SCHOOL DIFFERENCES IN PHYSICS EXAMINATIONS FOR GRAMMAR TYPE SCHOOLS IN MALTA

SUZANNE GATT

Abstract – *This paper studies the school differences in performance in Physics in the last two years of compulsory secondary education in Malta. Five grammar type schools are included in the study. Students' performance in their fourth year annual Physics examination and the Secondary Education Certificate (SEC) School leaving examination one year later are considered. The longitudinal study shows that although there is a correlation between the fourth form annual examination and the papers for SEC Physics up to a value of 0.68, a shift in performance from one year to another was observed in certain schools, especially in one girls' school which registered a drastic decrease in performance from one year to the next. It is argued that these school differences, which may also reflect gender differences since schools are single sex, reflect the still prevailing attitude in Malta for the male to be the family breadwinner. This seems to be the case mainly in families from a lower socio-economic level, as in the catchment area of the girls' school in this study. The implications of differences in performance within and across schools is then discussed.*

Introduction

Malta is a country with no natural resources. Besides the sun and sea, its only resources are its own inhabitants. As a country it therefore strives to have the best possible human resources such that it can sustain its economic development. Consequently, education is highly valued with a large proportion of the country's budget invested in it. In recognition of the need for the provision of a highly trained and efficient workforce, science education plays an important role since it ensures the supply of a number of scientists in the form of researchers, engineers etc to the local industry. It is therefore essential that good science education is provided in the country.

During the last few years, Malta has seen the number of students sitting for their school leaving examination in Physics increase steadily from about 1000 in 1970 (Bonnici, 1994) to well over 3000 in 1999. The major increase took place in 1979 when it was announced that physics would be compulsory for entry into the academic stream of post-secondary education as from 1982. Although as from 1997 any science rather than physics is compulsory for entry into post-secondary

education, the number of students sitting for the Secondary Education Certificate (SEC) physics has remained high.

The percentage of students obtaining their SEC Physics, however still makes up a small percentage of the total cohort in any year. In 1996, out of 2494 candidates, 1261 boys and 1233 girls sat for the SEC Physics (Abdilla *et al*., 1998). The percentage rate was 55%. When one takes the total student cohort in that year, these amount to 5200. The percentage of students who obtained their SEC Physics then amounts to about 25% of the total student population in that year.

Examiners' reports (MATSEC, 1997) point out that the lack of understanding of concepts was reflected in the students' responses. Many responses, rather than indicating understanding, reflect students' tendency to resort to rote learning. Problems of understanding in Physics were also identified in a number of the studies carried out by a number of researchers (Camilleri, 1996; Mangion, 1997).

This research focuses on students' performance in Physics at secondary school and the subsequent performance in SEC Physics one year later by the same students. Students attending Junior Lyceum schools which are grammar type schools are considered in the study. It aims to identify differences in performance across gender and schools. As a longitudinal study, it also involves a comparison of students' performance in the last two years of their secondary school with the intention to try and identify differences that may arise in performance both between and within schools over this time interval.

Context

Compulsory education in Malta starts at the age of 5 with primary school where children spend the following five years. At the end of primary education, most students sit for a competitive national eleven plus examination. Regardless of success in this exam, all students proceed to secondary education which lasts up to the age of 16. Students who pass the eleven plus examination attend grammar type schools, called Junior Lyceum schools. Only about half of the students sitting for this examination pass. The other half who 'do not make the grade' attend area secondary schools. All students at secondary level, regardless of which school they attend, follow more or less the same curriculum.

All students attending government schools study Physics. At the end of secondary education, students sit for the National school leaving examinations, the Secondary Education Certificate (SEC) run by the Matriculation Examination Board (MATSEC) of the University of Malta. Grades given range from 1-7, 1 being the highest and 7 the lowest.

Physics SEC consists of three components. Two components consist of a written paper while the third part involves course work. Paper 1 consists of ten compulsory short questions and is done by all candidates. Two versions (A and B) exist for Paper 2. Paper 2A is the difficult version and allows grades from 1-4 during the years for which results are considered. Paper 2B is the easier version and allows grades from 4-7 to be obtained. Both versions consist of five compulsory long questions. The coursework component amounts to 15 % of the total grade and involves presenting the write up of fifteen Physics experiments carried out at school.

Education in Malta is provided by a number of different sources. These involve government, Church and private or as know Independent schools. About 30% of students attend Church schools. Private schools cater for a much smaller percentage of the student cohort. A particular feature of Church schools relevant to this research is entry, done through a competitive eleven plus common entrance examination in the case of boys. This is due to a number of boys' Church schools catering only for secondary education. The situation is different in the case of girls where most schools cater for both primary and secondary and entrance criteria do not involve achievement.

