The Educational Impact of the Size of Primary Schools

A Literature Review carried out by Dublin City University
School of Education Studies,
Commissioned by Educate Together

January 2007

Table of Contents

Educational Impact of the Size of Primary Schools

Background to the Literature Review

Ireland has experienced a significant population increase as reported in the 2006 Census. The population is at its highest since 1861 with migration cited as the dominant factor. Ireland has the largest population growth in the EU, with growth of 8.1 percent between 2002 and 2006. The highest growth happened in the mid-Eastern region where the populations of Fingal and Meath increased by over 20 percent. All counties reported increases in population and the fastest growing small area was recorded in Blanchardstown—Blakestown.

Educate Together aims to meet a growing need in Irish society for schools that recognise the developing diversity of Irish life and the modern need for democratic management structures. In particular, Educate Together guarantees children and parents of all faiths and none equal respect in the operation and governing of education. It owes its origins in the movement to establish new multi-denominational primary schools, which emerged in the late 1970s and early 1980s. Today there are 39 schools, 19 of which are in the greater Dublin area.
Educate Together schools have a distinct ethos or governing spirit. This has been defined in the following terms:

- Multi-denominational, i.e. all children having equal rights of access to the school, and children of all social, cultural and religious backgrounds being equally respected;
- Co-educational and committed to encouraging all children to explore their full range of abilities and opportunities;
- Child centred in their approach to education;
- Democratically run with active participation by parents in the daily life of the school, whilst positively affirming the professional role of the teachers.

Educate Together is facing unprecedented demand for places in its schools, for increased services to schools, and is under pressure to open new schools in new areas. It is also being urged to promote its philosophy in the wider context of secondary education and pre-school provision. This growing demand can be attributed to objective factors in modern Irish life, namely the rapid diversification of society, economic growth, increasing population, globalisation of the economy and improved communications. It is also attributed to the increasing demand of Irish parents to participate as partners in the educational process and a wish that their children should grow up at ease with social, religious and cultural difference.'
In areas of rapid housing growth, the Department of Education and Science (DES) is urging Patrons of these schools to approve a standard school configuration of 32 classrooms. Current average class sizes are 29 students per class, i.e. approximately 928 children per school. Although there is a trend towards the reduction in class sizes to about 20, it is not envisaged that this progress will take place within the next five years. The pressure to move

to schools of this size is due to economic considerations related to the costs of acquiring school sites. The Board of Educate Together has, to date, approved only one school moving to a 24-classroom configuration but has opposed schools moving to a 32-classroom configuration.

This study sets out to examine the literature available on the impact of school size on education for Educate Together who would like to see what research exists in the area and what is recommended in terms of school size at Primary school level. In this report, the author consulted educational journal articles, papers presented at conferences, educational web sites and other material from the US, UK, European and Irish studies. The author also consulted the Irish Inspectorate, the Commission on School Accommodation, the Statistics Department and the Planning Department of the Department of Education and Science.

The vast majority of research in this area has been conducted in the US. However, two recent Irish reports published by the Educational Research Centre in collaboration with the Inspectorate contain reference to school size factors and performance of students in reading and mathematics. These are the National Assessment of English Reading and Counting on Success Mathematics Achievement in Ireland both of which will be referenced later. Research is also being conducted by the Commission on School Accommodation in Ireland on school size at second level; however, this research is not available to date. The Commission's study will include an investigation of the relationship between: size of cohort, range of educational programmes, retention rates, destiny of students, academic and vocational needs of students, and needs of disadvantaged students. The outcomes of the research on school size at first and second level being conducted by the Commission will be distributed to all the partners in education and be considered in the formulation of Area and County Development Plans for School Provision.

The Commission on School Accommodation recommends that development plans for school provision for areas/counties should be based on the demographic profiles and should include the following (Commission on School Accommodation Planning School Provision Three Praxes Report of the Steering Group December 2002, pp 30-31):

- Statement of aims for the educational provision at area/county level
- Projected enrolment for the next five years for the area/county
- Existing school capacity at area/county level
- Surveys of appropriate strategies to provide educational needs (including emerging initiatives) and accommodation needs.

Appropriate strategies may include, *inter alia*:

- Establishment of new schools or a multi-school campus;
- Extension, re-location, closure or amalgamation of schools;
- Enhancing co-operation and complementarity in educational provision;
- Clustering schools for purposes of management or educational programmes;

- Use of school buildings for other educational purposes;
- Expansion of distance mode in educational provision;
- Review of schools with a first-year enrolment decline of 40 percent over a five-year period;
- Allocation of major capital investment collaboratively.

Introduction/ History of School Size argument

Demographic changes have influenced school size at primary school level all over the world. School amalgamation has been carried out through much of the last century in the US, resulting in fewer and larger schools and school districts. Larger schools were thought to be more efficient and more economical to build and run, offering more comprehensive curriculum and extra-curricular provision. Between 1940 and 1990, as the US population increased by 70 percent, the total number of public schools declined by 69 percent and average school enrolment rose more than 500 percent (Cotton 1996). In 2000, the US Department of Education statistics show that the average number of students enrolled in elementary schools was 477.

Herbst and Herczyn (2000) citing Hopkins and Ellis (1991) report the UK government as seeing schools with fewer than 60 pupils as “too small”. Francis (1992) suggests that this was true in the 1960s, but that it rose to 100 in 1981 and seems now to have settled around 90. The UK Audit Commission’s 1990 Report Rationalising Primary School Provision is quoted as saying that below 80 and 90 students, unit costs begin to rise steeply.

Recent research indicates that smaller schools have higher student achievement, improved attendance and participation in school activities positive interactions between students, teachers and parents.

Schools in the United States have grown larger and larger, but how this growth affects learning is still being explored. The trend toward large schools stems from several historical processes, including school district consolidation and the belief that large schools can deliver education with major economies of scale. (Schneider 2002).

The majority of the work linking school size to education outcomes emanates from more qualitative than quantitative studies, including case studies, observation, interviews and questionnaires. This requires critical analysis of merits reported. Furthermore, with the move to consolidate and amalgamate, smaller schools and people involved in these have been required to defend the ‘small school’; hence there is more written in defense of the small school than larger schools.
More recent studies propose that small schools are better than large ones, especially for students with lower socio-economic status. There is a myriad references, conference papers

and journal articles expounding the virtues of small schools.

One alternative to creating small schools is the school within a school where large schools are subdivided into smaller units. However, as this is a relatively new initiative, the literature is less conclusive than the arguments in favour of school size.

The School Size Argument—What Constitutes Small, Medium and Large Schools?

This section reports on what constitutes 'small', 'medium' and 'large' in the context of primary or elementary schools from the literature reviewed. According to Cotton (1996) there is no clear agreement among researchers and educators about what constitutes a small or a large school. The indications are that 300-400 students is an appropriate size for a primary school and 400-800 students for a secondary school. The Chicago Task Force on Small Schools regards small elementary schools as those with enrolments of less than 300. Overbay (2003) citing Eberts KeyHole and Stone (1984) in their study of 287 elementary schools categorised school size in the following way; small fewer than 200 students, medium 400-600 students and large over 600 students.

The Lee and Loeb (2000) study of 264 Chicago elementary schools (grades K – 8) defined a "small" school as one with fewer than 400 students.

