during March - April 2002. The principal and five Heads of Department were interviewed in each school (HoDs of English, Mathematics, Science, Technology and the Arts curriculum areas). We sought their perceptions of the manner in which the NCEA has already, or might in the future, impact on subject choice within the school overall (the Principal) and within specific curriculum areas (the HoDs). We also canvassed views of NCEA-related issues such as implementation challenges. Via a written questionnaire, Year 11 students were surveyed about their decision-making and opinions on the subject choice options available to them. School timetable, subject choice policy, and procedure information were collected. Year 11 student questionnaires have now been followed up with telephone interviews of a sub-sample of students across the six schools (N = 80). Data from this phase are currently being processed.

Data analysis
Our main focus for the first year of the research has been on painting a rich picture of the Year 11 subject choice practice, policy, and issues in each school at this early stage of the NCEA reform process. To this end we initially focused on building a descriptive profile of the relevant practice in each school as a separate 'case'. We found that we needed to include a summary of the complete timetable structure – i.e. from Years 9–13 so that the patterns described could be located within the overall context of subject choice within each school.

These descriptions (Hipkins and Vaughan 2002a) now form a base line against which change can be tracked over the next two years of the study.

Where anonymity could not be assured if details were presented within a case (as for example in reporting subject-specific views and concerns of HoDS) we aggregated data from all six schools. Patterns of student responses from individual schools were remarkable for their similarity. These responses were also aggregated and presented as one data set (Hipkins and Vaughan 2002a).

4. Overview of key findings from the first stage

In this section of the paper we report on some key similarities and differences with respect to the subject choices available to Year 11 students in each of the six schools in the 2002 year, as the NCEA was introduced for the first time. (The new qualification, while ultimately intended to provide a 'seamless' pathway through the senior secondary school, was initially restricted to Year 11 in accordance with government plans for a staggered introduction at Years 12 and 13). We also report on patterns in students' perceptions of their subject choices.

Patterns of available subject choices

The schools in our study presented their students with distinct patterns of Year 11 subject choices. These patterns are summarised in Table One, which is discussed briefly below.

Column 2: The compulsory subjects

Choice *within* compulsion now occurs for the 'core' subjects in all six schools and represents a refinement of previous practice in most cases. All six schools now offer two mathematics options and five of them offer three mathematics options. All offer two English options, and five of the six also offer at least two science options. Many of the interviewed HODs in the core subject areas were very positive about the opportunities they now could provide to break down perceptions of 'cabbage'[1] subjects – in English and mathematics in particular.

Columns 3 and 4: Traditional and non-traditional 'choice' courses

It was an explicit intention of the NQF development that students could gain credentials for more than just 'academic' learning. To track any such development Table One provides separate columns for 'non-traditional and 'traditional' options. The technology curriculum area provides the widest range of examples of both types of courses. Traditional 'Materials Technology' subjects are typically offered in a range of materials (wood/metal/fabric/food) and are assessed by NCEA achievement standards. By contrast one school offers a course called 'Creative Technology' which combines elements of visual arts, design skills, computing skills, and technological processes and is assessed by Web Design unit standards. Non-traditional courses are listed in Column 4 of Table One.

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[1] During the initial data-gathering phase the concept of "cabbage" subjects was raised in all six schools on at least one occasion. Within the vernacular of secondary school life, "cabbage" is a pejorative term referring to a subject which is considered undemanding intellectually. The term also refers to students who are considered to be incapable of academic success. The very existence of the term can make this judgement self fulfilling for some students. Thus placement in a "cabbage" class is considered a derogatory personal assessment of intellectual worth. In the past some students, and often their parents, have resisted such labelling by insisting on the choice of a more academic option, which in the school's judgement may not best meet the specific set of learning needs of the student.