All government and Church secondary schools are single-sex. Only the Independent schools are co-educational.

Theoretical background

Students' examination performance has been an area of research interest to Maltese educators in a number of subjects at both primary and secondary level secondary. A number of studies were conducted on students' performance in Mathematics (Craus, 1993; Fenech and Pisani, 1998; Grima *et al*.,1995; Schembri, 1997; Vella, 1998); Enlgish (Baldacchino, 1998; Micallef and Galea, 1991); Maltese (Borg, 1983) and also Physics (Abdilla *et al*., 1998; Apps, 1989; Gatt 2002; Ventura and Murphy 1997,1998).

Studies in achievement in Physics have been carried out both for students during their secondary education and for performance at SEC level. Apps (1989) studied the performance of fourth form Junior Lyceum students in their Physics annual examination. She reports that girls in such schools performed significantly better than boys in their fourth form in the same type of school. Borg (1994) reports a similar trend, extending the research both across years, taking levels from forms 1 to four and across subjects, including English, Mathematics and Maltese as subjects. Borg (1994) argues that the girls' better performance can be explained in terms of a creaming off effect which occurs due to the common entrance examination for Church schools which takes place for boys. The placements in

Church schools occur due to order of merit, and so it is the best achievers who are offered a place at such schools. This would consequently result in most of the best students being taken up by Church schools.

Ventura and Murphy (1997) studied students performance at SEC level. They consider SEC performance over a number of years in a number of subjects. They report that statistical significance was obtained in 1994, 1995 and 1996 in favour of girls for Maltese, the national language. The same trend was obtained in 1995 and 1996 for English. An opposite trend in favour of boys was obtained for mathematics as would be expected. Physics proved to be the most interesting subject with no statistical significance obtained except in one particular year, 1994 where girls' performance was found to be better than that of boys.

Gatt (2002) considered SEC Physics results for the years 1997 and 1998 and similarly reports no statistical difference in 1997 but in favour of girls in 1998. In a further analysis of the different components of the examination Gatt (2002) shows that although no or little difference is found when one considers the overall grade, there actually exist gender differences in the different components of the examination. So boys were found to perform significantly better than girls in the written paper 1 of the examination in 1997. Girls, on the other hand, were found to perform better in the coursework component. The latter difference was found to have an effect size of 0.3 which would explain why although coursework carries only 15% of the overall grade, this difference was enough to make girls either perform as good or better than boys in Physics.

Ventura and Murphy (1998) considered school differences showing that both a gender and school type difference is present but no interaction between them. They point out that private schools (by private they refer to Church schools) outperform government schools for both boys and girls across many subjects. In fact the list of subjects includes Maltese, English, Mathematics, Physics, Italian and Religious Knowledge. However, in this analysis, Ventura and Murphy (1998) have combined together results of Junior Lyceum and Area Secondary schools. It is therefore not possible to apply such a difference to Junior Lyceum students since Area secondary students tend to be weaker and thus have lower academic achievement.

Gatt (2002), has considered performance in SEC Physics 1997 and 1998 and compared performance between Junior Lyceum students and Church school students. She has also looked at differences in performance in the different components of the examination. The study shows that Church school students outperform Junior Lyceum students with a p-value <0.001 and an effect size of 0.49 in Paper 1, and 0.32 in Paper 2A. An opposite trend, however, is obtained in the coursework component, the effect size being 0.37. The latter difference is easily explained since government schools are better equipped with laboratories and students perform much more than the minimum of fifteen experiments

required. This enables students to present their best fifteen experiments, thus allowing students to obtain a high proportion of the marks allotted to coursework. Church schools, on the other hand, have fewer facilities and perform fewer experiments. Overall difference, however, still remains in favour of students attending Church schools, the effect size being 0.32 for the overall grade obtained.

Aim of research

As already stated in the introduction, this study looks at performance in Physics by Junior Lyceum students. It is different from the studies reviewed in that it is a longitudinal study and traces the performance of the same students over the last two years of their secondary education. So it will be able both the compare the students' performance across gender to test whether results are consistent with findings obtained so far. It will also be possible to compare school performance from one year to another to see if shifts in level of achievement between one school and another occur.

The research questions can therefore be listed to be:

- Is there a difference in performance between boys and girls attending Junior Lyceum in the fourth form annual examination?
- Does a school difference in performance exist in performance of fourth form Physics annual examination?
- Do gender and school differences occur one year later in SEC Physics?
- If differences are obtained, do they reflect the same trends that were identified for the annual examination one year earlier?
- Is there a correlation between examination performance at Form four and performance at SEC one year later, and if so, what is the correlation with the different components of the examination?