In New Zealand an Educational Review Office report (ERO, 1999) defined "small" schools as those with fewer than 150 students (over half of all primary schools, 51.6 percent), "smaller" schools as those with between 26 and 50 (13.6 percent in 2001) and "very small" schools as those with fewer than 26 students (8.1 percent in 2001). According to Cotton, (1996) small-school benefits are achieved in the 300- to 400-student range for elementary schools

Craig Howley (2000), in an issue of the *Rural Education Digest*, indicates that high schools should never enroll more than 600-1000 students. Lawrence *et al.* (2002) report that elementary schools are on average half the size of high schools.
They also suggest the following upper limits based on US grade configuration:

- Elementary schools (grades 1-6)—25 students per grade, 150 total
- Elementary schools (grades 1-8)—25 students per grade, 200 total
- Middle schools (grades 5-8)—50 students per grade, 200 total
- High school (grades 9-12)—75 students per grade, 300 total

In the Irish context, recent statistics from the Department of Education and Science (DoES) show the numbers of schools with population sizes in the 'small', 'medium' and 'large' categories (Appendix A). Small is regarded as below 100 enrolments, medium is between

100 and 499 and large is over 500. The table shows the number of students enrolled in Irish Primary Schools during two years 1985-1986, 1995-1996 and 2001-2002. The figures indicate that the vast majority of schools in Ireland are small and there are very few large schools (64 schools out of 3157 in 2002). The number of large schools decreased from 105 to 64 from 1996 to 2002. Indications are that this number has increased marginally. The total number of Irish Primary schools in 2003 was 3321, an increase of 174 on the 2001/ 2002 figures (Appendix B). There were 446,029 students enrolled in Irish Primary schools in the academic year 2003-2004(Appendix C).

A note from the Planning and Building Unit of the Department of Education and Science Ireland states that 'in relation to recognition of new schools the requirement is for an initial enrolment of 17 with a minimum of 51 after three years. This should result in a single stream school growing to at least 150-200 pupils. A single stream entry school would be the minimum size in an urban area. In rural areas a three-teacher school would be the minimum size projection for establishment.'

Many Studies claim that small schools have many benefits including:

- Higher student achievement by creating small, intimate learning communities where all students are known and encouraged by adults who care for them. (Wasley et al. 2000; Nathan and Febey 2001)
- Reduced effects of socio-economic background, poverty and ethnic background (Wasley et al. 2000; Nathan and Febey 2001)
- Higher graduation rates
- More parental involvement (Schneider et al. 2000)
- Fewer discipline problems and a safer place for students (Nathan and Febey 2001; Meier 1996)
- A more positive, challenging environment (Nathan and Febey 2001)

Other studies conclude that school size alone has no bearing on student achievement (Craig 2001), while others maintain that larger schools provide better opportunities for curriculum and extra-curriculum provision, more specialised teachers, better facilities, etc.

Howley (1994) pointed out that studies based on "outcomes", e.g. student achievement, school completion rates and student attendance generally recommend smaller school size. Studies based on "inputs", e.g. teacher salaries, instructional materials, specialised staffing, etc., favour larger schools.

Optimal size of primary (or elementary) schools --Is There an Optimal School Size?

*"An optimal size school results if increased size is at first desirable (the benefits of special*ised *resources first outweigh any loss of coordination) but eventually increased size is detrimental (loss in coordination dominates specialization). If optimal school size characterizes the*

education process, this should be a concern of policy-makers. Schools should be planned such that they are neither 'too small' nor 'too large' but rather near the optimal size, to the extent possible." (Lamdin 1995)

Howley (1996) maintains that optimum school size is dependent on a number of variables including its cohort's relative poverty or affluence. Small schools provide an achievement advantage for impoverished students, while affluent students may fare better in larger schools.

Fowler, Howley and others consider the potential for curricular adequacy to be reached at 400 students. Lawton (1999) says that K-8 schools should not enrol more than 500 students. Meier (1996) claims that small schools between 300 and 400 students 'offer a real panacea for America's educational ills'.
(Harker) citing Hopkins and Ellis (1991) reviewed the situation in the UK, where they claim that the government regarded schools with fewer that 60 pupils as too small.

Overbay (2003) citing Andrews (2002) states that moderately sized elementary schools (300-500 students) and high schools (600-900 students) may optimally balance costs and benefits. The optimal or recommended size of schools varies widely in the literature. On average, the research indicates that an effective size for an elementary school is in the range of 300-400 students and that 400-800 students is appropriate for a secondary school (Williams 1990; Cotton 1996).

Herbst and Herczyn's (2000) review of available literature suggests that primary school size begins to negatively affect test results in schools above 600 students. Other literature cited here, Imsher (1997) and Raywid (1999) also conclude that educational quality deteriorates as school size increases. Their analysis showed that there are two conflicting influences on student achievements related to school size.

'A very small school finds it difficult to use its resources effectively, especially teacher and space resources, however when the school size becomes excessive the negative effects appear, probably due to poor control over student and learning, inability to adjust the curriculum and instructional methods to students needs etc. When the student specific factors (SES and similar) and the school specific factors (teacher qualifications and similar) are controlled, the average student outcomes initially improve as school size grows and then begin to decline.' They conclude that the optimal size of Polish primary schools is approximately 690 students.

The optimal size of the school is not just about the number of students attending, and there are many other factors that affect the quality of education in schools. However, most studies suggest that the optimum size is somewhere between large and small. This suggests that

‘medium’ sized schools are the optimum with enrolments between 200 and 500 for primary schools. Medium sized schools can provide the best of both worlds.

The Educational Impact of School Size

This section outlines the impact of school size on a number of educational factors that are reflected in the available literature:

- School Effectiveness
- Student Achievement
- Socio-Economic Status, Poverty and Race
- Gender
- Curriculum Delivery
- Extra Curricular Participation
- Student Attendance and Drop Out Rates
- Student Participation and Engagement
- Student Attitudes Towards School
- Student Behaviour
- School Climate
- Teachers Attitudes and Work Patterns
- Parental Attitudes and Parental Involvement in School Life
- Cost

The Impact of School Size on School Effectiveness

Stevenson (1996) analyse*d* the number of times elementary schools in South Carolina received a state incentive award for meeting or exceeding expected student improvements on standardise*d* achievement tests across a ten-year period. Stevenson also investigated the relationship between elementary school size and the likelihood a school would be declared "dysfunctional" by the state because of poor student academic performance. In both instances he discovered that school size was a factor.

McCathren (2004) concluded that size alone is not the issue, but how it interacts with other school factors; school climate, curricular offerings, student participation in extracurricular activities, student self-concept and self-esteem, teacher-student relationships, home-school relationships and student opportunities. All of these have important roles to play in determining student outcomes.

Craig's (2001) PhD thesis asked if there is an optimal size, or window of size, at which primary schools can be most effective? Primary head teachers and Local Education Authority (LEA) advisors throughout England were asked for their views on the most effective school size. The research concluded that little objective evidence could be found to say that school size was an important factor of effectiveness. There was stronger *subjective* evidence that schools found it easier to be effective within a particular size than others.

The Impact of School Size and Student Achievement

Small Schools

Overbay (2003) cites Eberts KeyHole and Stone (1984) who carried out a study of 287 elementary schools to examine the impact of school size on achievement scores. They found that school size in small (under 200) and medium (400-600) elementary schools had little impact on student performance; however, performance declined significantly as enrolment topped 800.

Cotton (1996) found that academic achievement in small schools is at least equal—and often superior—to that of large schools.

Howley's 1995 findings show neither a direct or indirect effect of size at grade 3, once socio-economic status is accounted for. A most direct effect appears at grade 6 and by grade 9 appears to strengthen. At grade 11 the size effects are stronger still with the final regression equation exhibiting both direct as well as indirect (interaction) effects, a combination of effects that not only debase student achievement in communities where socio-economic status is low, but now appear to enhance student achievement in communities where socio-economic status is high.

Wasley *et al.* (2000) found that the relationship between school size and student achievement suggests that students' attachment, persistence and performance are all stronger in small schools compared to in large schools. When examining a range of indicators to assess student achievement, the data from 1997 to 1999 suggests that students in small schools:

- Have better attendance rates;
- Have significantly lower drop-out rates;
- Have higher grade point averages (GPAs);
- Fail fewer courses;
- Have stronger achievement test scores;

Darling-Hammond (1999) and (Haller, 1993) found that school size and other school variables may play an important role in what students learn. Plecki (1991) examined the relationship between school size and student achievement in 4337 Californian K-6 schools. Data from 3rd-grade scores on the California Assessment Program for 1986-1987 was used as well as: total enrolment; percentage of students whose families received Aid to Families with Dependent Children; percentage of students with limited English proficiency; and school location (urban, suburban or rural). Plecki found that larger schools are not associated with improved student performance, even when comparing schools with similar student characteristics. For urban schools serving high percentages of students in poverty, school size and student performance displayed a negative linear relationship, with student performance best in schools with under 200 students.

