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The Case Studies

Introduction

The study of take-up and attainment in Junior Certificate mathematics indicated that while there were certain gender differences in take-up and attainment rates between girls and boys, these differences were relatively minor when compared with differences across school types. The greatest differences in take-up patterns and attainment were not those between girls and boys *within* school types, but between both girls and boys *across* school types. Vocational schools and community colleges, which are generally coeducational schools, also tend to be more working class in intake than other school types (Table 2.2). Both girls and boys in these schools were less likely to take Higher level mathematics than their peers in other types of schools, including coeducational secondary schools[1] (Tables 2.3, 2.4). While differences in performance, within each level of mathematics, did not vary greatly across school types, they did vary somewhat. Single sex schools generally, and girls' schools in particular, had the highest average rates of attainment in the Junior Cycle examinations of all groups (Table 2.7).

What the analysis of Junior Certificate data suggested, therefore, was that gender differences were strongly related to school-type differences, which, in turn, were closely related to social class differences. In choosing the case study schools, therefore, we were mindful of the importance of school-type and social class, as well as gender differences. While we chose schools that were representative of schools nationally, we chose a disproportionately larger number of both high and low achieving schools to help understand differences in take-up and performance, and to establish how gender and school type[2] impacted on students' experience of learning mathematics.

Choosing the Schools and Classes for the Case Studies

The aim of the case studies was to engage in an in-depth analysis of the teaching and learning of mathematics. In the context of this overriding objective, the study was designed to examine the perspectives of

mathematics teachers, of students and of parents on the teaching and learning of mathematics. Arising from the findings of our analysis of the Junior Certificate data, a further objective of the case studies was to analyse how the students' gender, social class background, the type of school they attended, and class group in which they were placed, impacted on their learning of mathematics.

The study was designed as a co-operative inquiry based on the general principles of co-operative and emancipatory research (Heron, 1981; Humphries and Truman, 1994; Humphries, 1997; Oliver, 1992). Because of this, the process of choosing case study schools took several months and involved a wide range of consultations with all the relevant management bodies, teacher unions and the Mathematics Teachers Association of Ireland. One of the first tasks was to make a presentation to the Mathematics Teachers Association at their annual general meeting in 1997. We held subsequent meetings with interested mathematics teachers as to the objectives of the study and the methodologies we should employ. We held discussions with the mathematics inspectorate in the Department of Education and Science and with experts in the field of mathematics education both in Ireland and internationally. In addition, a research advisory committee was established to guide the study. It comprised representatives of mathematics teachers in Ireland, mathematics educators and researchers, social scientists with research expertise on education, representatives of the Department of Education and Science mathematics inspectorate, and two leading international experts on the subject of mathematics education. The Gender Equality Committee of the Department of Education and Science, who funded the study, were also represented on the advisory committee.

Given the complex nature of the issues to be addressed, and in particular the need to gain insight into the teaching of mathematics in classrooms, a triangular approach to the research subject was adopted. A triangular approach is employed when a subject is complex and is not readily understood by employing a single research methodology (Seale, 1998). It involves using a range of research strategies to elicit different perspectives on a single phenomenon. In our case, it involved listening to the views of students, teachers and parents on the teaching and learning of mathematics as well as video-taping the classroom teaching of the subject. The use of a multi-faceted methodological approach enabled us to study the complex interface between the teaching and learning of mathematics from a range of different standpoints. By listening to all the major education partners, students, teachers and parents, and by observing teachers teaching and by recording their work on video, we were able go gain a holistic understanding of how the subject is taught and how learning takes place.

We were well placed, therefore, to understand whether boys and girls, and students from different social backgrounds, had different experiences of learning mathematics.[3]

Guided by insights gained from the TIMSS videotape study of mathematics classrooms (Kawanka et al., 1999), a small pilot study was undertaken prior to the main study. The pilot study involved the videotaping of six mathematics classes in three schools. The classes were both coeducational and single sex. In addition, pilot interviews were undertaken with both teachers and students. Both primary and second-level schools were involved in the pilot study as it was thought that a small study of the teaching and learning of mathematics at primary level would enhance our understanding of teaching and learning at second level. After the pilot study, it was decided to focus exclusively on second-level schools, largely because it would have been impossible to make any meaningful statement about the teaching of mathematics at primary level without engaging in an equally in-depth study to that planned for second-level. It was not possible to complete such an intensive study of primary-level mathematics within the time and resources available.

The research instruments were refined after the pilot study. Apart from the decision to focus exclusively on second-level mathematics, the most significant change after the pilot was the decision to use a second digital video recorder to observe the classes for the main study. In the pilot study we had used only one camera focused mostly on the students. The limitation of this was that it was not possible to record all teacher responses, especially non-verbal responses and initiatives. It also meant that if we focused the camera on the teacher, we had no video record (although we did have an audio record) of the students in the class at that moment. With the second digital camera, we were able to observe both the students and the teacher simultaneously. Having a second camera also minimised the disruption to the class, as we did not have to move around during the lesson.

There were ten schools chosen for the main case studies, a profile of which is presented in Table 3.1. Six of the schools were secondary, three were vocational/community colleges, and one was a community school. Five of the schools were coeducational, three of which were vocational/community colleges, one was a community school and one was a secondary school. Of the five single-sex schools, two were boys' schools and three were girls' schools. There were two fee-paying schools in the study, one boys' school and one girls' school (both secondary) and four designated disadvantaged schools, two of which were vocational/community colleges and two of which were secondary schools, one girls' school and one boys' school.

Table 3.1 Case-study schools: distribution by type, gender composition, status, size, geographical location and grouping procedure

Case-study schools	Status						
	School type*	Gender composition**	Fee- ***	DD versus NDD ****	Size *****	Location	Class group
Barrow (SSG F)	S	SSG	FP	NDD	MEDIUM	City	Top Set
Nore (SSG Fr)	S	SSG	FS	NDD	MEDIUM	City	Mixed
Suir (SSG Fr D)	S	SSG	FS	DD	VERY LARGE	Town	Bottom Band
Liffey (SSB Fr D)	S	SSB	FS	DD	SMALL	City	Top Stream
Lee (SSB F)	S	SSB	FP	NDD	MEDIUM	City	Mixed
Lagan (SC Fr)	S	COED	FS	NDD	MEDIUM	Town	Top Band
Errigal (CS Fr)	CS	COED	FS	NDD	LARGE	Town	Middle Band
Mourne(VCC Fr D)	VCC	COED	FS	DD	LARGE	City	Bottom Band
Blackstairs (VCC Fr D)	VCC	COED	FS	DD	LARGE	Small Town	Top Stream
Nephin (VCC Fr)	VCC	COED	FS	NDD	MEDIUM	City	Bottom Band

Key:
* S = Secondary; CS = Community School; VCC = Vocational/Community College;
** SSG = Single-Sex Girls; SSB = Single-Sex Boys; SC = Secondary coeducational; COED = Coeducational;
*** FP = Fee-Paying; FS = Free-Scheme (where free-scheme represents non-fee paying status);
**** DD = Designated Disadvantage Status; NDD = Non Disadvantage Status;
***** Small = <300; Medium = 301-600; Large = 601-800; Very Large = 801+.