Table 1 : Subject choice numbers in three areas

School data	Alternatives in 'core' subjects*		Option nos. in 'traditional' subjects		Option nos. in 'non-traditional choices'	
City School A Roll number: 790 No. at Year 11: 168 Decile: 6	Maths English Science	3 2 2	Languages Soc. sciences Arts Technology Health/PE	5 3 3 4 1	Info Mgmt ESOL**	1 1
Overall Total: 25	Total	7	Total	16	Total	2
City School B Roll number: 808 No. at Year 11: 172 Decile: 8	Maths English Science	2 2 4*	Languages Soc. sciences Arts Technology Health/PE	3 2 3 5 1	Alternative technology ESOL Career/work focused Senior recreation	6 1 2 1
Overall Total: 32	Total	8	Total	14	Total	10
City School C Roll number: 852 No. at Year 11: 160 Decile: 2	Maths English Science	3 2 1	Languages Soc. sciences Arts Technology Health/PE Accounting	4 4 2 4 1 1	ESOL Transition Text Info Mgmt	1 1 1
Overall Total: 25	Total	6	Total	16	Total	3
Town School D Roll number: 825 No. at Year 11: 171 Decile: 5	Maths English Science	3 2 4*	Languages Soc. sciences Arts Technology Health/PE Accounting	3 3 4 4 1 1	Alternative technology Text Info Mgmt Careers focused	3 1 2
Overall Total: 31	Total	9	Total	16	Total	6
Town School E Roll number: 956 No. at Year 11: 184 Decile: 7	Maths English Science	3 2 3*	Languages Soc. sciences Arts Technology Health/PE	- 4 3 4 2	ESOL	1
Overall Total: 22	Total	8	Total	13	Total	1
Town School F Roll number: 590 No. at Year 11: 141 Decile: 5	Maths English Science	3 2 3*	Languages Soc. sciences Arts Technology Health/PE	2 5 3 4 -	PE/Life Skills Alternative technology	1 3
Overall Total: 26	Total	8	Total	14	Total	4

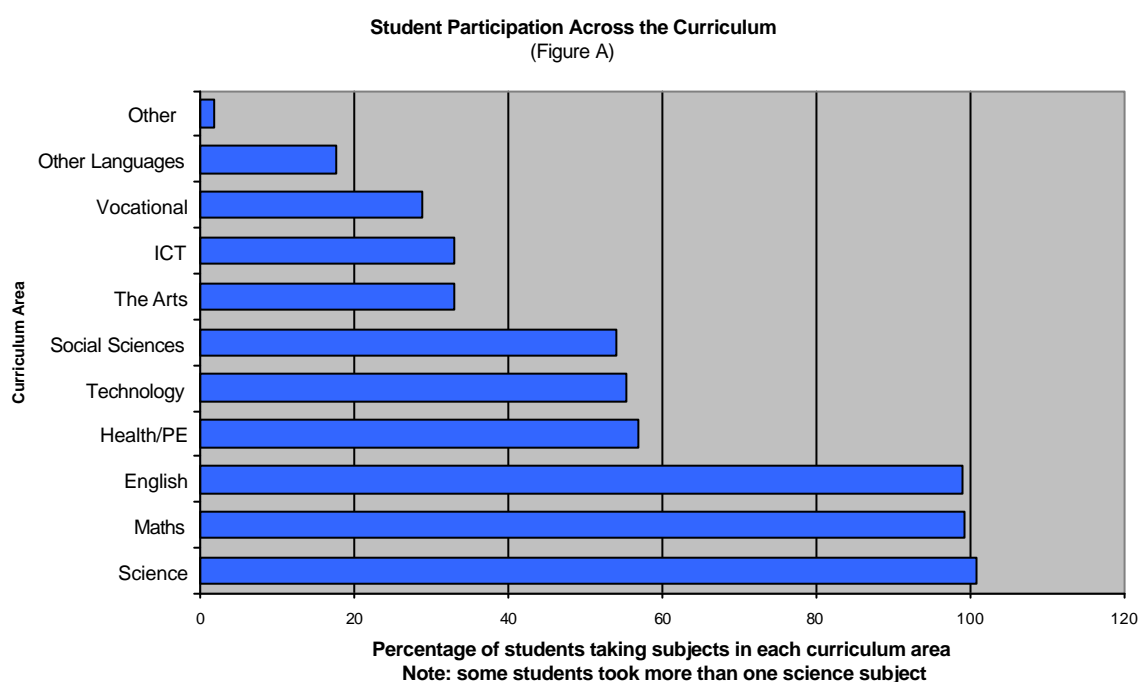* includes horticulture as an option choice

** We explore the relationship of ESOL courses to foreign fee-paying students and subject choice

Innovation is also possible within the traditional subject areas. Although not common in our case study schools as yet, some instances of this were identified. For example one school now offers geography, and history - as per curriculum tradition - and a subject called 'humanities'

which combines elements of both of these subjects with some content from the Social Studies curriculum.