Ilyana Kuziemko (2004) suggests that smaller schools increase both mathematics scores and attendance rates and that the benefit of smaller schools outweigh the cost. There is a causal connection between school size and the performance of elementary school students. Kuziemko urges administrators to consider the benefits to students of smaller enrolments when determining the size of their schools. Sammons *et al.* (1993) suggest that the size of primary school effects may be greater than those of secondary schools.

Wasley *et al.* (2000) researched 150 small Chicago schools between 1997 and 1999 and found that small schools help students succeed. The elementary schools had fewer than 350 students. It was found that Chicago's small schools served children of colour, children from poorer families and students performing below average levels.

'Charter schools are nonsectarian public schools of choice that operate with freedom from many of the regulations that apply to traditional public schools. The "charter" establishing each such school is a performance contract detailing the school's mission, program, goals, students served, methods of assessment, and ways to measure success (www.uscharterschools.org). Charter schools are generally small with enrollments under 250 students. More than half of the respondants in PricewaterhouseCoopers (2003) review of Charter schools cited small school size, small classes, a safe environment, quality of the academic programme, high achievement standards and a specialised curriculum focus as the best attributes to Charter schools.

The Report Card on American Education (2001) found a negative relationship between the number of students per school and academic achievement. It noted that student performance was more connected with school size than with race or class size. Dollars and Sense (2002) claim that school size is arguably more important than either racial makeup or class size. It also discusses how Florida, Maryland and Vermont considered legislation that supports small schools.

The legislature of Florida found that Florida's schools are among the largest in the US; smaller schools had fewer discipline problems, crime, truancy, dropout rates; improved student academic achievement, better teacher and student attitudes. The statute limits elementary schools to 500 students, middle schools to 700 students and high schools to 900 students and requires districts to plan for small schools.

In Maryland bills were submitted in 2001 requiring the state to pay ten percent over the maximum state allocation for construction and renovation of schools in "priority funding areas" meeting specific size limits. Vermont has also passed legislation to increase its funding to small schools.

Overbay (2003) citing Wendling and Cohen (1981) examined the impact of size, teacher-pupil ratios, socio-economic status (SES), and years of parental schooling on mathematics and

reading achievement in 1021 New York elementary schools. They found that high achieving schools had an average of 447 students and low-achieving schools had an average of 776.

Spielhofer *et al.* (2002) found that smaller schools in the U.K. obtain above-average results at key stage 1 and 2, but this can be explained by the fact that most are in relatively affluent areas with above-average indicators of socio-economic advantage. The analyses revealed that the relationship between school size and GCSE outcomes, after controlling for pupil, school and Local Education Authority (LEA) background variables, performance improved with size up to a certain point and then declined.

The 2004 National Assessment of English Reading (NAER) in Irish primary schools and The 2004 National Assessment of Mathematics Achievement (NAMA 2004)

The 2004 National Assessment of English Reading published in 2005 found that
'School size and location are other factors that have been linked to pupil achievement, with smaller schools or rural schools sometimes found to have a positive effect on achievement. However, there are many difficulties with these variables, not least because what constitutes a small or a rural school can vary enormously from study to study. Indeed, many of the 'small' schools described in American research would be classified as large by Irish standards, while some of the US 'rural schools' would be considered to be 'town schools' in Ireland. Further, Irish small schools often have multigrade classrooms, another confounding variable. Nonetheless, the balance of evidence would suggest that there may be some benefits to achievement associated with smaller or rural schools relationships between achievement and various school factors (including gender composition, school size, school location, attendance rates, and learning support) are examined.'

Schools were divided into small, medium, and large, based on their total enrolment. At both grade levels, pupils who attended small schools obtained mean scores that are significantly higher than those of pupils who attended medium sized schools, but do not differ significantly from the scores of pupils who attended large schools.' (Appendix D).

"The Big Benefits of Smallness" (Deborah W. Meier), drawing from the author's experience as a small-school pioneer, describes the many benefits of small schools. In "School Size' School Climate and School Performance" Kathleen Cotton reviews the research evidence on school size, finding strong support for the advantages of small schools.

Medium-Sized Schools

Spielhofer *et al.* (2002) found best results in medium-sized schools (approximately 180-200 students) and the worst in the very small or very large schools. The optimum size varied to some extent depending on certain key variables, such as sex of pupil, prior attainment and

type of school (girls', boys' or mixed, grammar or comprehensive).

Using 8th, 10th and 12th grade data for the same students from the 1988 National Education Longitudinal Study, Bracey (1998) examined achievement growth for schools with 100 to 2800 students. Mathematics achievement rises as school size increases to about 600 students, holds steady to about 900 students and then diminishes.

Large Schools

McCathern's (2004) examination of ten years of state data "revealed a small but significant positive relationship between school enrolment and number of times elementary schools have won the Incentive Award (Stevenson, 1996, p. 12). While the average size among the 598 South Carolina public elementary schools studied was 513 students, schools that had won the recognition all ten years averaged 818 students.

Stevenson (1996) identifies a positive relationship between larger schools and sustained academic achievement, although the impact of size was relatively small. Smaller schools tended to be serving students in lower socio-economic categories.

Spielhofer *et al.* (2002) voiced concerns regarding small primary schools' ability to provide a broad curriculum for their pupils and give them the same opportunities as larger schools. Very small schools with fewer than ten students are difficult to judge; however, the Department of Education and Skills, UK (DfES) figures suggest that their key stage 2 results are well below the national average. This could be because special schools were disproportionately represented in this category.

The Impact of School Size on Socio-Economic Status, Poverty and Race

Low socio-economic status (SES) students fair better in smaller schools. Smaller schools serve students from lower SES backgrounds better. High SES students fair better in larger schools. The effect of SES increases steadily with higher grades.

Low SES, racial and ethnic minority students are more adversely affected by attending large schools than are other students. Low SES, racial and ethnic minority students continue to be concentrated in large schools.

Friedkin and Necochea (1988) found that the higher the SES population of a school, the higher the performance and the lower the SES of a school, the lower the performance of its students. Smaller school size benefited school performance in impoverished communities, but larger schools were more efficient in relatively wealthy areas. Howley (1996) found similar evidence. Small schools facilitated the academic achievement of impoverished students, whereas large schools facilitated the academic achievement of affluent students. The difference in West Virginia was that impoverished students most often attended small

schools. Large schools and districts are associated with the lower achievement of impoverished students and higher achievement for the more affluent. This is more pronounced at the higher grades. Lamdin (1995) confirmed that the socio-economic status of the student population had a significant effect on academic achievement. However, there was no relationship between how students performed on the California Achievement Tests in grades one through five and the size of a school.

Bracey (1998) found that students gained more in high-SES schools, regardless of school size. Herbst and Herczyn (2000) cite Lee and Smith (1996) who found that poverty exerts a strong negative effect on high-school performance, and that this effect is sharply reduced in school cohorts below 300 students.

The Matthew Project, an investigation of the relationship between school size at all school levels and academic excellence and equity across four states (Georgia, Montana, Ohio and Texas) was carried out by Howley and Bickel in 2000. Studies were carried out on 13,600 urban, suburban and rural schools in 2290 school districts. Results showed that at least a quarter of the schools serving moderate- to low-income communities in Texas, one-third in Georgia and two-fifths in Ohio are too large for students to achieve top performance. The size of school had a negative influence on achievement in impoverished schools. Groups of less-affluent students out-performed groups of more-affluent students on standardised tests in the eighth grade if they attended a smaller school.

McCathren (2004) discovered that the greatest predicator of student achievement among fifth-grade elementary school students was the percentage of a school's pupils receiving free and reduced lunch. Vinson (2001) studied the Georgia Department of Education's Directory of School Report Cards 2000-2001 from 40 rural elementary schools. Data was collected on school enrolment, the percentage of students on free and reduced lunch, the percentage of teachers with a Masters Degree or higher, and the average years of experience of teachers. The Stanford 9 scores for fifth grade were collected in the areas of math, reading, science and the Complete Battery. The schools were divided by enrolment size into three categories. Code one was small with fewer than 475 students. Code two was medium with between 475 and 850. Code three was large with more than 850. A relationship between free and reduced lunch and achievement but not school size was found in rural Georgia schools.