Methodology

This section will include details of the measuring instruments used, how the data was obtained and the way the data was analysed.

Instruments used

The measuring instruments were the students' annual examination results at the end of form IV and SEC Physics results of the same students one year later.

Students in the same form in all Junior Lyceum students sit for a common end of year examination for each subject. The examination papers are prepared at the test construction unit within the central examination department. The paper is designed such that students have to answer all questions. All areas covered during the scholastic year are examined. The paper also has the same format as that used in the SEC. Teachers at the respective schools correct the students' papers. Moderation of papers is done regularly. Results are expressed as a value out of 100. Results for the examination of form IV students in June 1996 were obtained.

A team of examiners sets SEC Physics papers. All questions in both papers are compulsory ensuring that assessment covers all areas of the syllabus. SEC results are compiled from the students' performance in the different components of the examination. For the purpose of this study, the separate performance in the different components was obtained together with the overall grade. SEC results for the 1997 SEC examination were considered.

Data collection

The annual examination results were collected from the respective schools' records in September 1996. All schools were helpful, providing photocopies of the results to ease work. The 1997 SEC Physics results were provided on an Excel program and students' names supplied such that it would be possible to compare performance by the same students in their annual examination.

Sample

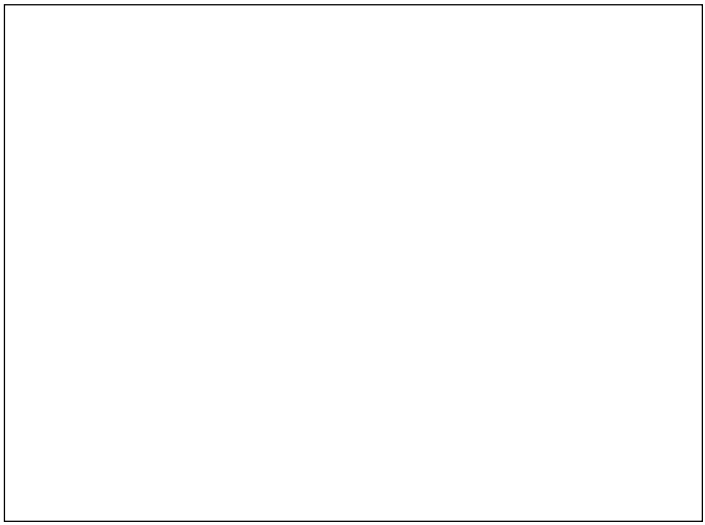
The sample in the study included all Form IV students in Five Junior Lyceum schools in Malta. All the students in the particular schools were included rather than a representative sample since the schools streamed students according to ability. It was, therefore, difficult to obtain a representative sample of the Junior Lyceum students. Taking the whole school population solved the sampling problem.

A total of five Junior Lyceum schools, 3 boys' and 2 girls' schools were chosen out of a total of eighth school in Malta. Since schools have different catchment areas, care was taken to choose the schools in such a way as to ensure uniform demographic distribution. Three boys' schools were chosen since boys' schools tend to be smaller in size than those for girls. An additional school will therefore ensure a better balance between sexes. A total of 870 students were included in the sample, 396 boys and 474 girls, covering all the classes in the chosen schools.

Results

Results were available for 837 of the student cohort. This was due to a number of students being absent on the day of the examination. The distribution of marks for the form IV annual examination in Physics shows a range from a minimum of 3 to a maximum of 99. The mean was 51.24 with a standard deviation of 21.07. A measure of Skewness was 0.063 showing that a nearly normal distribution obtained. The large standard deviation could have been obtained due to a degree of discriminating power in the examination papers set.

FIGURE 1: Distribution of Marks for From IV Junior Lyceum students Physics annual examination in 1996.



Gender and examination performance in form IV Physics Annual Examination

A t-test carried out across gender was found to be statistically significant with a t-value of 10.33 and p-value of 0.001. Table 2 below shows that the effect size is significant at 0.47 with girls performing better than boys by a percentage difference of nearly 10%. These results are similar to those found by Borg (1994, 1996) and Apps(1989) who both reported significantly better examination performance by form IV girls over boys in the same type of schools.

