OECD Education Working Papers No. 106

School Size Policies: A Literature Review

Macarena Ares Abalde

https://dx.doi.org/10.1787/5jxt472ddkjl-en

OECD

Unclassified **EDU/WKP(2014)5**

Organisation de Coopération et de Développement Économiques
Organisation for Economic Co-operation and Development **03-Nov-2014**

English - Or. English

DIRECTORATE FOR EDUCATION AND SKILLS

EDU/WKP(2014)5
Unclassified

SCHOOL SIZE POLICIES: A LITERATURE REVIEW

OECD Education Working Paper No. 106

This paper was prepared by Macarena Ares Abalde during a secondment at the Early Childhood and Schools Division, Directorate for Education and Skills, OECD, with the sponsorship of the Jaume Bofill Foundation for the period March-August 2013. The paper is part of the work undertaken by the OECD Review of Policies to Improve the Effectiveness of Resource Use in Schools (School Resources Review) and includes revisions in light of the discussion of an earlier version [EDU/EDPC/SR(2014)2] at the first meeting of the Group of National Experts on School Resources (14-15 May 2014). Macarena Ares Abalde is currently a phd candidate at the European University Institute in Florence (Italy) and can be contacted at: macarena.ares@eui.eu.

The purpose of the OECD School Resources Review is to analyse how resource inputs in school systems should best be distributed, utilised and managed to optimise school outputs, encourage successful teaching and learning and promote continuous improvement. The Review provides analysis and policy advice to help governments and schools achieve effectiveness and efficiency objectives in education. More information is available at: www.oecd.org/edu/school/schoolresourcesreview.htm.

Deborah Nusche, Policy Analyst
Email: deborah.nusche@oecd.org
Tel: +(33-1) 45 24 78 01

JT03365439

Complete document available on OLIS in its original format
This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

English - Or. English

OECD EDUCATION WORKING PAPERS SERIES

OECD Working Papers should not be reported as representing the official views of the OECD or of its member countries. The opinions expressed and arguments employed herein are those of the author(s).

Working Papers describe preliminary results or research in progress by the author(s) and are published to stimulate discussion on a broad range of issues on which the OECD works. Comments on Working Papers are welcome, and may be sent to the Directorate for Education and Skills, OECD, 2 rue André-Pascal, 75775 Paris Cedex 16, France.

This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

You can copy, download or print OECD content for your own use, and you can include excerpts from OECD publications, databases and multimedia products in your own documents, presentations, blogs, websites and teaching materials, provided that suitable acknowledgement of OECD as source and copyright owner is given. All requests for public or commercial use and translation rights should be submitted to rights@oecd.org.

Comment on the series is welcome, and should be sent to edu.contact@oecd.org.

This working paper has been authorised by Andreas Schleicher, Director of the Directorate for Education and Skills, OECD.

---

www.oecd.org/edu/workingpapers

COPYRIGHT © OECD 2014

ABSTRACT

Recent demographic, economic and political trends have placed the issue of school size at the heart of school effectiveness and efficiency discussions. The subject of school size is particularly salient in remote and rural areas where the viability of small schools has been questioned. In spite of the relevance of school size policies, the literature on this issue is quite fragmented with few studies taking a comprehensive view on the implications of school size policies. This literature review attempts to bridge different strands of relevant research and describes existing country practices in order to provide a broader picture of the benefits and costs associated with different school sizes. The paper describes the different trends that have affected school enrolment and how different countries have managed school size policies, with a particular focus on school consolidation. It discusses the consequences of school consolidation and the alternatives to consolidation when schools are facing declining enrolment. It also reviews the different mechanisms through which school size affects the quality and efficiency of schools, and the existing empirical evidence on these effects.

RÉSUMÉ

Les récentes évolutions démographiques, économiques et politiques ont placé la question de la taille des écoles au centre du débat sur l'efficacité et l'efficience du système éducatif. Le sujet de la taille des écoles est particulièrement important dans les régions isolées et rurales où la viabilité des petites écoles est mise en cause. Malgré l'importance des mesures visant à réguler la taille des écoles, la littérature sur ce sujet reste divisée et peu d'études présentent une vue d'ensemble de ces politiques et de leurs implications. Cette revue de littérature vise à rapprocher les différents courants de la recherche sur ce sujet et à examiner les pratiques existantes afin de présenter une vue exhaustive des coûts et bénéfices qu'impliquent différentes tailles d'écoles. Ce papier décrit les facteurs sous-tendant l'évolution des inscriptions ainsi que les politiques visant à réguler la taille des écoles menées dans différents pays. Il analyse les conséquences des politiques de consolidation d'écoles et des options alternatives à la consolidation lorsque les inscriptions sont en baisse. Il examine également les résultats empiriques relatifs à l'impact de la taille sur la qualité et l'efficience des écoles.