Poor students and those of racial and ethnic minorities are more adversely affected—academically, attitudinally and behaviourally—by attending large schools than are other students. Unfortunately, poor and minority students continue to be concentrated in large schools.

Stevenson (2006) argued that, because he found at least a small indication that poverty could be a critical factor in the analysis of the school and student performance, the right size school

for a student might depend on that student's socio-economic circumstance. Stevenson analyse*d* the data across the five poverty categories in which schools were placed by the state. The findings indicated that among elementary schools with the highest percentage of students on free and reduced lunch, a negative relationship existed between school size and number of incentive awards earned.

Research by Roeder (2002) looked at Kentucky schools and maintained that smaller school size does not reduce the negative effects of poverty on performance. Poverty in itself is a determinant of performance, having a negative impact on school performance. Therefore solutions to poor school performance need to focus on reducing the harmful effects of poverty on achievement rather than creating smaller or larger schools.

Lee and Loeb (2000) found that school size is particularly important in schools enrolling disadvantaged students. Their findings suggest that school size is important for young adolescents' learning and also has an influence on teachers' attitudes about their students. They support a move to small elementary schools.

These findings reflect post elementary schools level also. LeFevre and Hederman, in their Report Card on American Education (as cited in Lawrence et al., 2001), noted that higher outcomes on standardised tests, such as the Stanford Achievement Test (SAT) and ACT, as well as higher rates of graduation, may be connected more with school size than with race.

The Impact of School Size on Gender

La-Sage and Ye (2000) explored the relationship between school size and students' achievement in reading and mathematics by school level and gender. Data on 251,049 students from K-12 grades was collected from 291 elementary, middle and high schools in an urban Texas district. Female students were more negatively affected by school size in reading and mathematics at elementary, middle and high school levels. A negative impact on male students is only seen at the high school level.

Spielhofer *et al.* (2002), in the National Foundation for Educational Research (NFER), commissioned by the Local Government Association (LGA) explored two issues — the impact on performance of school size and single-sex education. Almost all primary schools in the UK are mixed, but an analysis of key stage 2 results was undertaken to investigate the possible impact of primary school size. When other factors were taken into account, and very small schools are removed, school size was not found to have any significant impact on performance.

The Impact of School Size and Curriculum Delivery

The main argument, historically, in favour of large schools is that they can offer more variety and amount of curricular offerings than small schools can.

Irmsher (1997) cites research that although large schools offer greater curricular variety, only a small percentage of students take advantage of advanced and alternative classes. Meier (1995) argues that while large schools offer more specialise*d* programs for disadvantaged and disabled youth, students in these programs are more likely to feel cut off from the school culture.

Monk (1987) studied the relationship of school size and curriculum offering. The study concluded that it is possible to offer the same curriculum in terms of breadth and depth in a school of 400 students as in larger schools.

Klonsky (1995) in relation to more comprehensive programs in larger schools found that a one-hundred percent increase in enrolment yields only a seventeen percent increase in variety of offerings. McGuire (1989), Monk (1992) and Rogers (1987) are cited as showing that only five to twelve percent of the students in large schools avail of those extra courses.

The Impact of School Size on Extra-Curricular Participation

Barker and Gump's 1964 book, *Big School, Small School: High School Size and Student Behaviour,* reveals that both the number and the variety of extra-curricular activities in which students participate are significantly higher in small schools than in large ones. In small schools, students were more likely to hold important positions in the activities in which they engaged and got greater satisfaction from participating.

Cotton (1996) also found that students participate in extra-curricular activities at significantly higher levels in small schools than in large ones. Researchers point out that, in small schools, everyone is needed to populate teams and clubs, and that all students are encouraged to participate and made to feel they belong. In large schools, a greater proportion of students do not participate in extra-curricular activities. They are not needed as much as they are in small schools to fill the places.

Overbay (2003) cites a study by Lindsay (1982) who carried out research on students' extra-curricular participation rates, student satisfaction, and attendance as it related to school size and SES background—14,668 students in 328 elementary schools were studied. The study found that schools with 100 pupils or fewer in rural and urban areas had higher extra-curricular participation rates, student satisfaction and attendance. Barker and Gump (1964) also found greater levels of extra-curricular participation in small schools than in large ones.

In their large-scale 1988 study, Schoggen and Schoggen found that, although large schools offer more varied activities, the average student does not participate in these. Although the small school does not provide such a wealth of activities, the average student has a better experience as measured by the amount of involvement in the available activities (cited in Cotton)

The Impact of School Size on Student Attendance and Drop Out Rates

Cotton (1996) reports that students' attendance is better in small schools; a smaller percentage of students drop out of small schools than large ones. Irmsher (2004) cites Klonsky (1995) and Raywid (1995) who found that large schools tend to have poorer attendance and have higher drop out rates.

Overbay (2003) cited studies that found smaller school size to be associated with lower high school dropout rates (Fetler 1989; Pittman and Haughwout 1987; Toenjes 1989). Howley and Bickel (1995) found that the benefit of smaller schools was particularly important in the middle grades, when children are most at risk of dropping out.

The Impact of School Size on Student Participation and Engagement

Cotton (1996) found the following attributes to be associated with small school size:

- Participation is needed to populate the school's offices, teams, clubs, and. this means that fewer students are overlooked or alienated.
- People know and care about one another to a greater degree than is possible in large schools.
- A higher rate of parental involvement.
- A stronger sense of personal efficacy in small schools.
- Students take more responsibility for their own learning; their learning activities are more often individualise*d*, experiential and relevant to the world outside of school; classes are generally smaller; and scheduling is much more flexible.

Overbay (2003) maintains that proponents of smaller schools consistently cite evidence that the more intimate environment of smaller schools increases student engagement. Barker and Gump (1964) indicated that smaller schools offer students more opportunities for involvement and interaction.

Small school advocates argue that there is a strong relationship between smaller schools and better interpersonal relations, evidenced in increased social bonding to teachers and school, self-esteem and academic self-concept. Lawton (1999) concluded that student participation decreases with increasing institutional size and that a school should be sufficiently small to need all of its students for its enterprises. He found that engaged students attend regularly, whereas marginalised students drift away, and advised that K-8 schools should not enrol more than 500 students.

The Impact of School Size on Student Attitudes Towards School

Much research has been done on student attitudes in large versus small schools toward school in general and toward particular school subjects. This research favours small schools. Cotton found that research indicates that the attitudes of low SES and minority students are especially sensitive to school size and benefit greatly from attending small schools.

The PricewaterhouseCoopers (2003) report says that three-fifths of students reported that their Charter schoolteachers are better than their previous schools' teachers. When students were asked what they liked about their Charter school, the most frequent answers were: "good teachers" (58.6 percent), "they teach it until I learn it" (51.3 percent) and "they don't let me fall behind" (38.5 percent).

The Impact of School Size on Student Behaviour

Dunne (2000) found that although a number of factors affect student achievement, the greatest factor was the reduction of anonymity. Being known by teachers and peers makes a difference in reducing the effects of isolation, which in turn reduces the incidents of fighting and violence. In situations where everyone knows each other, students took more responsibility for their own behaviour.

Research linking school size to social behaviour has investigated truancy and classroom disruption, vandalism, aggressive behaviour, theft, substance abuse and gang participation. This research shows that small schools have lower incidences of negative social behaviour than large schools. The social behaviour of ethnic minority and low-SES students is even more positively impacted by small schools than that of other students.

Cotton (1996) on social disruption in schools cites Stockard and Mayberry (1992, p. 47) who report that ‘problems are so much greater in larger schools, that any possible virtue of larger size is cancelled out by the difficulties of maintaining an orderly learning environment.’ Research also shows that students in small schools have a greater sense of belonging.