TABLE 1: Examination results for Form IV Annual examination across Gender

Subject	Mean		Mean difference	S.D.	Effect size
	Boys	Girls			
Physics	45.83	55.68	9.85	21.07	0.47

One cannot, however, conclude that Maltese girls are generally better academic achievers than boys. As already highlighted, the situation in Malta is that an additional 11+ examination for entry into boys' Church schools exists. The number of vacancies at secondary level for October 2001 was only for boys and amounted to 473 students in 9 schools (The Sunday Times, 2001). Since entrance is through a common exam, selection via performance is used, leading to creaming off of the best elements into these schools, leaving Junior Lyceum schools with less able students (Borg, 1994). This is not the case for girls where most Church schools start off from nursery and lead up to secondary. It can also be noted that the number of boys attending Church schools is greater, with 2236 for boys, compared with 617 in the case of girls (Government of Malta, 1995).

The argument in favour of creaming off is further substantiated by the analysis carried out Ventura and Murphy (1997) who reported that in the SEC examinations the only statistical significance was obtained in 1994 and it was in favour of girls. Abdilla et al. (1998) also show that both boys and girls in Church schools outperform students from Junior Lyceums. However, the difference is somewhat greater in the case of boys.

TABLE 2: SEC Physics Paper 1 Performance May 1996 Session

School type	***Girls***		***Boys***		***P-value of t-test***
	No.	Mean	No.	Mean	
Private (church)Schools	383	55.58	649	53.68	<0.001
Junior Lyceum Schools	628	47.31	340	44.13	<0.001

(Abdilla *et al.* 1998)

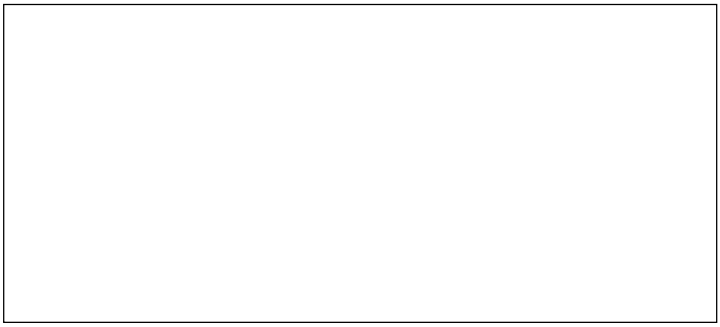
Ventura and Murphy (1998) also show that "private schools outperform government schools for both boys and girls. This indicates that there appears to be some creaming off for both boys and girls but does not indicate the extent to which this takes place. If one considers the number of boys and girls in Church

schools the number of girls is much smaller, indicating that less girls are absorbed by the private schools.

Schools differences for form IV Physics Annual Examination

A one-way ANOVA carried out across schools was found to be statistically significant with an F-value of 6.71 and a p-value <0.001. Schools 1-3 were boys' schools whereas schools 4 and 5 were girls' schools. The girls' schools have outperformed the boys schools throughout, reflecting the gender difference which was identified. However, differences across schools also emerge.

FIGURE 2: Distribution of marks for Physics Form IV Annual Examination across schools



School 4 was found to be the best performer in physics with school 5 following. School 1 is the weakest school from the boys' schools while schools 2 and 3 performed more or less at the same level. Whereas gender differences could be explained in terms of creaming off in terms of boys, school differences are more difficult to explain and no straightforward reason can as yet be put forward.

SEC physics results

Grades obtained by students have been awarded points from 0-7, with a zero for U, and then increasing from 1 up to maximum points of 7 as performance improves from grade 7 to the top grade 1. This method is similar to that adopted by Ventura and Murphy (1998). The actual marks obtained in Paper 1 of the exam are also considered. These marks should give a more accurate picture of differences in performance. Since two versions of SEC – Option A for the better

students with possible grades 1-4 and U (these students could have obtained a grade 5-7 had they chosen option B), and Option B for weaker students with range 4-7 and U (these candidates cannot obtain a grade 1-3, however well they do in their exam), differences in grades obtained may be due to choice of paper type opted for in Physics rather than in performance. Since Paper 1 is common for all students, this possible interference is eliminated.

Gender differences

A MANOVA carried out for Paper 1, Practical work and Grades as the dependent variable across gender as the independent variable gave a main effect. Papers 2A and 2B were not included due to the number of empty cells in each case.

TABLE 3: MANOVA results for Gender as the independent variable

Multivariate Tests	**Test**	**Value**	**df**	**Sig.**
Gender	Hotelling's Trace	3.726	3	0.037
Univariate				
Gender	Paper 1	0.148	1	0.700
	Practical	5.318	1	0.021
	Grades	1.326	1	0.250

The only gender difference present is that of girls over boys in practical work. Separate t-tests carried out for papers 2A and 2B across gender also do not give any statistical difference. A look at the means for every part shows a better performance by girls even though not statistically significant. The difference obtained for practical work is large enough amounting to an effect size of 0.5, which is significant, and to result in an overall effect. On the contrary, form 4 annual exams done by the same students one year before had shown a significantly higher performance by girls over boys. It appears that boys have caught up with girls in their last year of schooling. However, it may be that one of the schools fared much better or worse, affecting the overall result. This issue will be discussed further on when the separate schools are considered.