Student perspectives

As already noted, patterns of student subject choice across the six schools were remarkably similar, notwithstanding the differences in patterns of subjects offered to them. Figure A shows how aggregated choices were distributed across the curriculum areas. The pattern reflects adherence in all six schools to a compulsory 'core'. The availability of different subjects within science (science, NZASE certificate science, biology, horticulture) pushes the total for this curriculum area over 100 percent, despite its status as an optional choice in one school. Physical education (PE) was also compulsory in several schools, but this aggregation into curriculum areas masks the lack of support for health education, with just one of the six schools offering this as a specific subject choice. Although computer related subjects (ICT) are often administered within technology departments, we report them separately here because few of them have traditionally reflected the (design and research cycle) aims of *Technology in the New Zealand Curriculum.*
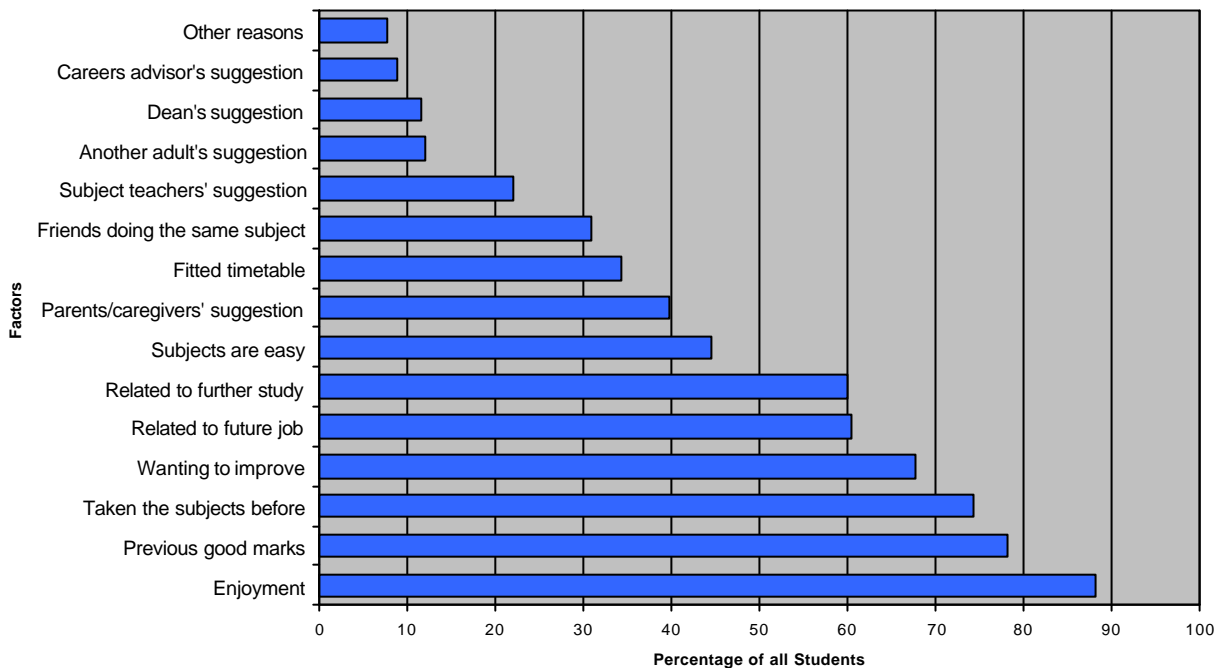
Student Participation Across the Curriculum
(Figure A)

Percentage of students taking subjects in each curriculum area
Note: some students took more than one science subject

As shown in Figure B, students reported that their subject selections were primarily motivated by expectations of *enjoyment.* This finding is congruent with that of other New Zealand (Boyd, McDowall and Cooper 2002) and international research (Lannes, Rumjanek, Velloso and de Meis 2002). Mathematics, English, and science were valued for perceived career/study links, although we came to suspect that students could not elaborate on the actual nature of such links. The preliminary findings from the follow-up telephone interviews support our impression that most students perceive only the broadest and most instrumental of links between what they learn in their school subjects and their future lives (Hipkins and Vaughan 2002a).