The case study schools were strategically chosen, not only to represent different school types, but also to enable us to understand why there were differences across schools in terms of both take-up rates for different levels of mathematics as well as differences in performance. As the greatest difference in take-up rates for different levels of mathematics was between fee-paying secondary schools and vocational schools and community colleges, both of these types of schools were over-represented in the case studies relative to their representation nationally: two of the ten schools we studied were fee-paying, although just 7 per cent of schools nationally are of this type; four of the ten schools were disadvantaged, although only 26 per cent of schools nationally are disadvantaged.

The method for choosing the schools was based on a combination of criteria. While it was essential that schools were representative of different types of schools, and in particular that they would enable us to understand key differences related to gender and social background, they were also chosen on the basis of their regional location, and the type of grouping system that they operated (we needed to have schools using different methods of grouping students so that we could examine the learning experiences in different tracks or streams). Finally, it was necessary to choose schools and classes where principals, teachers and students were interested and willing to be part of the research project.

The soliciting of schools and classes took place through a series of advertisements in educational newsletters and newspapers and by making direct contact with the relevant bodies representing schools and teachers. A list of forty-seven schools was eventually drawn up in which teachers had volunteered to be part of the study, and in which principals had also agreed that they could participate. These schools were willing also to seek the permission and co-operation of students. It was from this list that the final ten schools were selected.

Classes within schools were chosen from among the second year students of the Junior Cycle. The reason for focusing on Junior Cycle mathematics was because the ESRI study (Hannan et al., 1996) had identified significant gender differences at this stage across school types that they believed needed further research investigation. In addition, second year students seemed an appropriate research group, as they had covered a good deal of the Junior Cycle syllabus but were not undertaking examinations during the course of the study. The fact that they were not examination classes meant that school principals, teachers and students were more likely to have time to participate in the study.

Having chosen the schools and year of classes, we then systematically chose classes at the top, bottom and middle streams or tracks across the schools. The objective was to ensure that we observed the teaching of

mathematics at different levels. We knew from existing research that high track students were generally taking the Higher level course, while mixed classes varied, with some being taught Higher, others being taught Ordinary and some being taught both Higher and Ordinary. Lower tracks or streams generally follow either the Ordinary mathematics syllabus or, in some cases, the Foundation level course (Hannan et al.1996; Lynch, 1989; Lynch and Lodge, 2002).

Table 3.2 Case study schools: grouping practices in the Junior Cycle

Schools	1st Year	2nd Year	Junior Cert Year
Barrow (SSG F)	Mixed	Mixed, Set for Irish and mathematics	Mixed, Set for Irish and mathematics
Nore (SSG Fr)	Mixed	Mixed	Mixed
Suir (SSG Fr D)	Banded	Banded	Streamed for mathematics
Liffey (SSB Fr D)	Streamed	Streamed	Streamed
Lee (SSB F)	Mixed	Mixed	Mixed
Lagan (SC Fr)	Banded	Banded	Banded
Errigal (CS Fr)	Mixed, Banded for Irish, English, mathematics, French, German	Banded	Banded
Mourne (VCC Fr D)	Mixed, Banded for Irish, English, mathematics	Banded	Banded
Blackstairs (VCC Fr D)	Mixed	Streamed	Streamed
Nephin (VCC Fr)	Mixed, Banded for Core Subjects	Banded	Banded

Key: SSG F: Secondary girls', fee-paying; SSG Fr: Secondary girls', free scheme; SSG Fr D: Secondary girls', free scheme designated disadvantaged; SSB Fr D: Secondary boys', free scheme designated disadvantaged; SSB F: Secondary boys', fee paying; SC Fr: Secondary coed, free scheme; CS Fr: Community school, free scheme; VCC Fr D: Vocational/Community college, free scheme designated disadvantaged; VCC Fr: Vocational/Community college, free scheme (where free-scheme represents non fee-paying status).

There were three mixed classes[4], three top streams/ bands/sets, three defined as bottom bands, and one class that was a middle band.However, as can be seen from Table 3.2, the schools varied their grouping procedures from year to year. The most notable change is from mixed classes in first year to a more hierarchical ordering of tracks in second and third year.

Researching the Mathematics Classes and English Classes

When permission was obtained from the school principals, teachers and students in the ten classes to participate in the study, the design of the research instruments got under way.

After extensive consultations with teachers and the research advisory group, it was agreed that it would be desirable to have some measure of students' attainment in mathematics at the outset of the study. To determine this we devised a short test in mathematics based on the released items of the TIMSS study. Forty items were selected in all; these examined students' competency in mathematical skills that were appropriate to their age and Junior Certificate status. The test was administered to students in the ten classes after the teacher had obtained their consent at a previous lesson. It provided us with useful background data on students' skills in mathematics, and enabled us to determine what level of competence students had in the different classes at the time the study was being undertaken. The overall national mean for the forty items chosen from the TIMSS for this study is 62 per cent (25 out of a possible 40).

To research students' experience of learning mathematics, a threefold research strategy was devised. First, it was agreed that the best method for recording information on teaching was to videotape the classes. With the agreement of the ten mathematics teachers and their students, each of the chosen mathematics classes were videotaped twice, at intervals several weeks apart. While it was appreciated that videotaping was intrusive, research from the TIMSS study had suggested that videotaping was a very valuable research tool for understanding how mathematics was actually taught in classrooms. (Stigler and Heibert, 1999). Therefore, to counter some of the bias built into the video observation, classes were videotaped on two separate occasions. Contrary to expectations, we did not find that the videotape interfered greatly with the flow of the lesson. Following the initial interest in the mechanics of the video itself, the classes settled down to a normal lesson routine, especially in the second lesson. Our focus group interviews with students after the observations suggested that being videotaped was not unusual for students as many of them had been videotaped before in their homes and at social gatherings. Moreover, we used small digital cameras, one focused on the teacher and the other on the students, and these were not particularly intrusive.

In the analysis of the video material we were guided by the procedures utilised in the TIMSS study (Stigler and Heibert, 1999). When the video material was collected, the tapes were coded and viewed by all the research team, both individually and collectively. After the initial viewings, the tapes were transcribed in full on to hard copy and analysed systematically in terms of their public discourse and interactions. The

analysis focused on the style of teaching, language content, teacher-student interaction patterns, and gender differences in interaction flows. Initial interpretations were read and re-read by the research team, and were presented to the research advisory committee on four separate occasions. In the light of their comments and further viewing of the material, interpretations were revised and edited further. Coding systems based on key themes were devised and a content analysis of these was undertaken systematically for all classes. The teachers who had been videotaped, and who had expressed an interest in continuing dialogue with us about the study, were also invited to read our interpretations of the video material. Their comments and reservations were taken into account in the final analysis. In addition, a senior mathematics teacher, who was not involved in the study, read the entire manuscript to check it for authenticity prior to publication.