School differences

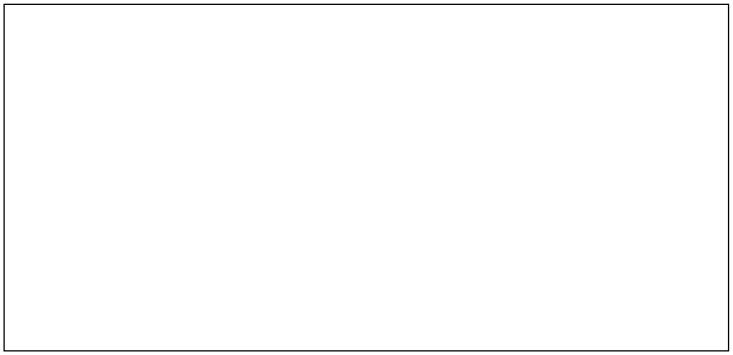
A MANOVA carried out with paper 1, practical and grades as the dependent variables across school as the independent variables gave a main effect.

TABLE 4: MANOVA results across Schools as independent variable

Multivariate Tests	Test	Value	Df	Sig.
Schools	Hotelling's Trace	34.622	15	<0.001
Univariate				
Schools	Paper 1	6.208	5	0.018
	Practical	2.763	5	<0.001
	Grades	4.601	3	<0.001

School differences are yet again present and can be identified both at coursework level and in the written exam. Separate ANOVAs carried out for Papers 2A and 2B across schools gave a main effect with F-values of 3.8 and p-value of 0.005 for Paper 2A but is not significant with a p-value of 0.082 for Paper 2B.

FIGURE 3: Distribution of marks and grades for SEC Physics of J.L. students

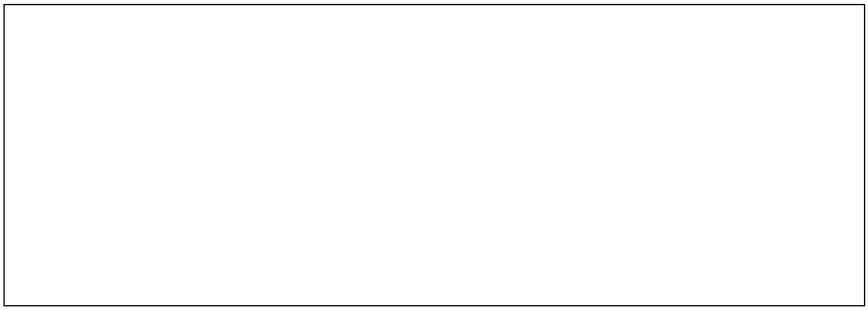


The plotted means show particular patterns. School 5 appears to have done poorly overall. This is unlike results obtained for form 4 annual exams where the performance of school 5 tended to be higher than that of boys. This poor performance is probably why no gender difference has been obtained. It appears that rather than boys catching up, it is school 5 that has done poorly. This phenomenon is difficult to explain. One possibility may be the students' catchment area. School 5 takes students from areas with a tendency for more working class backgrounds. Parents, therefore, in the case of girls, may not place as much

emphasis on education as for boys or as parents from middle class backgrounds. In view of this, either fewer invest in extra tuition or take less initiative to motivate their daughters in doing that extra effort when facing school leaving exams. In fact, in an informal interview with this school's head, she commented that on taking responsibility of the school, she had noticed that most of the girls' education ended with secondary education.

Another reason may be students' poor preparation for the examination. Students need to familiarize themselves with the type of questions set in the examination papers. Practice in tackling such questions is essential in helping students perform well. If, on the other hand, there is no such training, students will feel unprepared and so will be at a disadvantage, possibly affecting their overall grade.

FIGURE 4: Means for grades and Practical work across schools



Correlation between form IV Physics Annual Examination and SEC physics

Correlations were worked out between the annual examination results for Form IV and the various components of the SEC Physics examination.

TABLE 5: Correlations of form 4 annual exam with components of the Physics SEC 1997

Component	**Form 4 Annual Physics Exam**
Paper 1	0.678**
Paper 2A	0.566**
Paper 2B	0.617**
Practical	0.388**
Grades	0.551**

** Statistical significance < 0.01

The fourth form annual physics exam is quite a good predictor of SEC performance. Correlations with the written papers completed under examination conditions are quite high at about 0.6. Correlation is, however, less in the case of practical work. This is understandable since practical work is done under different conditions to those of an exam. The distribution of marks tends to be less and so there is limited discrimination between students of different ability.