The Impact of School Size on School Climate

White (2005) looked at the effects of elementary school size on school climate and defined school climate indicators as the percentage of:

- Teachers and students satisfied with the learning environment, social/physical environment and home-school relations within the schools;
- Students identified as gifted and talented;
- Students on academic plans;
- Students on academic probation;
- Students suspended, expelled and retained in a given year;
- Students daily attendance
- Teachers returning from the previous year;
- Teachers holding advanced degrees; and

- Teachers daily attendance.

Data from South Carolina School Report Card produced by the South Carolina Department of Education was used. Of the 267 elementary schools studied, in most instances no relationship was found between size of student enrolment and school climate indicators when controlling for SES, operating cost per pupil and percentage of pupils served by special education programs other than speech. White found two significant positive correlations between elementary school size and an increase in the number of students being retained and a higher percentage of students being suspended/expelled.

Klonsky (1995) maintained that in small schools' teachers and students know one another personally. This knowledge fosters a sense of community and promotes a climate of mutual respect. The result is fewer discipline problems and an environment that is tolerant, caring and safe.

The Impact of School Size on Teachers' Attitudes and Work Patterns

Dunne (2000) found that teachers had higher expectations of their students because they knew them better and cared about what happened to them. Teachers reported more collaboration with colleagues and more regular professional development activities at their schools. They also had greater contact with parents and understood them as an important element in student success. Lack of parental involvement in schools is often a problem in poor communities.

Lee and Loeb's 2000 study explores whether teachers and students are influenced by the size of their inner-city elementary schools. Data from almost 5000 teachers and 23,000 sixth and eighth grade students in 264 K-8 Chicago schools was studied. Data included surveys and annual standardised tests from 1997. Lee and Loeb found that small schools teachers have a more positive attitude about their students' learning and students learn more. Even after taking size into account, learning is also higher in schools with higher levels of collective responsibility. School size influences student achievement indirectly, through its effect on teachers' attitudes. Small schools (enrolling fewer than 400 students) are favoured compared with medium-sized or larger schools.

Cotton (1996) maintains that while less school size research has concentrated on teachers and administrators than on students, what findings there are favour small schools. Gottfredson (1985) is cited as saying that large schools appear to promote negative teacher perceptions of school administration and low staff morale.

McCathern (2004) found that average years of professional experience of the teaching corps had a statistically significant relationship, though small, to student academic performance in both mathematics and reading.

The Impact of School Size on Parental Attitudes and Parental Involvement in School Life

PricewaterhouseCoopers (2003) found that more than two-thirds of parents felt that their Charter school was better than their child's previous school. Parents cited class size, school size and individual attention from teachers as being better. Over three-fifths said that their Charter schools were better with respect to teaching quality, parental involvement, curriculum provision, support for students, academic standards, accessibility and openness and discipline.

The 2002 report on Charter Schools prepared by SRI's Center for Education Policy found that parents play an important role in choosing whether to send their child to a charter school. More than half of the charter school respondents believed that features such as small school size, small classes and a safe environment were powerful in attracting parents. Parent involvement also is a key component of the charter school movement, and most charter schools reported that parents were involved in a wide variety of activities.

Cotton maintains that the higher rate of parental involvement in smaller schools is frequently cited as a major positive influence on student achievement and attitudes. Walberg (1991) is cited as saying that parents are more likely to know the principal and teachers, be informed about their children's progress, participate more fully in school activities and influence decision making. This can occur partly because the school is smaller but also because it is likely to be physically and psychologically close to students' homes.

The Impact of School Size on Cost

It was believed that larger schools were more efficient from a cost point of view.
Large schools may be creating “diseconomies” of scale with both administrative and behavioural consequences.

The question of cost, or “economy of scale,” represents a major theme in the literature on smaller schools Overbay (2003). As discussed earlier, school consolidation and amalgamation has been forged by the belief that larger schools are less expensive to operate and create better efficiencies due to economies of scale. The ability of larger schools to offer more types of courses at lower per-pupil costs remains a major justification for larger schools. Even small-school proponents have conceded that smaller schools rarely cost less. Other research has demonstrated, however, that this may not necessarily the case.

Irmsher (1997) cites Lee and Smith (1996) who found that savings projected by proponents of school consolidation have not materialised. Instead of long-assumed economies of scale, they discovered “diseconomies”, or penalties of scale. Large schools need more layers of support and administrative staff to handle the increased bureaucratic demands.

Other ‘diseconomies’ refer to the cost of higher dropout rates, numbers of graduates, and increased violence occurring within large schools. Nevertheless, the argument that smaller schools may be more cost-effective warrants the examination of claims about optimal school size and the benefits smaller schools may offer.

Dollars and Sense (2002) maintains that small schools are not prohibitively expensive and investing in small schools does make sense. The report indicates that creating facilities for small schools can be done cost effectively and that the cost of large schools is higher considering their negative outcomes. Large schools are expensive to individuals, their communities and the nation because there are many hidden costs (increased transportation, higher administrative overhead and expenditures for maintenance and security). The less obvious costs are lower graduation rates, higher school dropout rates, high rates of violence and vandalism, higher absenteeism and lower teacher satisfaction. Closing schools has a detrimental effect on the social and financial impacts on a community.

Size Doesn’t Matter/ Size Makes Little or No Difference

Much research is also available which concludes that neither small nor large schools have a decisive advantage. Ramirez et al. (1992) in their Size, Cost and Quality of Schools and School Districts: A Question of Context, provides information on school size as it relates to educational quality and finance. The following factors are examined:

- relationships of size to course offerings, teacher qualifications, student achievement, student , student participation and school climate;
- state level reports concerned with school or district consolidation efforts, with examples illustrating how cases for and against consolidation are typically framed;
- publications and reports on the issue of equity in school finance.

The research concludes that any type of school (small or large, urban, suburban, or rural) can achieve successful outcomes. Ramirez et al. maintains that much of the confusion around size issues is related to asking the wrong questions or putting questions in the wrong context. The optimum size for educational institutions is an elastic concept related to institutional mission, setting and available resources. Researchers and policy-makers should consult those affected by size decisions to gain perspective on the historical, cultural and political context of the affected community.

Harker (2005) citing (Crooks and Hamilton, 2001) in an analysis of five years of National Education Monitoring Project (NEMP) data indicated that there was little difference in achievements that could be related to school size. Only 2 percent of the 500 or so assessment tasks, both at year 4 and year 8, showed statistically significant differences in performance for students from “small”, “medium” and “large” schools. At the primary level, most New Zealand schools are small-to-medium by international standards and the research evidence does not support any systematic relationship between student achievements and

size differences within the New Zealand size range.

Using the production-function approach and data from Baltimore (Maryland) public elementary schools, a study shows that school size minimally affects student performance on standardized achievement tests Lamdin (1995). The importance of student socio-economic status shown here is consistent with earlier studies. Also, not only was there no positive relationship between student performance and school inputs, but in many cases the relationship was negative and statistically significant. The results reveal no significant influence of school size on student achievement.

David Cox (2002) found using data from Utah school districts that on the Stanford Achievement Test (SAT), that student scores are nearly identical irrespective of the size of the school. He also found the higher the level of poverty among students, the lower the expected scores.

Wainer and Zwerling (2006) maintain that smaller schools do not improve student achievement. They challenge the logic of creating more small schools to raise achievement. The authors argue that although many high-performing schools are smaller, that does not imply that being small means a greater likelihood of being high-performing and providing a better-quality education.

Surgenor, Shiel, Close, Millar (2006) in Counting on Success Mathematics Achievement in Irish primary schools found that the mathematics achievement of pupils was not associated with school size or gender composition, or with the percentage of pupils in the school whose first language was not English or Irish. Associations with mathematics achievement were found for four school-level variables: geographical location, designated disadvantaged status, average socioeconomic status, and average attendance rate.

Other Factors that Can Affect Educational Impact and Schools Size

Darling-Hammond (1998) maintains that four factors consistently affect student achievement: smaller school size (300-500 students); smaller class size, especially at elementary schools; challenging curriculum; and more highly qualified teachers.