Students were also asked to complete a detailed questionnaire about their experience of learning mathematics, and to provide other relevant personal background information. Much of the focus of the questionnaire was on students' attitudes to, and experience of, learning mathematics. Details of the research instruments devised for measuring attitudes, and examining students' experiences of mathematics are presented in Chapter 10 below. As with all aspects of the study, students were informed in advance that they need not fill out the questionnaires and a small number chose not to do so: of the 250 students in the ten classes, 237 filled out the questionnaires.

On the basis of a preliminary analysis of both the videotapes and questionnaires, a number of students from each of the ten classes were asked to take part in a short focus group discussion about their experience of learning mathematics, focusing especially on their current class experience. We chose students who were both high and low participants in class, as well as students who were getting high grades and lower grades. There were equal numbers of girls and boys. In all, eighteen focus group interviews were undertaken with an average of four students in each. The questionnaire data was analysed using the SPSS software programme while the interviews were transcribed in full and rigorously analysed, using software applications where relevant. As with the classroom material, a coding scheme for analysing key themes was drawn up and each interview was analysed within that frame.

Although the main focus of the study was on mathematics, it was believed that it would be useful to video a small number of English classes in the case-study schools, with the same groups of students if possible. Like mathematics, English is a core subject for almost all second-level students. It was important to know if the style of teaching that operated in

mathematics operated also in another core subject. Although time and resources did not enable us to investigate English teaching in any depth, the data we collected did enable us to make some basic comparisons between the teaching of English and mathematics to second year students.

While grouping practices did not allow us to videotape identical groups of students, we were able to videotape some of the same students in English classes that we had observed in mathematics. Five English classes were videotaped, and of this, three were in single sex classes and two were in coeducational classes. These were coded and analysed the same way as the mathematics lessons, but not in as much depth. A more detailed discussion of the classes and findings in relation to the teaching of English is presented in Chapter 8.

Teachers and Parents

How students approach the learning of mathematics and how they learn is not just influenced by their views and interests in the subject, it is also strongly determined by the attitudes of their parents and teachers. Because of this, we undertook intensive interviews with the ten mathematics teachers.[5] The objective was to explore their views on the teaching of mathematics in particular. The teachers also filled out a short questionnaire giving their professional profiles and general views on the subject of mathematics. A detailed profile of individual teachers is not included here to preserve the anonymity of those who participated[6].

We also decided to interview a small subset of the parents of students that we had observed. We asked the parents of students from each of the ten schools if it was possible to interview them, stressing that we did not need, nor had we time, to interview them all. Our target was to interview a few, three or four parents, from each class to ascertain their views on the teaching and learning of mathematics. We eventually interviewed twenty-eight parents of students across the ten schools. The findings from these interviews are reported in Chapter 11.

General profile of the schools

Table 3.1 above provides a general profile of the ten schools in the study. Of the ten, six were secondary schools, three were community colleges and one was a community school. Five of the six secondary schools were single-sex, three being single-sex girls' schools while two were boys' schools. Two of the ten schools were fee-paying while four were designated-disadvantaged.

In terms of size, one of the schools was very large with over 800

students, and one was small with less than 300 students. Of the remainder, four were classified as medium (between 301-600) while three were classified as large (601-800). Six of the schools were located in the Dublin or the greater Dublin area. Of the four schools outside of these areas, two were located in medium-sized towns and two others were in small towns.

Coeducational Schools – Origin and Gender Distribution

Table 3.3 provides a profile of the coeducational schools in terms of their origin, their present status, and the gender distribution within the school. What is clear from this is that boys were in the majority in three of the five schools. The only school in which girls were in the majority was the one that was originally a girls' school but became a coeducational school some years previously.

Table 3.3 Coeducational case-study schools: origin by present school type and gender distribution

School	Origin of school	Present school type	Gender		Ratio m-f
			Male %	Female %	
Lagan (SC Fr)	Girls only	Coed Secondary	46	54	0.85
Errigal (CS Fr)	Amalgamation	Greenfield	53	47	1.12
Mourne(VCC Fr D)	Greenfield	Greenfield	50	50	1.0
Blackstairs (VCC Fr D)	Greenfield	Greenfield	56	44	1.27
Nephin (VCC Fr)	Greenfield	Greenfield	57	43	1.32

As can be seen from this table, three of the five schools were established as coeducational schools. One of the five schools was formed through amalgamation and one broadened its intake to include students of the opposite sex.

Social-Class Background of Students in Case Study Schools

Table 3.4 shows that a slight majority of the students were from middle-class backgrounds (52.4 per cent), with just under half (47.6 per cent) from working-class backgrounds. When social class is considered across the single-sex and coeducational sectors, we can see that over three quarters of students in the single sex schools are from a middle-class background while just over one third of students attending the coeducational schools are from middle-class backgrounds. The table also shows that there is a major difference between the case study schools in terms of the proportion of students from upper middle-class backgrounds in attendance: over

Table 3.4: Case-study schools: social class background of students in observed mathematics classes*

School	Upper middle class	Middle class	Lower middle class	Total middle class	Upper working class and skilled manual	Working class semi-skilled and unskilled	Total working class	% (n)	Class organisation: streamed or mixed
Barrow (SSG F)	76.0	12.0	8.0	96.0	4.0	0	4.0	100 (25)	Streamed-Top
Nore (SSG Fr)	0	38.1	28.6	66.7	33.0	0	33.3	100 (21)	Mixed
Suir (SSG Fr D)	0	10.0	10.0	20.0	40.0	40.0	80.0	100 (10)	Streamed-Bottom
Liffey (SSB Fr D)	0	9.5	14.3	23.8	42.9	33.3	76.2	100 (21)	Streamed-Top
Lee (SSB F)	72.0	24.0	4.0	100.0	0	0	0	100 (25)	Mixed
Average SS	36.3	19.6	12.7	79.4	20.6	0	20.6	100 (102)	
Lagan (SC Fr)	6.9	41.4	13.8	62.1	34.5	3.5	37.9	100 (29)	Streamed-Top
Errigal (CS Fr)	0	4.5	9.1	13.6	68.2	18.2	86.4	100 (22)	Streamed-Middle
Mourne(VCC Fr D)	0	5.9	17.6	23.5	11.8	64.7	76.5	100 (17)	Streamed-Bottom
Blackstairs (VCC Fr D)	0	18.8	15.6	34.4	34.4	31.3	65.6	100 (32)	Streamed-Top
Nephin (VCC Fr)	0	0	37.5	37.5	50.0	12.5	62.5	100 (8)	Streamed-Bottom
Average COED	1.9	19.4	15.7	37.0	45.4	17.6	63.0	100 (108)	
Overall Average	18.6	19.5	14.3	52.4	33.3	14.3	47.6	100 (210)	

*The social class profile of students was compiled using the standard Central Statisitics Office procedure devised from the 1996 Census, Principal Socio-economic Results, Dublin: Stationery Office.