Although it may be considered as obvious that a good student performing well in Physics, will predictably also do well the following year, a correlation of about 0.6 also shows that effort on behalf of the students and teachers can help to improve performance over a one-year interval.

Discussion

The study shows the presence of a degree of creaming off occurring for boys attending government Junior Lyceum secondary schools in comparison to those attending Church schools. This difference in performance can be easily explained in the case of the boys' schools. Since entry into the main boys' Church schools is through a highly competitive 11+ entrance examination in which only the best performers are successful, it is an effective way of attracting the best academic achievers.

Another possible reason may be the effect of the different pedagogies adopted by teachers in Church and Junior Lyceum schools together with the teachers' expectations. Mifsud (1994) describing a typical Church school, points out the high self esteem which such a school gives to its students. This sense of superiority promoted in students may result in better performance due to a self-fulfilling prophecy. Darmanin's (1991) study, in comparing Church and government schools, notes different pedagogies adopted in the different schools and which in turn also reflect teachers' expectations of the students' performance. Darmanin (1991a) also reports that both more boys and girls attending Church schools aspire to top managerial and professional occupations associated with service class A and Intermediate class B and C occupations than do their counterparts in government schools. She argues that even within a largely feminized sector, Church school girls are more likely to occupy higher positions than their peers in state schools.

It may have also been the case that more parents of a particular social class were keen to send their children to Church schools. In fact, Darmanin (1991) found that more class A, or professional parents sent their children to Church schools than class B or working class parents. Gewirtz, Ball and Bowe (1992) describe how in the United Kingdom those parents who work inside the system, like teachers and education administrators and which are all of a certain social

class, are particularly knowledgeable about the opportunities available for their children. They, therefore, are at an advantage and have a greater possibility of being successful in obtaining entry into the schools they choose than working class parents who often are not even aware of the possible options available. Gewirtz *et al*. (1992) also note that parents from a higher social class are even ready to send their children to schools distant from their home if they believe that their children would benefit from a better education. Working class parents, on the other hand, do not know how to exploit the market. Even when such parents were capable of achieving this, material resources or the level of the right sort of cultural capital may hinder achieving success in entry.

Such explanations give rise to the issue of social class and school choice, eventually leading to the probability of academic success. As Gewirtz *et al*. (1992) point out, 'rather than being part of a shift towards a 'classless society', choice as a mechanism of school allocation seems likely to re-emphasise and revitalize the divisions of social class in education' *(p.27).* Sultana (1991) also makes a similar point when discussing the relationship between social class and educational achievement in Malta. He argues that this division is evident from the education structures which exist in the local educational system. He lists the main criteria for school choice in favour for Church schools to be the parents' impression that such schools provide a higher standard of education, that they give students a better religious formation, and as a means of preventing their children from mixing with students from other social classes. He overwhelmingly concludes that 'in Malta as elsewhere, 'social class' – even when this is reduced to the nominal form of 'parental occupation' – affects one's educational achievement in our formal school system' (p.248).

Another main finding of this study is the change in boys' performance at SEC level compared to their performance in their fourth form annual exam during the previous year. The apparent difference in ability between boys and girls which emerged in the fourth form, disappeared in the SEC physics exam for the same students one year later. The better performance by girls noted in form four conforms to results obtained in other studies (Apps, 1989; Borg, 1994) which also report a better performance by Junior Lyceum girls. The question now focuses as to what happens to performance during the last year of secondary education. It was noted that one girls' school in the study did particularly badly in the SEC physics exam and that it could be the case that the girls' performance was dragged down rather than the boys making a substantial improvement.

In trying to find out the cause or causes for this change in performance, two possible explanations can be put forward. One reason may be that the teachers in this particular school did not prepare the students well for the exam in that students could, for example, have faced the examination with little exposure to the style and

format of the questions set. This lack of preparation could have put the students at a disadvantage, resulting in the poor performance obtained. On the other hand, one may consider the girls' social background as another possible cause.

It is essential for students to know the format, structure and standard of the examination paper s/he is going to face during the exam. Those students who have worked out examples of previous papers will be at an advantage over those students who have not encountered similar question types before. Teachers in the poor performing school may therefore have missed out on this aspect of preparation for the exam. Likewise, teachers in boys' schools could have placed greater emphasis on providing students with examination skills, with the end result of bridging the gap between boys and girls. In addition, teachers also come to the classroom with prior experiences, assumptions and values with which they are constructing understandings about what they see as acceptable 'feminine or masculine balances' for themselves and for their students (Hildebrand, 1996) These teachers' gendered assumptions can be displayed in many ways and affect students' performance in the long run.