Arguably previous learning success, the next most influential factor, is also strongly linked to enjoyment. However our tentative thinking that personal enjoyment might also be positively correlated with the subject being perceived as easy was *not* borne out by the data. Our research did show a strong correlation between choice of PE as a subject and expectations that it will be "easy". However other subjects chosen for personal enjoyment were not linked to ease of learning in the same way. History rated third highest for personal enjoyment, but did
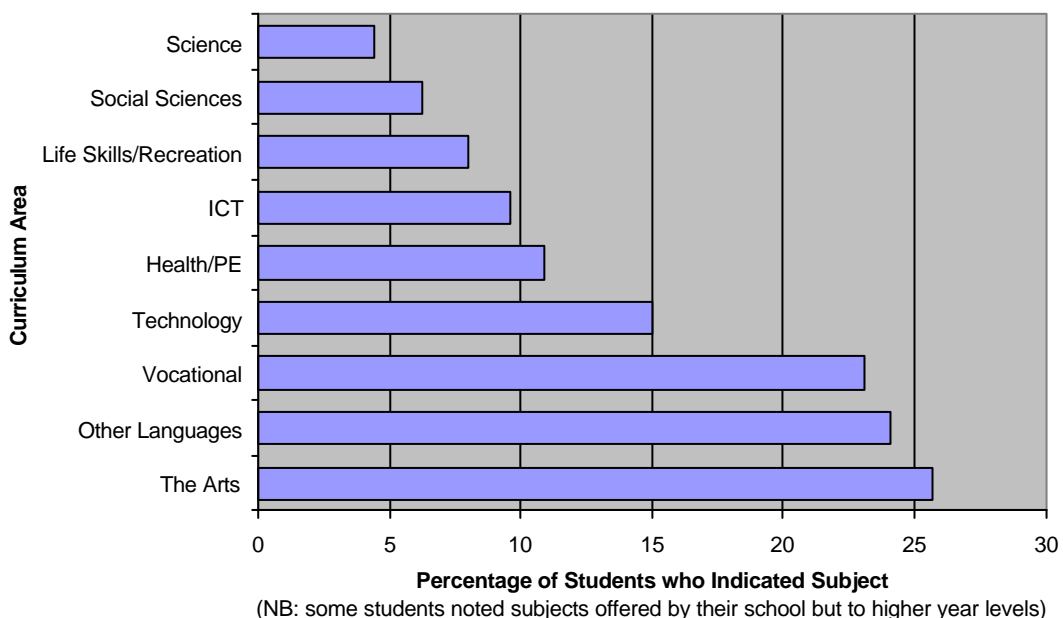
not feature at all amongst the subjects nominated as 'easy'. Students do appear to weigh perceived ease carefully against other factors. In fact, it seems quite possible that some of what students find enjoyable is the challenge or demands of their subjects. It is also likely that what is enjoyable for students is different depending on gender, social class, ethnicity, and previous school achievement. Other research has linked enjoyment of learning to feelings of academic success that have been enabled for some previously under-achieving students by New Zealand's qualifications reforms (Boyd, et al. 2002), particularly where unit standards have been used for assessment of alternative learning pathways.

Factors Influencing Student Subject Choice
(Figure B)

Horizontal bar chart titled "Factors Influencing Student Subject Choice (Figure B)". Y-axis labeled "Factors", X-axis labeled "Percentage of all Students" from 0 to 100.

Factor	Percentage (approx)
Other reasons	8
Careers advisor's suggestion	9
Dean's suggestion	12
Another adult's suggestion	12
Subject teachers' suggestion	21
Friends doing the same subject	31
Fitted timetable	34
Parents/caregivers' suggestion	40
Subjects are easy	44
Related to further study	60
Related to future job	60
Wanting to improve	68
Taken the subjects before	74
Previous good marks	78
Enjoyment	88

We asked students about subjects they would like to have taken, given the opportunity. Close to half of the students in all the schools could envisage alternative subjects that they would like to study at school.