In October 2005, Lynn Thompson reported in the *Seattle Times,* "The Gates Foundation announced last week it is moving away from its emphasis on converting large high schools into smaller ones and instead giving grants to specially selected school districts with a track record of academic improvement and effective leadership." The foundation's leaders concluded that "improving classroom instruction and mobilising the resources of an entire district were more important first steps to improving high schools than breaking down the size." Perhaps there's a lesson for elementary schools in this. As stated earlier, size in itself

may not be the issue but how resources are deployed within a school community among teachers and students.

In 2001 Stevenson, examined the size of elementary school populations and student academic performance. Data from student scores on South Carolina's newly developed Palmetto Achievement Challenge Test (PACT). While size initially appeared to correlate positively with student performance, as measured by the percentage of pupils scoring *proficient* or *advanced* on PACT, when the portion of students with free or reduced lunch status was entered as a control variable, the effects of school size disappeared. Performance on PACT among fourth- and fifth-graders in both reading and mathematics was related to the percentage of a school's student body receiving free and reduced lunch. The larger the portion of children in poverty served by a school, the fewer the percentage of students who scored proficient or advanced on the state-wide achievement test. Interestingly, the only other variable at the elementary level that consistently added to the predictability of a school's academic achievement was student attendance, though the effects were small.

Stevenson discovered that it was less probable for larger schools to be identified as "poor performing" in his study of South Carolina elementary schools. School size alone does not assure success.

Alternatives/Other Considerations

If neither small nor large schools have the answer, then other possibilities and alternatives should be considered. Two initiatives in the US provide us with options in relation to the creation of small learning communities and schools with in a school.

Small Learning Communities

Sammon (2000) as cited in Cotton (2001) defines a Small Learning Community (SLC) as any separately defined, individualised learning unit within a larger school setting. Students and teachers are scheduled together and frequently have a common area of the school in which to hold most or all of their classes. Much research in the area of small learning communities shows that when students are part of smaller learning communities, they are more successful.

Small size, in and of itself, is insufficient to produce improved student outcomes (Page *et al.*2002). The outcomes typically produced by SLCs, in contrast to large schools, include:

- Higher achievement.
- Reduction of the negative effects of poverty on achievement.
- Increased student affiliation with their school community.
- Greater safety and order.
- Much less truancy and many fewer dropouts.
- Similar college entrance exam scores, acceptance rates, GPAs and completion.
- Higher levels of extracurricular participation in traditional small schools; role of extracurricular participation differs across SLCs.
- Higher levels of parental and community involvement and greater satisfaction.
- More positive teacher attitudes and satisfaction.
- Comparable core curricula.
- Lower costs per student graduate.

The National Forum to Accelerate Middle-Grades Reform in Issue 4, June 2004, of Small Schools and Small Learning Communities recommends that national, state and local policymakers provide resources and support to create small schools at the middle-grades level to create a personalised environment for teaching and learning.

Fourteen million US students in grades five to eight fare poorly on national and statewide performance tests. Many eventually tune out or drop out of school. One reason for this low level of achievement is that too many middle-grades students attend large, impersonal schools from school. Louis and Kruse (1995) cited here maintain that ‘smallness’ allows teachers to design and implement individual learning plans that meet the needs of students, smaller student/teacher ratios and more opportunities for students to engage actively in both curricular and extra-curricular activities. Small learning communities were also attributed with

the following merits:

- Increased student performance, reduction in the dropout rate
- A more positive school climate, including safer schools, more active student engagement, fewer disciplinary infractions and less truancy
- A more personalised learning environment in which students have the opportunity to form meaningful relationships with both adults and peers
- More opportunities for teachers to gather together in professional learning communities
- Greater parent involvement and satisfaction
- Cost-efficiency

The School Within a School (SWS)

The school within a school is another major initiative worth considering in trying to create the small school climate in larger school communities. Anderson in "Smaller is better" tells how one elementary school in Chicago has transformed itself from a large school to a cluster of small schools in the same building. DeJong and Locker (2006) explains that the school within a school is a planning pattern that has emerged during the last ten years as a means of balancing small school aims with big school traditions and efficiencies. They also predict that this pattern is simpler to put in place than more expansive reforms and may become the most common model for American high schools during the next 30 years.

Wasley *et al.* (2000) discussed a number of positive academic outcomes associated with SWS. The research team studied 143 elementary and secondary SWS programs in Chicago and found that SWS students, like students of small schools, showed increased course completion, higher grades and higher graduation rates.

Lee and Smith (1997) cited by Overbay (2003) suggests that given the thorny argument on the cost-effectiveness of small schools and the difficulty of identifying a definitive link between school size and achievement, "a reasonable alternative to building new schools is a movement to create a set of smaller schools-within-schools" (p. 220). McAndrews (2002) points out that there are a number of variations on this model, from schools-within-schools for specific grades, to the vertical-house plan common in Great Britain, where entire schools are broken up into "houses," or groups of several hundred students, but share the same facilities and faculty.

Gordon (1992) evaluated students who were not performing well in grades 7,8,9,10 in the context of SWS in Des Moines Public Schools, Iowa. The findings suggest that teachers work with reduced class sizes to make personal connections with students. Counsellors intensify human connections with these students. Students perceive the SWS program positively, with an average of 88 percent responding favourably in attitude surveys since 1989. Student performance objectives between 1989 and 1992 demonstrate positive growth for SWS

students in progress towards graduation and attendance and lower drop out rates. Research on the effect of SWSs is very positive. Cotton (1996) argues whether SWS students are compared with non-SWS peers in large schools or with their own pre-SWS performance, researchers have noted benefits in the areas of:

- Academic achievement in reading and test scores
- Student satisfaction
- Student-teacher relations
- Attendance
- Lower drop out rates
- Higher grade-point averages
- Higher high school graduation rates
- Fewer incidents of violence
- Increased parent participation and satisfaction
- Teacher job satisfaction

"Taking Stock: The Movement to Create Mini-Schools, Schools-Within-Schools and Separate Small Schools" (Mary Anne Raywid) discusses different ways that small schools can be nurtured within large buildings. Dunne (2000) warns school districts that simply creating small schools isn't enough. The following key considerations are offered.

- Small schools need support from within and outside the system to flourish.
- Small schools succeed only when teachers and administrators have enough time to plan the vision and mission of the school. They must act as a unified team to build the school's structure, rules and consequences for parents and students.
- School systems must supply ongoing staff development to help teachers identify and use best practices. Schools do better if they rely on data rather than educational trends.
- Being small isn't enough to improve student achievement. Small schools are a key ingredient, not a panacea for improvement.

Conclusion

Having reviewed the available literature on the issue of educational impact of school size, there are two schools of thought. There is no doubt that most of the literature available on the issue of school size and educational impact suggests that small schools are more beneficial for the following reasons:

- Student achievement in various standardised tests is greater in smaller schools, although marginally greater
- Student participation in school life including extra-curricular activities is greater
- The school climate is more positive
- Students have better attitudes towards their school and teachers
- Students have a greater sense of belonging
- Students form better interpersonal relationships with their peers and their teachers
- Student behaviour is improved with fewer serious incidents of disruptive behaviour
- Teachers' attitudes towards their work and students is more positive
- Parents are more involved and more positive about smaller schools.

The available literature favouring larger schools cites the following advantages:

- Their ability to provide a wide and varied curriculum
- Students from advantaged backgrounds perform well in larger schools.

There is much debate around possibilities of creating 'smaller' schools by means of small learning communities and SWS configurations. The creation of small learning communities and schools within schools was found to be advantageous and cite similar benefits associated with the small school argument. However, as this is a relatively new initiative, the literature is less conclusive than the arguments in favour of school size.

The size of schools seems to be determined more by political, economic, social and demographic factors. Whatever decision is taken, must take into account the context of the school, its history, local needs and potentialities as well as looking at the criteria for success in schools including; school climate, policies and procedures, curriculum and teaching quality, etc.

Bibliography

Andrews, M., Duncombe, W., and Yinger, J. (2002). Revisiting economies of size in American education: Are we any closer to a consensus? Economics of Education Review, 21(3). 245-262.