Another possible cause can be traced to the students' social background and the families' different expectations with respect to boys and girls. The girls' school doing badly in SEC physics has a catchment area tending to have many working class families. This is unlike the other girls' school maintaining the high achievement of the previous year. This particular school's catchment area includes mainly middle-class families, one town in particular identified by Boswell (1994) as consisting mainly of managerial and professional people. It may be that working class parents do not place as much importance to their daughters' education as they would do for that of a boy, usually still considered as the main breadwinner. Parents, therefore, would not provide as much encouragement and support for girls as they would to boys, and so the girls' performance falls. An interview with the current Head of school sheds some light on the situation. She stated that the year of the study was the first year that she took responsibility of the school and in fact she had noticed that although the cohort of students was usually quite good, few girls actually continued to further their studies with a very small percentage eventually going to University. She explained this in terms of being mainly influenced by the parents' social background and their expectations, an aspect she has been trying to fight during her years at the school. Although this is only one person's personal opinion, it sheds light on the possible factors in play. However, a study by Darmanin (1991), although not at this particular school, notes that girls have much lower job expectations than boys. Obviously, one would need to carry out a tracer study of the students at this particular school and to probe the aspirations and choices made, in order to get a better understanding of the situation, and to be in a position to draw conclusions.

The study highlights the issue of gender and the type of assessment procedure employed. Although at face value there does not appear to be any gender differences in overall performance in SEC physics, girls were significantly better performers in coursework, in physics consisting of write ups of experimental work carried out. The same effect was also registered in the United Kingdom where it was noted that girls' achievement in science and mathematics increased to match that of boys when coursework formed a substantial element of the G.C.S.E assessment (Harding, 1996). In explaining girls' underperformance in written exams, Harding (1996) argues that girls lack the necessary affective readiness. A typical explanation for girls' better performance in coursework is that girls tend to be more diligent and do their work meticulously whereas boys, on the other hand, tend to be careless which results in poorer marks. White (1996), however, argues that these stereotypic assumptions are not supported by evidence. In fact she reports that in the case of G.C.S.E English, coursework made a slightly larger contribution to the final subject mark for boys than for girls. It may, therefore, be that girls' schools are more equipped to carry out laboratory work (Xuereb, 1996) than boys' schools or that teachers in girls' schools are concerned about this aspect of the course which is then reflected in the better performance obtained.

Conclusion

The present study looks at a very small part of students' achievement. It, however, highlights the effect that individual schools tend to have on students' performance and how this effect is not consistent across all the levels for which schools cater. Further research into individual schools' success still needs to be carried out. The research, however, shows how it is not always the case that students who do well in their fourth year, will necessarily perform just as well in their school leaving examination. The final year of compulsory education proves to be an important phase of secondary education since variations in examination performance, whether improving or regressing, tend to be significant in some schools. Schools, therefore, need to treat the final year as crucial due t its effect on determining the school leaving qualifications with which students leave compulsory education.

Suzanne Gatt *is a Lecturer in Primary Science and Environmental Education at the Department of Primary Education at the University of Malta. E-mail address: suzanne.gatt@um.edu.mt*

References

Abdilla, S.; Briffa, N. and Mifsud D. (1998) *An Evaluation of the Physics SEC examination Paper, May 1996.* Unpublished B.Ed.(Hons) dissertation, University of Malta.

Apps, L. (1989) *An item and Error Analysis of a Form IV Physics Junior Lyceum Exam.* Unpublished B.Ed.(Hons) Dissertation, University of Malta.

Baldacchino, E. (1998) *English Language Testing in the Secondary Education Certificate Examination: An Evaluation***.** Unpublished B.Ed.(Hons) Dissertation, University of Malta.

Bonnici A. (1994) *Compulsory Physics: An Evaluation***.** Unpublished M.Ed. dissertation, University of Malta.

Borg, M.G. (1996) 'Sex and Age differences in the Scholastic attainment of grammar school children in the three years of secondary schooling: a longitudinal study.' *Research in Education,* Vol.56, 1-20.

Borg, M.G. (1994) 'Sex differentials in scholastic attainment from Year 3 to Form III: A study of trends.' *Education,* Vol.5(2), 22-29.

Borg, R. (1983) *Correlation between the Religion, Maltese and Social Studies 1978 Secondary School Annual Papers.* Unpublished B.Ed. (Hons) Dissertation, University of Malta.