Key: SSG F: Secondary girls', fee-paying; SSG Fr: Secondary girls', free scheme; SSG Fr D: Secondary girls', free scheme designated disadvantaged; SSB Fr D: Secondary boys', free scheme designated disadvantaged; SSB F: Secondary boys', fee paying; SC Fr: Secondary coed, free scheme; CS Fr: Community school, free scheme; VCC Fr D: Vocational/Community college, free scheme designated disadvantaged; VCC Fr: Vocational/Community college, free scheme (where free-scheme represents non fee-paying status).

36 per cent of students attending single-sex schools were upper middle-class compared with only 2 per cent of those in coeducational schools.

Case Study Classes: Mathematical Profile

A profile of the grades achieved by students in each of the ten classes in the TIMSS-related test is presented in Table 3.5 below. It is evident from this table that there is a considerable disparity in the attainment level of the students in mathematics at the time the study was undertaken. The highest scores were in Barrow, a girls' fee-paying school, where the students were in the top set for mathematics and 72 per cent achieved an A or B grade. The students in a top stream in Lagan had the next highest grades where 60 per cent were awarded an A or a B, followed by a top band in Blackstairs (a designated disadvantaged community college) where 51.6 per cent got an A or B grade. It is interesting to note that although almost all the students in Barrow and over 60 per cent of those in Lagan were middle-class, two thirds of students in Blackstairs were working class.

The lowest scores were in the low streams with 90 per cent of the students in the girls' school in Suir, and over two thirds of those in Mourne, getting an E or lower grade. Both schools were designated disadvantaged.

The relatively low rates of mathematical attainment of the students observed in Mourne and in Suir were reflected in their Junior Certificate examinations. No students from the classes in Suir or Mourne took the Higher level paper, while 31 per cent of those in Suir and 26 per cent of those in Mourne took Foundation level examinations (Table A3.1)[7]. School-level data on the take-up of different levels of mathematics in the ten schools three years prior to the case studies (1996) show that the patterns we observed in the case study classes were typical of the overall patterns in some schools but not in others. This arises from the fact that in some schools the classes we observed were not typical of that school, in others they were more typical. In Suir (SSG Fr) for example, we observed a bottom stream class in a school that had several higher stream classes doing Higher and Ordinary level mathematics. Thus, while the Junior Certificate take-up rates for Suir for 1996 show that 44 per cent took Higher level examinations, none of the students in the class we observed took Higher level. In Mourne (VCC Fr D) and Liffey (SSB Fr D) however, the patterns of take-up for Higher level mathematics in the classes we observed seemed to be quite typical of whole-school patterns. In Mourne, none of the students we observed took Higher level mathematics while just 3 per cent of the whole cohort took Higher level in 1996; in Liffey, almost 17 per cent of the students we observed took the Higher level paper, while

*Table 3.5: Case-study schools: performance in TIMSS-related test**

School		Grades						
	Mean Score on TIMSS-related test	A %	B %	C %	D %	E or lower %	Group position	% Working class in the group %
Barrow (SSG F)	29.8	16.0	56.0	24.0	4.0	0.0	Top Set	4.0
Nore (SSG Fr)	21.9	4.2	20.8	29.2	25.0	20.8	Mixed	33.3
Suir (SSG Fr D)	13.2	0.0	0.0	0.0	10.0	90.0	Bottom Band	80.0
Liffey (SSB Fr D)	24.4	9.1	27.3	22.7	36.4	4.5	Top Stream	76.2
Lee (SSB F)	25.6	11.5	26.9	23.1	38.5	0.0	Mixed	0.0
Lagan (SC Fr)	28.5	16.0	44.0	28.0	8.0	4.0	Top Band	37.9
Errigal (CS Fr)	18.1	0.0	0.0	33.3	29.7	37.0	Middle Band	86.4
Mourne (VCC Fr D)	13.3	0.0	0.0	0.0	33.3	66.7	Bottom Band	76.5
Blackstairs (VCC Fr D)	27.2	12.9	38.7	29.0	19.4	0.0	Top Stream	65.6
Nephin (VCC Fr)	16.5	0.0	0.0	10.0	70.0	20.0	Bottom Band	62.5

*The national mean for second year students in second-level schools is twenty-five out of a possible forty.

no student in the school took the Higher level paper in 1996 (Tables 3.1, 3.2).

Profile of the Individual Case Study Schools and Classes

Before presenting the findings from the case studies, it is important to present a brief profile of the individual classes and their schools. In the following pages a pen picture of each of the case study schools is presented, including a resume of their stated educational philosophy.

The Girls' Schools

Barrow

Barrow is a single-sex, girls', fee-paying school, run by a Roman Catholic religious order. It is a large school situated in a city. The prospectus for the school emphasised the importance of educating the whole person, focusing on formation of character and spiritual values. The school stressed the importance of equipping the girls to fulfil their certain future roles within 'marriage, parenthood and careers'. It also emphasised the importance of educating students for dealing with leisure time, and stressed the need to develop leadership skills. The school operated very strict regulations regarding uniform, punctuality and general manners.

Almost all of the second year students in Barrow were from middle-class backgrounds, with over three-quarters of the twenty-five girls in the class from upper middle-class backgrounds (Table 3.4).

Within the Junior Cycle, the school had mixed classes for all subjects with the exception of Irish and mathematics, both of which were set by level of attainment. The class we observed in Barrow was the top set for mathematics in second year. All of the students expected to be taking the Higher level mathematics paper for the Junior Certificate Examination. The mean score achieved by the class on the TIMSS-related test was 29.8 (out of a possible 40), which was the highest score of all ten schools. All of the girls passed the test, while twenty-four of the twenty-five attained a grade C or higher, with 4 attaining grade A (Table 3.5). In their Summer Test of 1999 (at the end of second year) all of the students attained a grade C or higher, while ten attained grade A.

The core subjects in Barrow were Irish, English, mathematics, history, geography, science and civil, social and political education (CSPE). As with all secondary schools, physical education (PE) and religious education (RE) are part of the core curriculum but are not examined. Other subjects, on offer in Barrow included French, Spanish, business studies, art and choir. None of the subjects available at Barrow were taught at Foundation level for the Junior Certificate.

All of the girls we observed were taking at least one modern language and science. Over three quarters were studying science at the Higher level. Just over one quarter of the students were doing an arts and humanities subject, such as art or music. Practical subjects such as home economics or metal technology, metalwork or technical graphics were not on offer in this school (Table A3.3).

Nore

Nore is also a single-sex girls' school, located in a city and run by a Catholic religious order. It is a free-scheme school and does not charge fees. It is categorised as a large school, having over 500 students. The ethos of this school centres on the all-round development of the individual, emphasising the importance of relationships and respect among staff and students. Nore also has strict regulations regarding uniform, the wearing of make-up and jewellery and general behaviour. However, the development of good working relationships is emphasised over discipline in the school.