Barker, R. and Gump, P. (1964), Big School, Small School: High School Size and Student.

Bracey,-Gerald-E. (1998), An Optimal Size for High Schools? National-Education-Longitudinal-Study-1988 *Phi-Delta-Kappan*; v79 n5 p406 Jan 1998.

Cotton, K. (1996), School Size, School Climate and Student Performance.

Central Statistics Office (CSO) Census (2006), Preliminary Report The Stationary Office July 2006.

Cotton, Kathleen (1996), Schools Affective and Social Benefits of Small-Scale Schooling *ERIC® Clearinghouse on Rural Education and Small Schools* EDO-RC-96-5 (December 1996).

Cotton, Kathleen (1996), School Size, School Climate and Student Performanc, a comprehensive review of formal research studies on school size. ERIC Digest 113 July 1997, pp 10-11.

Cotton, Kathleen (2001), New Small Learning Communities: Findings from Recent Literature Research Associate School Improvement Program December, 2001.

Craig, I. (2001), Primary school size and its relationship to school effectiveness: an exploration of optimal size for primary schools. Ph.D., Kent, 51-12924.

Craig, I. (2001), Primary school size and its relationship to school effectiveness: an exploration of optimal size for primary schools. B3e Ph.D., Kent, 51-12924.

Darling-Hammond, Linda (1999), Teacher Quality and Student Achievement: A Review of State Policy Evidence by Stanford University Center for the Study of Teaching and Policy University of Washington December 1999.

DeJong, William S.; Locker, Frank (2006), When Large Is Small *The American School Board Journal* v.193 no. 10 (October 2006), p. 39-41.

Eberts, R.W., Kehoe, E., and Stone, J.A. (1984). The effects of school size on student

outcomes. Eugene, OR: Oregon University. (Eric Document Reproduction Service No. ED 245 382).

Eivers, Shiel, Perkins, Cosgrove (2005) The 2004 National Assessment of English Reading, Educational Research Centre

Fowler, Jr., William J., Herbert J., and Walberg (1991), School Size, Characteristics and Outcomes *Educational Evaluation and Policy Analysis*, Vol. 13, No. 2 (Summer, 1991), pp. 189-202.

Francis, L.J. (1992), Primary school size and pupil attitudes: Small is happy? *Educational Management and Administration, 20* (2), pp 100-104.

Friedkin, Noah E., Juan Necochea (1998), School System Size and Performance: A Contingency Perspective *Educational Evaluation and Policy Analysis*, Vol. 10, No. 3 (Autumn, 1988), pp. 237-249

Gordon, Randy (1992), School within a School, Grades 7,8,9,10. Focus on Program Evaluation. Des Moines Public Schools, Iowa. Department of Information Management

Harker, Richard (2005), School size and student attainments: Some New Zealand data CIES (West) Conference, Vancouver, Sept 29 – Oct 1, 2005 College of Education Massey University

Herbst, Miko aj and Jan Herczyn (2004), Is Large More Effective than Small is Beautiful? Size and Performance of Primary Schools in Poland1 Warsaw University November 2004

Hopkins, D. and Ellis, P. David (1991), The effective small primary school: Some significant factors. *School Organisation, 11* (1), pp 115-122.

Howley, Craig (1994), The Academic Effectiveness of Small-Scale Schooling (An Update). *Eric Digest*. Eric Clearinghouse on Rural Education and Small Schools Charleston WV.

Howley, Craig (1995), The Matthew Principle: A West Virginia Replication? *Education Policy Analysis Archives Journal*

Howley, Craig 1996 *ERIC Clearinghouse on Rural Education and Small Schools* Charleston WV. Ongoing Dilemmas of School Size: A Short Story. ERIC Digest. ED401089

Howley, Craig (1996), Compounding Disadvantage: The Effects of School and District Size

on Student Achievement in West Virginia *Appalachia Educational Laboratory ERIC Clearinghouse on Rural Education and Small Schools*

Howley, Craig, Marty Strange, Robert Bickel Research about School Size and School Performance in Impoverished Communities *ERIC Educational Reports (2000)*

Howley, Craig B., Aimee A. Howley (2004), School Size and the Influence of Socioeconomic Status on Student Achievement: Confronting the Threat of Size Bias *Education Policy Analysis Archives*. Volume 12 Number 52 September 24, 2004

Irmsher, Karen School Size *Clearing House on Educational Policy and Management (1997)*

Kent, Lawrence, Ed.D., Barbara, Bingler, Steven, *et al.* (2002), The Cost Effectiveness of Small Schools *Dollars and Sense.*

Klonsky, Michael, Are Smaller Schools the Answer? *Education World (1999)* http://www.educationworld.com/a_admin/admin/admin101.shtml

Kuziemko, Ilyana (2004), Using shocks to school enrolment to estimate the effect of school size on student achievement *Economics of Education Review* 25 (2006), 63–75 Department of Economics, Harvard University, Cambridge, MA 02138, USA

La-Sage, ed.; Ye, Renmin (2000), A Study on the Relationship between Students' Achievement, School Size and Gender. Paper presented at the *Annual Meeting of the Southwest Educational Research Association (Dallas, TX, January 27-29, 2000).*

Lamdin, Douglas J. (1995), Testing for the Effect of School Size on Student Achievement within a School District. *Education Economics*, v3 n1 p33-42 April 1995.

Lawton, Stephen-B. (1999), School Size, Cost and Quality. *School-Business-Affairs*; v65 n11 p19-21 Nov 1999

Lee, Valerie E.; Loeb, Susanna (2000) School size in Chicago Elementary Schools: Effects on Teachers' Attitudes and Student' Achievement *American Educational Research Journal*, Vol. 37, No. 1. (Spring, 2000), pp. 3-31.

LeFevre, Andrew T. and Rea S. Hederman, Jr. (2001), Report Card on American Education A State-by-State Analysis 1976-2000 American Legislative Exchange Council

Luyten, Hans (1994), School Size Effects on Achievement in Secondary Education: Evidence

from the Netherlands, Sweden and the USA. *Paper presented at the Annual Meeting of the American Educational Research Association* (New Orleans, LA, April 4-8, 1994).

McLaughlin, Don (2005), Considerations in Using the Longitudinal School-level State Assessment Score Database *Statistics and Strategies*, Palo Alto, CA December 2005

Meier, Deborah W. (1996), The Big Benefits of Smallness. *Educational Leadership*, v54 n1 p12-15 Sep 1996

Monk, D.H., and Haller, E.J. (1993), "Predictors of High School Academic Course Offerings: The Role of School Size," *American Educational Research Association*, Vol. 30, No. 1, Spring, pp. 3-21

Nathan, Joe and Karen Febey (2001), Smaller, Safer, Saner, Successful Schools Center for School Change *National Clearinghouse for Educational Facilities*

Overbay, Amy (2003), School Size: A Review of the Literature E&R Report No. 03.03 February 12, 2003 Wake County Public School System Research Watch

Page, Lindsay, Layzer, Carolyn, Schimmenti, Jennifer, *et al.* (2002), National Evaluation of Smaller Learning Communities Literature Review February 2002 *Prepared for* David Goodwin US Department of Education Planning and Evaluation Service 400 Maryland Avenue, SW Washington, DC 20202

Plecki, Margaret (1991), The Relationship between Elementary School Size and Student Achievement. *Paper presented at the Annual Meeting of the American Educational Research Association* (Chicago, IL, April 3-7, 1991).

PriceWaterhouseCoopers Department of Education and Skills Academies Evaluation Annexes (2003), *Journal of Research in Rural Education,* Spring, 1996, Vol. 12, No. 1, 25-32

Ramirez, Al (1992), Size, Cost and Quality of Schools and School Districts: A Question of Context. Source Book on School and District Size, Cost and Quality

Raywid, Mary Anne, "Taking Stock: The Movement to Create Mini-Schools, Schools-Within-Schools and Separate Small Schools"

Schneider, Mark (2002), Do School Facilities Affect Academic Outcomes?
National Clearinghouse for Educational Facilities

Spielhofer, Thomas, O'Donnell, Lisa, Benton, Tom, Schagen, Sandie and Schagen, Ian (2002), The impact of school size and single-sex education on Performance (LGA Research Report 33). Slough: NFER.