Boswell, D. (1994) 'The Social Prestige of Residential Areas.' In R. Sultana, and G. Baldacchino (eds) *Maltese Society: A Sociological Perspective***,** Msida, Malta: Mireva Publications

Camilleri, C. (1996) *Students' Ideas in Mechanics***.** Unpublished B.Ed.(Hons.) dissertation, University of Malta.

Craus, B. (1993) *Maltese Girls and Mathematics.* Unpublished M.Ed. Disseration, University of Malta.

Darmanin, M. (1991) 'Schooling and Class.' In R. Sultana (ed.) *Themes in Education: A Maltese Reader,* Msida, Malta: Mireva Publications.

Darmanin, M. (1991a) 'Gender Differentials and Subject Choice in Maltese Secondary Education.' In R. Sultana (ed.) *Themes in Education: A Maltese Reader*. Msida, Malta: Mireva Publications.

Fenech J. and Pisani, T. (1998) *An Analysis of the May 1996 SEC Mathematics Mental Paper Examination.* Unpublished B.Ed.(Hons) Dissertation, University of Malta.

Gatt, S. (2002) *Alternative Frameworks about Newton's Laws of Motion: Examination Performance, Cognitive Development and Cognitive Styles of Maltese Fourth Form Junior Lyceum Students.* Unpublished Ph.D. dissertation, University of Malta.

Gewirtz, S.; Ball, S. and Bowe, S. (1992) **'**Parents, privilege and the education market place.' Paper presented at the British Educational Association Annual conference, 22-29August 1992.

Government of Malta, (1995) *Education Statistics.* Government of Malta, Central Office of Statistics.

Grima, J.; Magri, M. and Refalo M. (1995) *Analysis of the MATSEC 1993 Mathematics Examination.* Unpublished B.Ed.(Hons) Dissertation, University of Malta.

Harding, J. (1996) 'Girls' achievement in science and technology – implications for

pedagogy.' In P. Murphy and C. Gipps (eds) *Equity in the Classroom: Towards Effective Pedagogy for Girls and Boys,* London: The Falmer Press

Hildebrand, G. (1996) 'Redefining achievement.' In P. Murphy and C. Gipps (eds) *Equity in the Classroom: Towards Effective Pedagogy for Girls and Boys,* London: The Falmer Press.

Mangion, G. (1997) *Secondary Students' Ideas about Newton's Third Law of Motion.* Unpublished B.Ed. (Hons.) Dissertation, University of Malta.

MATSEC (1997) *SEC Physics Examiners' Report.* MATSEC: University of Malta.

Micallef, L. and Galea, J. (1991) *An Evaluation of English Literature Examinations at Ordinary Level.* Unpublished B.Ed.(Hons.) Dissertation, University of Malta

Mifsud, E. (1994) 'Schooling and socialization: rituals, symbols and hidden messages in a private school.' In R. Sultana and G. Baldacchino (eds) *Maltese Society: A Sociological Inquiry*. Msida, Malta: Mireva Publications.

Schembri, L. (1997) *The May 1996 SEC Examination in Mathematics: A Study.* Unpublished B.Ed. (Hons.) Dissertation, University of Malta.

Sultana, R. (1991) 'Social class and educational achievement in Malta.' In R. Sultana (ed.) *Themes in Education: A Maltese Reader,* Msida, Malta: Mireva Publications.

The Sunday Times (2001) *Advert for Application of vacancies in Secondary Boys' Church schools,* February 15th, Valletta : Progress Press.

Vella, R. (1998) *Analysis of the SEC Mathematics Examination Paper IIB, May 1996.* Unpublished B.Ed.(Hons.) Dissertation, University of Malta.

Ventura, F. and Murphy R. (1997) 'Equity Issues in Education and Assessment: The Impact of Measures to Promote Equity in the Secondary Education Certificate Exams in Malta: An Evaluation'. Paper presented at the 23rd Annual Conference, June 1997 Durban South Africa, Organised by the International Association for Educational Assessment.

Ventura, F. and Murphy, P. (1998) 'The impact of measures to promote equity in the Secondary Education Certificate Examinations in Malta: An evaluation.' *Mediterranean Journal of Educational Studies,* Vol.3(1), 47-73.

White, J. (1996) 'Research on English and the teaching of girls.' In P. Murphy and C. Gipps (eds) *Equity in the Classroom: Towards Effective Pedagogy for Girls and Boys,* London: The Falmer Press.

Xuereb, P. (1996) *An Evaluation of Practical Work carried out in Secondary schools.* Unpublished M.Ed. Dissertation, University of Malta.