Overall, the school had students from quite a wide range of backgrounds in social class terms. More than half of the second-year students were from a working-class background (60 per cent), with the remainder being either from middle-class (20 per cent) or lower middle-class (20 per cent) backgrounds. In the class we observed, two thirds were from middle-class backgrounds (Table 3.4).

The school used a mixed system of grouping for all classes throughout the Junior Cycle (Table 3.2). Almost 60 per cent of the girls in the observed class in Nore expected to take the Higher level paper in the Junior Certificate mathematics examination. Just over one third reported that they expected to sit the Ordinary level in the examination, while a minority (4 per cent) expected to do mathematics at Foundation level (Table A3.1).

The mean score achieved by the students in Nore on the TIMSS-related test was 21.9 (out of a possible 40), which ranked it sixth among the case-study schools. Over one fifth of the class got a grade E or lower on the test. Six of the twenty-four girls got grade D, while the remainder were awarded a grade C or higher. Just one of the class group attained a grade A in this test (Table 3.5). The broad range of mathematical competency in the class was also evident in their summer test of 1999: scores ranged from four grade A's and six grade E's or lower in the higher paper.

The core subjects in Nore were Irish, English, mathematics, history, geography, CSPE, RE and PE. Other subjects provided were science, French, German, home economics, business studies, art, music, classics and computer studies. Three of the subjects, Irish, English and mathematics, were taught at Foundation, Ordinary and Higher levels.

The majority of girls we observed were taking one modern language (96 per cent) for the Junior Certificate Examination. Three quarters were studying science, of which just over one third were taking the subject at the Higher level. Over half of the students in the class were taking home economics, while other practical subjects such as metal technology, metalwork and technical graphics were not on offer. Almost two thirds of the girls were studying at least one of the arts and humanities subjects (art, craft and design or music) (Table A3.3).

Suir

Suir was the third single-sex girls' school in the study. It is owned and managed by a Catholic religious order and is situated in a large town. It is a free-scheme school and is a designated-disadvantaged school. The educational philosophy of the school emphasises the holistic development of students, and the accommodation of the diverse needs of the student group. The principal of Suir emphasised the importance of gearing education programmes in the schools towards the disadvantaged; she also mentioned the importance of team work and extra-curricular activities.

The social class intake in Suir is quite wide, although almost two thirds of the second year students were from a middle-class background. The class we observed in Suir was a bottom stream group. Of the ten girls in the class, eight were from working-class backgrounds.

The class in Suir achieved the lowest mean score among the ten schools (13.2) on the TIMSS-related test. Nine of the ten girls got a grade E or lower on the test and one girl attained a grade D (Table 3.5). In the Junior Certificate Examination, of those taking the Foundation level (two students) one attained a grade C and one a grade D. Of the remaining eight students (all of whom took the Ordinary level paper), the results were evenly divided between a grade C and grade D).

Suir was one of four of our ten case-study schools to have completed the Junior Certificate Examination during the course of the field work. Comparing students' expectations of expected level of mathematics to be taken in the exam with the actual level taken, we can see that almost 70 per cent of the girls had expected and eventually took the Ordinary level paper. Fifteen per cent expected to take the Higher level paper but none of the class did and although only 15 per cent expected to do Foundation level mathematics in the examination, almost one third (31 per cent) of the class were examined at this level (Table A3.1).

All of the students took at least one modern language and all were studying science, of which just over one third were studying for the Higher level paper. Almost two thirds were taking at least one arts and humanities subject. Of the practical subjects, 46 per cent were taking home economics

and 31 per cent were taking either metal technology/metalwork or technical graphics (Table A3.3).

Students in Suir were banded for the first two years of the Junior Cycle and streamed for mathematics in the Junior Certificate year (Table 3.2). The core subjects in Suir were Irish, English, mathematics, history, geography, science, French, art, music, CSPE, choral singing, computer science, physical education and religious education. Other subjects provided by Suir were German, home economics, business studies, technology, art, and RSE. Just Irish, English and mathematics were provided at Foundation level.

The Boys' Schools

Liffey

Liffey is a single-sex boys' school located in a city. It is a free-scheme, designated-disadvantaged school. The principal claimed that a major objective of the school was to encourage parents to take an active part in school life. There was a high drop-out rate traditionally in Liffey. However, the principal highlighted a new plan for improving performance, encouraging students to attend third level education, and a move away from an 'obsession' with monitoring student behaviour.

Most students in Liffey were from the immediate vicinity of the school and all students in second year in Liffey were from working-class backgrounds. The class we observed in Liffey was a top stream (Table 3.1). More than three quarters (76 per cent) of the boys in the class were from working-class backgrounds.

Liffey ranked fifth among the ten schools on the TIMSS-related test with a mean score of 24.4 out of a possible 40 (Table 3.5). Just one of the twenty-three boys sitting the test in this class achieved a grade E or lower; thirteen of the boys attained a grade C or higher, two of which attained a grade A.

The students in Liffey had also completed their Junior Certificate during the course of the study. While most of the top-stream group (71 per cent) expected to take the higher mathematics paper in the Junior Certificate, just 17 per cent actually took this paper in the examination in 2000. While only 4 per cent of the class reported that they would take the Foundation level paper, 12 per cent of the class were examined on this course. The remainder of the class group, 70 per cent, took mathematics at Ordinary level, despite just one quarter of the class reporting that they would do so (Table A3.1).

Of the three people sitting the Higher paper, one got an E and the remaining two got either a grade C or D. Sixteen students in the class sat

the Ordinary paper in mathematics; one of these got an E, four attained a grade D while the remainder were awarded either a grade C (eight students) or B (three students). Of the three boys taking the Foundation paper, just one attained a grade B and two a grade C, while one student had left the school prior to the Junior Certificate exam.

The school used a streaming policy and students were streamed from the moment they entered first year. The core subjects in Liffey were Irish, English, mathematics, history, geography, woodwork, CSPE, PE, RE and RSE. Other subjects provided were science, French, home economics, business studies, art and computers. Foundation level was taught in Irish, English and mathematics in this school.

All of the boys in this class were taking at least one modern language and the vast majority (97 per cent) were studying an arts and humanities subject (art, craft, design or music). Just 4 per cent of the class were taking science, none of whom were studying it at Higher level. Just under one third (31 per cent) were taking either metal technology/metalwork/technical graphics, while home economics was not on offer in Liffey (Table A3.3).

Lee

Lee is a single-sex boys', fee-paying school located in a city. The school is owned and managed by a Roman Catholic religious order. The educational philosophy focuses on the development of the whole person and students are encouraged to work in the service of others. There is also a strong commitment to academic excellence.

All of the second year students in Lee were from middle-class backgrounds, with almost one third from upper middle-class backgrounds. Almost three quarters of the class we observed were from upper-middle class backgrounds.