Curriculum Areas in which Students Indicated a Desire to See More Subject Options Made Available
(Figure D)

Horizontal bar chart titled "Curriculum Areas in which Students Indicated a Desire to See More Subject Options Made Available (Figure D)". Y-axis labeled "Curriculum Area", X-axis labeled "Percentage of Students who Indicated Subject" from 0 to 30.

Curriculum Area	Percentage (approx)
Science	4
Social Sciences	6
Life Skills/Recreation	8
ICT	10
Health/PE	11
Technology	15
Vocational	23
Other Languages	24
The Arts	26

(NB: some students noted subjects offered by their school but to higher year levels)

Collectively a very wide range of such subjects were nominated although some made only very general reference to students' areas of interest – for example "something to do with horses", typically linked to "because I want to work with them when I leave school"[2]. The Arts, languages, vocational options, and technology are the curriculum areas where more choice is most commonly desired.

5. Emerging issues

This section addresses just four of the issues that emerged for us as we collated the data from our initial school visits and student questionnaires. We have chosen these issues because clear patterns are already apparent and/or because they introduce interesting new questions that we intend to pursue over the next two years of the study.

Wide subject choice or a solid foundation?

It is already apparent that the NCEA reforms are offering opportunities to restructure courses to accommodate a wider range of learning needs. Most of the professionals (principals and HoDs) whom we interviewed were positive about this aspect of the reforms, in sharp contrast to their concerns about workload issues of implementation. Notwithstanding these concerns, all six schools have already implemented changes to accommodate a broader range of perceived learning needs within the core subjects. Furthermore, those schools with an established history of curriculum innovation have been, in the words of one principal, "waiting for" the opportunity to credential a wider range of student learning.

On a more cautionary note, we also found that teachers were torn between the desire to provide the wide choices that some students seem to seek, and the long-established professional wisdom that a 'solid foundation' of basic subject knowledge and skills will ultimately serve students best. The latter stance is reflected in the continuing 'core' of compulsory subjects – some form of English and Mathematics in all six schools, and some form of science in five of the six schools. For students who study five subjects at Year 11, this leaves a personal choice of just two of their subjects in five of the six schools, and three of their subjects in one of the schools. In addition, there are constraints presented by conventional timetable structures, where five or six option lines inevitably delimit possible choice combinations, no matter how many subjects are offered in total (Hipkins and Vaughan 2002a).

Perceptions of students and parents

The increasing complexity of learning pathways in the senior secondary school highlights the need to consider how critical nature of choices made by students, usually in conjunction with their parents. In the view of most of the staff whom we interviewed, and as supported by the documentary evidence of the relevant practices, all six schools went to considerable lengths to provide advice for students as they made their Year 11 subject choices. However the students themselves were decidedly lukewarm about the advice provided and they reported being most inclined to discuss their choices with their parents. Sixty-one percent of student respondents thought that their parents were 'extremely' or 'very' interested in their subject choices. Only 6 percent perceived that their parents were 'not at all' or 'not very' interested in their subject choices. The remaining 33 percent thought their parents were 'fairly' interested.

Parents and students see progress in the 'core' subjects as critical to future success. Students clearly identified English and Mathematics as the two key subjects they would need for future academic study. Unsurprisingly, these are also the two subjects in which they were most anxious to improve, and in which they perceived their choices to be most influenced by their parents. Although, in their teachers' view, students' perceptions of 'cabbage' subjects are

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[2] We coded student responses to the question about subjects they would like to have taken in terms of academic or vocational subject options. Responses such as "something to do with horses" were coded as interest in a vocational subject option.

thought to be diminishing, the same may not hold for their parents. Comments from some of the teachers and principals interviewed indicate that many parents may not yet fully comprehend the alternative versions of core compulsory subjects that have been opened up by the NCEA. Tensions will inevitably rise in a situation where parents want their children to achieve (academic) qualifications which they perceive as keeping options open for the future and where teachers perceive that the student may make better learning progress in an alternative course in that subject. The structure and purposes envisaged for each new type of course need to be carefully explained and differentiated accordingly. There are communication challenges here for schools and for the wider education community.