Stevenson, Kenneth R. (1996), Elementary School Student Capacity: What Size Is the Right Size? *Educational-Facility-Planner*; v33 n4 p10-14 1996

Stevenson, Kenneth R. (2006), School Size and Its Relationship to Student Outcomes and School Climate A Review and Analysis of Eight South Carolina State-wide Studies *National Clearinghouse for Educational Facilities* University of South Carolina

Stevenson, Kenneth R. (2006), School Size – Considerations for Safety and Learning WestEd Policy Brief October 2001

Stevenson, Kenneth R. (2006), Elementary School Climate and Its Relationship to School Size

Stevenson, Kenneth R. (2007), Educational Trends Shaping School Planning and Design: Educational Leadership and Policies *National Clearinghouse for Educational Facilities* Department of College of Education University of South Carolina

Surgenor, Shiel, Close, Millar (2006) Counting on Success Mathematics Achievement in Irish primary schools Prepared for the Department of Education and Science by the Educational Research Centre

Vinson, Judith (2001), Small vs. Large Schools: Are Smaller Schools Better? A Pilot Study University of Georgia

Williams, D.T. (1990). 7-8 School Size The dimensions of education: Recent research on school size. Working Paper Series. Clemson, SC: Clemson University, Strom Thurmond Institute of Government and Public Affairs. ED 347 006.

Wasley, Patricia A., Fine, Michelle, Gladden, Matt, *et al.* (2000), Schools: Great Strides. A Study of New Small Schools in Chicago. Bank Street College of Education, New York, NY. Joyce Foundation, Chicago, IL. http://www.bnkst.edu.html/news/SmallSchoolsinChicago.pdf

Weaver Dunne, Diane (2000), Are Small Schools Better Schools *Education World* http://www.education-world.com/a_issues/issues108.shtml

Wendling, W.W. and Cohen, J. (1981), Education resources and student achievement:

Good news for schools. Journal of Education Finance, 7, 44-63.

Wilson, Howard Wainer, and Harris, L. Zwerling, Evidence That Smaller Schools Do Not Improve Student Achievement *Phi Delta Kappan* 88 no4 D 2006 PAGE(S): 300-3.

Consulted Databases and Web sites

- Association for Computing Machinery (ACM)
- Digital Library
- Academic Search Primer\|Business Source Primer
- Business Source Primer
- Emerald Management Xtra
- Cambridge Journals Online
- Education Resources Information Center (ERIC)
- Economic and Social Research Institute (ESRI) Reports
- Index to Theses
- Inspec (EI Engineering Village)
- Oxford reference online
- Professional Development Collection _PsycArticles
- Psych INFO
- Science Direct
- Social Science Citation Index
- SwetsWise
- Web of Science
- Wilson OmniFile
- JSTOR
- Social Science Citation Index

The following are some of the web sites that have also been referenced in the course of the research

http://www.education.ie (Department of Education and Science - Ireland)

http://www.dfes.gov.uk (UK Department of Education and Skills)

www.ed.gov (US Department of Education)

http://www.qca.org.uk/ UK Qualifications and Curriculum (QCA)

http://www.bera.ac.uk British Education Research Association (BERA)

http://www.aera.net American Educational Research Association (AERA)

http://www.esai.ie Education Studies Association of Ireland (ESAI)

http://www.leeds.ac.uk/bei/bei.htm British Education Index (BEI)

http://www.eera.ac.uk European Education Research Association (EERA)

http://www.scre.ac.uk The Scottish Council for Research in Education (SCRE)

http://brs.leeds.ac.uk British Education Index (BEI)

http://www.eurydice.org Eurydice – the information network on education in Europe

www.bei.ac.uk

http://www.leeds.ac.uk/edcol/

http://www.edfacilities.org

Appendix A

TABLE 1—NUMBER OF STUDENTS ENROLLED AT PRIMARY SCHOOLS IN IRELAND BY YEAR.

Enrolment	Less than 50	50-99	100-199	200-299	300-499	Above 500
2001/2002	728	995	765	377	228	64
1995/1996	727	901	827	371	270	105
1985/1986	611	864	916	363	534 (figure for 300+)	-

Table shows the number of students enrolled at Primary schools in Ireland by year. The total number of schools is 3157

Appendix B

Data relating to enrolment are based on statistical returns from educational institutions in the academic year 2003/2004. The enrolment reference date is September 30th 2003.

TABLE 2—NUMBER OF EDUCATIONAL INSTITUTIONS

FIRST LEVEL:	
Aided by Department of Education and Science:	
National Schools (Ordinary)	3,150
Special Schools	128
•Non-Aided Primary Schools	43
SECOND LEVEL:	
Aided by Department of Education and Science:	
Secondary Schools	406
Vocational Schools	247
Community Schools	74
Comprehensive Schools	16
Aided by other Departments (Agriculture/Defence)	9
•Non-Aided Colleges	**11**
THIRD LEVEL:	
Aided by Department of Education and Science:	
† Universities	7
* Other H.E.A. Institutions	3
Teacher Training:	
— Primary **	3
— Home Economics	2
Institutes of Technology	14
Other (includes N.C.I., Killybegs H.T.C., Tipperary Institute, Mater Dei and Pontifical College)	5
Aided by other Departments (Justice/Defence)	**2**
•Non-Aided:	
Religious Institutions	4
Others (including Royal College of Surgeons in Ireland)	16

Data in respect of Non-Aided Schools and Colleges represent the number of such schools which provided the Department with Statistical Returns of their enrolment. Non-aided primary schools not catering for children aged 6 or over are excluded from this table. Non-aided second level colleges provide Secretarial, Commercial and Leaving Certificate courses.

† The seven Universities are Trinity College, Dublin; University College Dublin – National University of Ireland, Dublin; University College Cork – National University of Ireland, Cork; National University of Ireland, Galway; National

University of Ireland, Maynooth; University of Limerick and Dublin City University. The National University of Ireland comprises the four Constitutent Universities – University College Dublin – NUI, Dublin; University College Cork – NUI, Cork; NUI, Galway and NUI, Maynooth

* Includes National College of Art and Design, St. Patrick's Teacher Training College, Drumcondra and Mary Immaculate College of Education.

** Includes St. Mary's Marino, Church of Ireland College of Education, Upper Rathmines Road and Froebel College of Education, Sion Hill, Blackrock.

Appendix C

Data relating to enrolment are based on statistical returns from educational institutions in the academic year 2003/2004. The enrolment reference date is September 30th 2003.

TABLE 3—NUMBER OF PERSONS RECEIVING FULL-TIME EDUCATION BY SEX AND TYPE OF INSTITUTION ATTENDED

TYPE OF INSTITUTION ATTENDED	MALE	FEMALE	TOTAL
FIRST LEVEL **AIDED BY DEPARTMENT OF EDUCATION and SCIENCE**			
National Schools:	**229,565**	**216,464**	**446,029**
Pupils in Ordinary Classes	220,171	209,800	429,971
Pupils in Special Schools … … … … … … … … …	4,290	2,428	6,718
Pupils with special needs in Ordinary National Schools	5,104	4,236	9,340
†† **Non-Aided Primary Schools**	**3,097**	**2,629**	**5,726**
TOTAL - First Level	**232,662**	**219,093**	**451,755**
of which aided by Department of Education and Science	229,565	216,464	446,029

Apendix D

Table 8.21: School size and pupil achievement

	1st class (N=3735)				5th class (N=3968)			
Mean % enrol	%	Mean ach	SE		Mean % enrol	%	Mean ach	SE
Small (RefGroup)	96.7	33.1	258.6	4.39	82.3	33.4	258.9	3.44
Medium	234.5	33.6	241.3	4.51	223.9	33.2	241.1	5.42
Large	457.2	33.3	250.4	3.62	438.8	33.5	251.9	3.33