The mean score on the TIMSS-related test for the boys in Lee was the fourth highest among the schools (25.6 out of a possible 40). Ten of the twenty-six boys sitting the test were awarded a grade D. Just three of the class attained a grade A, while the remaining thirteen boys received either a grade B or grade C (Table 3.5). The summer test results for the class showed that seven boys were awarded an E or lower, six students got grade D, four attained a grade A and the remaining nine got either grades B or C.

All of the boys expected to take the Higher level paper in the Junior Certificate mathematics examination (Table A3.1). All of the boys were taking at least one modern language subject and were studying science; 96 per cent were taking Higher level science. Over half of the class were studying an arts and humanities subject and the majority (92 per cent) were

taking either metal technology, metalwork or technical graphics (Table A3.3).

Lee employs a mixed system of grouping throughout the Junior Cycle. The core subjects in the school were Irish, English, mathematics, history, geography, science, French, music, Latin, PE, RE, RSE, and CSPE. Other subjects provided were German, art and Greek. All subjects were taught at Higher level only.

The Coeducational Schools

Lagan

Lagan is a coeducational secondary school located in a small town. It is a free-scheme school. The educational philosophy of the school centres on the development of the individual, in particular, focusing on relationships, respect and instilling a sense of responsibility in individual students. Lagan was originally a girls' school and became coeducational during the 1980s.

The social class intake is mixed in Lagan with 65 per cent of second year students from middle-class backgrounds. The class we observed was a top-stream group and of the twenty-nine students in the class, almost two thirds were from middle-class backgrounds.

The class in Lagan achieved a mean TIMSS-related score of 28.5 (out of a possible 40) which was the second highest of the ten schools. Just one of the twenty-five students sitting the test was awarded a grade E or lower, two students attained a grade D and the remaining twenty-two attained a grade C or higher, four of which were awarded a grade A (Table 3.5).

Almost all the class (97 per cent) expected to take the Higher level mathematics paper in the Junior Certificate Examination: all of the girls in the class and 93 per cent of the boys felt they would take the Higher level. Nobody expected to take Foundation level mathematics and 7 per cent of the girls and 3 per cent of boys expected to take mathematics at Ordinary level (Table A3.1).

All of the class in Lagan were taking at least one modern language and all were studying science. Almost half of those taking science were studying the subject at the Higher level. Looking at this in gender terms, almost two thirds (65 per cent) of females and just under one third (29 per cent) of boys were studying science at Higher level. Almost two thirds of the class were taking either art, craft and design or music, which accounted for 82 per cent of girls and 43 per cent of boys. Looking at the practical subjects in Lagan, almost one third of the class were taking home economics – 47 per cent of the girls in the class and just 14 per cent of the boys. Just under one third were taking metal technology/metalwork/-

technical graphics, and this included half of the boys and just 11 per cent of the girls (Table A3.3).

The school employs a banding system for the first three years of the Junior Cycle. The core subjects in Lagan were Irish, English, mathematics, history, geography, science, French, German, CSPE, RE, RSE and PE. Other subjects provided in Lagan were woodwork, technical graphics, art and music. Foundation level is taught in Irish and mathematics only.

Errigal

Errigal is a free-scheme coeducational, community school. It is a large school and is situated in a small town. Errigal was built as a community school arising from the amalgamation of three schools. The school claimed its principal objective was to improve students educationally, socially and morally. There is also a strong emphasis on religious education. In addition, the school stressed the importance of developing mutual respect among students, and between students and staff. It also emphasised the importance of developing the potential of each individual.

The majority of the second year students were from working-class backgrounds, with 25 per cent from lower middle-class and 10 per cent from middle-class backgrounds. The observed class in Errigal was a middle-stream group. Of the twenty-five students in the class, 86 per cent were from working-class backgrounds (Table 3.4).

The mean score achieved by the class on the TIMSS-related test was 18.1 (out of a possible 40), which was the fourth lowest score among the ten schools (Table 3.5). Ten of the twenty-seven students sitting the test got grade E or lower and the remainder achieved either grade C or grade D.

All of the boys and just 65 per cent of the girls expected to take Higher level mathematics for the Junior Certificate Examination, accounting for three quarters of the whole class. The rest of the girls in the class reported that they would take Ordinary level mathematics. Nobody in the class said they would take the Foundation level paper (Table A3.1).

All of the girls and 78 per cent of the boys were studying at least one modern language. All of the class were taking science: two thirds of the girls in the class, and all of the boys were taking this subject at the Higher level. Turning to practical subjects, 80 per cent of the girls were taking home economics, while none of the boys had opted for this subject. On the other hand, all of the boys and just 25 per cent of the girls were taking metal technology, metalwork or technical graphics (Table A3.3).

Errigal employs a banding system to group students for certain subjects up to the Junior Certificate year. The core subjects in the school were Irish, English, mathematics, science, CSPE, RE and PE. Other subjects included history, geography, French, German, home economics, business

studies, metalwork, woodwork, technical graphics, art and music. Irish, English and mathematics were taught at Foundation as well as Higher and Ordinary level.

Mourne

Mourne is a coeducational vocational community college, situated in a city and is designated-disadvantaged. The philosophy of Mourne is strongly influenced by the location of the school, which is in an extremely disadvantaged area. One of the main objectives of the school (as stated by the principal) is 'to expose children to education for as long as they can hold them'. A core element in their philosophy was to ensure that the staff responded to the needs of the children and families in the area; the principal hoped the school would generally raise expectations regarding education in the area.

All of the second year students were from working-class backgrounds, with almost 30 per cent primarily dependent on social welfare. The observed class was a bottom stream and almost all of the eighteen students were from working-class backgrounds (Table 3.4).

This class scored a below average score of 13.3 out of a possible 40 in the TIMSS-related mathematics test. This was the second lowest score among our case-study schools. Two thirds of the eighteen students sitting the test got a grade E or lower, while the remainder attained a grade D (Table 3.5).

Mourne was one of our four schools to have completed the Junior Certificate Examination during the course of the study. When students' expectations, regarding the level of mathematics they would take, were compared with the actual level taken, there was a wide disparity. While no students expected to take Foundation level, 26 per cent actually took this paper (30 per cent of the girls and 22 per cent of the boys). Also, 26 per cent of the class (33 per cent of the girls and 20 per cent of the boys) expected to take the Higher level paper, but none did. Expectations for the Ordinary level paper appeared more realistic with 70 per cent of the girls and 78 per cent of boys actually taking this paper (Table A3.1).

Less than one third of the students in the class were studying a modern language: just 22 per cent of the girls and 40 per cent of the boys. All of the students were taking science: over half of the girls and less than one third of the boys were studying the subject at Higher level, accounting for 42 per cent of the whole class. With regard to practical subjects, one third of the girls and just 10 per cent of the boys were taking home economics, while one third of the girls and almost three quarters of the boys were studying metal technology, metalwork or technical graphics (Table A3.3).