Our interviewees also raised the issue of student difficulties in understanding the various learning pathways opening up. Preliminary data from the telephone interviews suggests that our students, nearing the end of their Year 11 studies, still hold rather superficial views of the benefits to be gained from their school learning in specific subjects (Hipkins and Vaughan 2002b). This is turn suggests that some of their choices may not be well informed. This raises challenges for careers advisors and teachers who will need to work not only with students, but also with their parents, if changes in outlook about the role of learning, forms and purposes of assessment, and the wider benefits to be gained from school, are to occur.

A re-emergence of streaming?
While all six schools provided a clear *achievement* rationale for the reorganisation of the core compulsory subjects into a range of options, it appears that this development could serve as a form of de facto streaming (into general *ability* levels) in most of the case study schools. One principal openly worried that this was the case, while the longer-serving staff at the school were happy that they had at last been able to achieve a situation for which they had lobbied for some years. Different degrees of compulsion appear to exist in this 'streaming' process. In one school the students are banded for most of their subjects and appear to have little personal choice in this process. At the other extreme, students in one school are relatively free to make their own option choices within compulsory courses.

Given the common finding in the research literature that streaming (or "setting" as it is called elsewhere) has no significant effect on pupil achievement (Harlen and Malcolm 1999, Sukhnandan and Lee 2000) this development is of concern. In the next year of the study we will monitor patterns of student placement in options within the compulsory subjects more carefully. Specifically we want to know whether perceptions of each student's overall ability are the basis for school decision making, and students are on a similar level for all their subjects, or whether the student's achievement in each subject is considered separately. It is also our intention to document more fully the differences between the options offered within the core subjects, in order to compare the types of outcomes each course offers.

The reconceptualisation of technology
In two of New Zealand's seven curriculum areas (technology and the arts) the implementation of the NCEA appears to have given a new shape to academic/vocational tensions. Technology, as it is defined by the curriculum document, is an uncomfortable fit with subjects such as Text and Information Management (TIM), woodwork, and home economics. For the technology teachers we interviewed, the 'intellectualisation' of such subjects is of real concern. Underlying this, we suggest, is the assumption that the 'status' of the subject can best be enhanced by the development of assessment instruments that focus on the academic – that is, that academic abilities are perceived to be of more value and status than practical 'skills'. However while students who have been the traditional takers of technology subjects are now finding the more academic content and structure difficult, the creative possibilities of the new courses could make them more attractive to academically inclined students. The technology teachers are torn. They rue the loss of traditional values and skills associated with craftsmanship in technology subjects, and experience associated unease over the potential demise of a place where the least able students could be sure of some form of achievement.

At the same time they are interested in the new potential within their subject and the subsequent raising of technology's status within the curriculum.

Teachers of subjects within the Arts curriculum area describe similar tensions. They see that the more 'intellectual' components of their courses could prove very stimulating for academic students. However these students are often discouraged from taking Arts courses in favour of subjects that are more traditionally perceived as 'academic'. Moreover the Arts HODs we interviewed expressed a concern over a potential flattening out of student achievement, prompted by what they worried were overly high definitions of the level of 'excellence' in achievement standards for Arts subjects. They saw a potential for more students to achieve at a 'credit' level but less at an 'excellence' level in comparison to relative School Certificate marks, possibly discouraging any academically-inclined students who do take Arts subjects.

6. What next?

Full analysis of the telephone interviews with a group of 80 students, chosen from questionnaire respondents across the schools, and across a range of subject-type mixes is our next task.

We will be returning to our six case study schools in Term One 2003 to re-interview HODs and principals, gather material about subjects, options, and timetables, and to survey a new Year 11 cohort. During these visits we will also be looking at:

- the patterns of NZQA achievement data for the Year 11 students from 2002
- data on Year 12 course content and structuring, and the factors that have influenced school decision making about this
- Year 11 course content and choice implications
- If possible, we will also follow up 2002's Year 11 cohort and their subject choices at Year 12 in 2003

Our focus will remain on how the NCEA impacts on schools and influences students with respect to making subject choices and meeting learning needs. We will also be examining the possibilities for a reconceptualisation of the pervasive academic/vocational divide in schooling and considering the usefulness of other conceptualisations, such as a model based on cognitive, affective, and psychomotor abilities.

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