A system of banding was used in Mourne in the Junior Certificate year. The core subjects were Irish, English, mathematics, history, geography, science, French, CSPE, PE, RE and RSE. Other subjects on offer in Mourne were home economics, business studies, materials technology (metal/woodwork), technical graphics, art and music. Irish, English, mathematics and science were taught at Foundation as well as Higher and Ordinary level.

Blackstairs

Blackstairs is a coeducational vocational community college situated in a rural area. It is a designated-disadvantaged school. There was no written or stated philosophy articulated for the school, or no prospectus.

The majority of the second year students were from working-class backgrounds. The class we observed in Blackstairs was a top stream. Of the thirty-two students, two thirds were from working-class backgrounds (Table 3.4).

The average mean score on the TIMSS-related test was 27.2 (out of a possible 40), which was the third highest among the ten schools (Table 3.5). All of the girls and 94 per cent of the boys expected to take the Higher level mathematics paper for the Junior Certificate. The remainder of the boys (6 per cent) expected to take Ordinary level mathematics. None of the class reported that they would take mathematics at Foundation level (Table A3.1).

All of the girls and just over half of the boys were taking at least one modern language (accounting for 77 per cent of the class). All of the students were taking science: 42 per cent of the boys and of the girls were studying the subject at Higher level. A small minority were taking art or music. Three quarters of the girls and just 6 per cent of the boys were studying home economics, while 88 per cent of boys and just 12 per cent of girls were taking metal technology, metalwork or technical graphics (Table A3.3).

Blackstairs used streaming to group students in the second and third years of the Junior Cycle. The core subjects in the school were Irish, English, mathematics, history, geography and science. Other subjects provided were French, German, home economics, business studies, metalwork, woodwork, technical graphics, technology, art, music, CSPE, PE, RE, RSE and computer studies. Irish, English and mathematics were taught at all three levels.

Nephin

Nephin is a coeducational vocational community college, free-scheme school located in a city.

The social class intake is varied with approximately 40 per cent of second year students from working-class backgrounds, 40 per cent from lower middle-class backgrounds and roughly 10 per cent from middle-class backgrounds. The class we observed was a bottom stream group of students, almost two thirds of whom were from working-class backgrounds (Table 3.4).

In the TIMSS-related test, no student got an A or B grade in Nephin, 10 per cent got a C grade, 70 per cent got a D and 20 per cent got an E or lower grade. The average mean score on the TIMSS-related test was 16.5 out of a possible 40 (Table 3.5).

Nephin was one of the schools to have completed their Junior Certificate Examination. Comparing expected level of mathematics to be taken with actual level taken, we can see that all of the students expected to take the Ordinary level paper. In the examination, just one third of the girls and 57 per cent of the boys actually took this paper. While nobody expected to take the Foundation level paper, two thirds of the girls and 43 per cent of the boys actually sat this paper in the exam. None of the students either expected to sit, nor eventually sat, the Higher level paper (Table A3.1).

All of the girls in the class and just 14 per cent of the boys were taking a modern language. All of the class were studying science, but just one third of the girls and almost three quarters of the boys were taking science at the Higher level. Turning to the practical subjects, two thirds of the girls and 27 per cent of the boys were taking home economics, while just one third of the girls and 86 per cent of boys were taking metal technology, metalwork or technical graphics (Table A3.3).

Nephin employs a banding system of student allocation in the Junior Certificate year. The core subjects in the school were Irish, English, mathematics, history, geography, science, PE, RE and CSPE. Other subjects provided were French, home economics, business studies, metalwork, technical graphics and art. Irish, English and mathematics were taught at all three levels.

Conclusion

The case studies undertaken to analyse the teaching and learning of mathematics were intensive and wide ranging. Not only were twenty mathematics classes videotaped and analysed in depth, the students observed in these classes were subsequently surveyed and interviewed about their learning experience.

To complement the mathematics study, a small video study of English classes, with as many of the same students as possible, was completed in five of the ten case study schools.

Each of the mathematics teachers observed, and a small sample of observed students' parents, were interviewed about their perspectives on the teaching and learning of mathematics. A triangulated view of the research problem was obtained by dialoguing with all the main parties to the learning process, namely students, teachers and parents.

The study employed a co-operative mode of research inquiry with teachers in particular, and to a lesser degree with students. In so far as time and resources permitted, we operated a dialogue with the case study teachers as to the authenticity of our interpretations of their classroom teaching.

The account of our findings from the case studies is presented in Chapters 4 to 11.

Table A3.1: Case-study schools that had completed the Junior Certificate: actual level of mathematics taken (in parentheses) compared with students' expectation regarding participation.*

School	Mathematics								
	Foundation %			Ordinary %			Higher %		
	F	M	T	F	M	T	F	M	T
Barrow (SSG F)	0	–	0	0	–	0	100	–	100
Nore (SSG Fr)	4.2	–	4.2	37.5	–	37.5	58.3	–	58.3
Suir (SSG Fr D)	15.4	–	15.4	69.2	–	69.2	15.4	–	15.4
	(30.8)		(30.8)	(69.2)		(69.2)	(0)		(0)
Liffey (SSB Fr D)	–	4.2	4.2	–	25.0	25.0	–	70.8	70.8
		(12.2)	(12.2)		(70.1)	(70.1)		(16.7)	(16.7)
Lee (SSB F)	–	0	0	–	0	0	–	100.0	100.0
Total SS			3.6			21.4			75.0
Lagan (SC Fr)	0	0	0	0	7.1	3.2	100	92.9	96.8
Errigal (CS Fr)	0	0	0	35.0	0	24.1	65.0	100	75.9
Mourne (VCC Fr D)	0	0	0	56.6	80.0	68.4	33.4	20.0	26.3
	(30.0)	(22.2)	(26.3)	(70.0)	(77.8)	(73.7)	(0)	(0)	(0)
Blackstairs (VCC Fr D)	0	0	0	0	5.9	2.9	100	94.1	97.1
Nephin (VCC Fr)	0	0	0	100	100	100	0	0	0
	(66.7)	(43.0)	(50.0)	(33.3)	(57.1)	(50.0)	(0)	(0)	(0)
Total COED			0			26.2			73.8

* Junior Certificate results were only available for four of the ten case study schools.

Key: SSG F: Secondary girls', fee-paying; SSG Fr: Secondary girls', free scheme; SSG Fr D: Secondary girls', free scheme designated disadvantaged; SSB Fr D: Secondary boys', free scheme designated disadvantaged; SSB F: Secondary boys', fee paying; SC Fr: Secondary coed, free scheme; CS Fr: Community school, free scheme; VCC Fr D: Vocational/Community college, free scheme designated disadvantaged; VCC Fr: Vocational/Community college, free scheme (where free-scheme represents non fee-paying status).

Table A3.2 Case-study schools: level of mathematics taken in Junior Certificate Examination by the entire year cohort in the school, 1996

School	Foundation %			Ordinary %			Higher %		
	F	M	T	F	M	T	F	M	T
Barrow (SSG F)	0	–	0	30	–	30	70	–	70
Nore (SSG Fr)	2	–	2	44	–	44	54	–	54
Suir (SSG Fr D)	6	–	6	50	–	50	44	–	44
Liffey (SSB Fr D)	–	33	33	–	67	67	–		0
Lee (SSB F)	–		0	–	3	3	–	97	97
Lagan (SC Fr)	6	9	8	51	59	55	43	32	37
Errigal (CS Fr)	12	24	19	55	70	63	33	6	18
Mourne (VCC Fr D)	50	60	56	50	35	41	0	5	3
Blackstairs (VCC Fr D)	7	24	17	61	68	64	32	8	19
Nephin (VCC Fr)	7	14	12	74	66	69	19	20	19

Table A3.3: Case-study schools: school types and gender differences in subject choice for the Junior Certificate Examination

	% studying at least 1 modern language (French, German or Spanish)			% studying at least 1 arts and humanities subject (art, craft and design or music)			% studying home economics			% studying at least 1 practical subject (metal technology, metalwork or technical graphics)			% studying science at any level			% studying higher level science			% Gender distribution (coeducational schools)	
	F	M	T	F	M	T	F	M	T	F	M	T	F	M	T	F	M	T	F	M
Barrow (SSG F)	100	–	100	26.9	–	26.9	0	–	0	0	–	0	100	–	100	76.9	–	76.9		
Nore (SSG Fr)	95.8	–	95.8	60.9	–	60.9	58.3	–	58.3	–	–	–	75.0	–	75.0	37.5	–	37.5		
Suir (SSG Fr D)	100	–	100	61.5	–	61.5	46.2	–	46.2	30.8	–	30.8	100	–	100	38.5	–	38.5		
Liffey (SSB Fr D)	–	100	100	–	96.5	96.5	–	–	–	–	30.8	30.8	–	4.0	4.0	–	–	–		
Lee (SSB F)	–	100	100	–	57.7	57.7	–	–	–	–	92.0	92.0	–	100	100	–	96.2	96.2		
Lagan (SC Fr)	100	100	100	82.4	42.9	64.5	47.1	14.3	32.3	11.8	50.0	29.0	100	100	100	64.7	28.6	48.4	54	46
Errigal (CS Fr)	100	77.8	93.1	85.0	44.4	75.4	80.0	0	55.2	25.0	100	48.3	100	100	100	65.0	66.7	65.5	47	53
Mourne (VCC Fr D)	22.2	40.0	31.6	55.6	10.0	31.6	33.3	10.0	21.1	33.3	70.0	52.6	100	100	100	55.6	30.0	42.1	50	50
Blackstairs (VCC Fr D)	100	52.9	76.5	11.8	5.9	8.8	76.5	5.9	41.2	11.8	88.2	50.0	100	100	100	41.2	41.2	41.2	44	56
Nephin (VCC Fr)	100	14.3	40.0	66.7	57.1	60.0	66.7	28.6	40.0	33.3	85.7	70.0	100	100	100	33.3	71.4	60.0	43	57
TOTAL	93.8	79.6	87.3	53.9	50.9	52.5	48.1	5.6	28.7	13.3	62.0	35.6	95.3	77.8	87.3	55.0	46.3	51.1	51.5	49.5

Notes

[1] Coeducational secondary schools are very similar to single sex secondary schools in terms of social class profile, although the boys in such schools are somewhat more middle class in background than girls . Girls in vocational schools and community colleges are also slightly less likely to be middle class than their male peers, and more likely to be working class, while both gender groups in the community and comprehensive sectors have similar class profiles (Table 2.2). What this data suggests therefore is that girls in coeducational schools are somewhat more likely to be working class than boys.

[2] While we knew the gender profile of schools and their official status in terms of school type, we had no way of measuring the social class profile of students taking the Junior Certificate courses in 1998 and 1999 (the years we were collecting the data). To address this problem we used designated disadvantaged status and fee-paying status as proxy measures of social class. The analysis of both the 1994 data provided by the ESRI, and information available from the Department of Education and Science regarding the classification of schools, indicated clearly that schools designated disadvantaged had high proportions of students from working class backgrounds, while fee-paying schools were largely catering for upper middle class students. Non-feepaying secondary schools, and community and comprehensive schools occupied an interim position between the fee-paying and disadvantaged sectors, as did non-disadvantaged vocational schools and community colleges although the latter had a higher working class intake than the former.

[3] Given the wide range of research instruments used it was not possible to incorporate them into the present text. They are available on the Equality Studies website at www.ucd.ie/~esc/.

[4] So-called *Mixed-Ability Grouping* refers to the practice of allocating students to classes across all subjects so that there is a range of different attainment levels in all classes. *Banding* refers to the practice of dividing students into broad 'ability' bands with two or three mixed classes in each. It is a form of streaming in larger schools where numbers allow schools to stratify students into top, middle and lower bands. Students are mixed within each band, but not between bands. Although banding is formally a less stratified system than streaming, in our study we found that some teachers used the terms interchangeably, often referring to the bottom or top band as the bottom or top stream respectively. *Streaming* is a method of assigning students hierarchically to classes on some overall assessment of general attainment. The streamed classes are used as the teaching units for all subjects. *Setting* is a practice whereby students are grouped into streams or tracks according to their attainment in a given subject; at Junior level it is quite common for schools to set students for mathematics and Irish, and sometimes English. Occasionally throughout the text we refer to the different groups (whether they are called bands, sets or streams) as *tracks* as it is a relatively generic and neutral word and is inclusive of different types of grouping.

[5] We also undertook interviews with each of the school principals about the school's educational policies and philosophies.

6 The mathematics teachers who participated were very experienced with most (seven of the ten) having twenty or more years of service, while all but one had taught the subject at Leaving Certificate level. In addition, all the teachers had a Higher Diploma in Education, two had master's degrees, while three more had other postgraduate educational qualifications. Eight of the teachers had studied mathematics for their basic degree, while two had read mathematics only in the first year of their degree. Six of the teachers had done mathematics as part of their science degree, while three had taken it as a subject in an arts degree; there was one person who studied mathematics in a commerce degree. Four of the teachers were men and six were women; three were under forty years of age, four were between forty and fifty, while three others were over fifty years of age.

7 Unfortunately Junior Certificate results were only available for four of the ten case study classes. This happened because of the timing of the study. The classes that we observed in the early part of the study had completed their Junior Certificate Examination and had obtained their results by the end of the data collection period, thereby enabling us to record their results in time for analysis. The Junior Certificate Examination results of the classes we videotaped later in the study were not available in time for us to analyse them. We did ask the schools to forward the results after the study was completed, but this did not happen for a variety of reasons, including pressures on teachers' and principals' time and changes of staff.