TABLE OF CONTENTS

ABSTRACT 3
RÉSUMÉ 3
1. INTRODUCTION 5
2. METHODOLOGY 6
3. TRENDS AFFECTING SCHOOL ENROLMENT 8
4. HOW SCHOOL SIZE INFLUENCES SCHOOL EFFECTIVENESS AND EFFICIENCY 10
4.1 The effects of size on school effectiveness 10
4.2 The effects of size on school efficiency 17
4.3 Effects of school closure and consolidation on the surrounding community 19
5. SCHOOL SIZE POLICIES IN RURAL AND URBAN AREAS 21
5.1 Country approaches to school size policies 21
5.2 Policy options to confront declining rolls and disadvantages related to small schools 24
6. EVIDENCE OF THE EFFECTS OF SCHOOL SIZE 33
6.1 Evidence for the relationship between school size and effectiveness 33
6.2 Evidence for the relationship between school size and efficiency 35
6.3 Implications of the research results 37
6.4 Deficiencies in existing literature and methodological challenges 39
7. CONCLUSION 43
BIBLIOGRAPHY 44

1. INTRODUCTION

The question of what makes schools effective has been a frequent concern in educational policy literature. Research on the determinants of school and student outcomes is extensive and considers a vast set of school resources. School size is one of many factors that can affect school quality, and a widely researched and debated topic in the literature. Practice and research show that there is no 'one-size-fits-all' recipe for creating effective schools, and this is also the case for school size. Moreover, school size policy is a salient issue that attracts the attention of policy-makers, school reformers, parent groups, community organisations and professionals. School size can become a sensitive issue, especially when size policies entail the restructuration or closure of schools.

Debates (and research) on school size mostly revolve around two different, but intrinsically related, issues: the implications of size for school quality, and for fiscal efficiency. Scholars have tended to treat these two issues separately, focusing either on the effects of size on school effectiveness or on school efficiency.

Due to demographic, economic and political trends that will be reviewed below, small schools have become a pressing policy issue in many countries and regions. The sustainability of small schools is threatened by falling rolls, and many small schools across the OECD have been closed or consolidated over the last few decades. Concerns about the viability of small schools are based on the quality of the education provided by these schools and their maintenance costs (Howley et al., 2011). There is considerable variation in the size of schools across countries and regions. This variation reflects differences in population dispersion, geography, economic activity, but it is also a result of professional, political and social struggles (Howley et al., 2011).

School restructuring as a means to have larger schools or to confront underutilised schools has frequently taken the form of consolidation. Consolidation is the process of combining, dissolving or reorganising schools or school districts into one unit (Killeen and Sipple, 2000). As a consequence of consolidation students are relocated to another school (or a new school building) (Howley et al., 2011). However, large school size cannot be achieved in all contexts. In some situations school consolidation or restructuring can be very problematic or even unfeasible. Increasing school size can be considered a policy option in densely populated areas with more than one school in them. In these situations, it should be possible to reorganise or merge schools. However, in areas with low population density, increasing school size may not be an option for policy-makers. This is the situation in many rural and remote areas, where schools facing declining rolls do not have the possibility of attracting more students, and where consolidation may be problematic for different reasons such as travel distances and lack of adequate facilities.

The rest of the paper proceeds as follows: Part 2 presents the methodology applied in this literature review; Part 3 introduces different trends that have affected school enrolment and school size policies in the last decades; Part 4 presents the different mechanisms through which size effects take place, these effects are presented separately for the quality of education (effectiveness mechanisms) and its efficiency; Part 5 reviews different country approaches to school size policies, in particular the practice of school consolidation and alternatives to it; Part 6 presents the empirical evidence on the effects of size on school effectiveness and efficiency available, the implications of these results as well as the limitations and challenges presented in the empirical studies; lastly, Part 7 presents some concluding remarks.

2. METHODOLOGY

The literature addressing school size policies is very extensive and covers a variety of issues, from a strict evaluation of the effects of school size (measured by the number of students per school) on a set of performance measures, to a wider contextualisation of school size policies into recent demographic trends or practices of school closure. Moreover, these different strands within school size policy research have developed quite independently from each other with little cross-referencing. For this reason, this literature review relies on a variety of sources to build a comprehensive picture about the problematic of school size policies and the empirical findings on the effects of such policies. The sources reviewed cover journal articles, conference proceedings, as well as government and corporate reports.

To locate the relevant literature, this paper relied on online search portals (Science Direct and Google Scholar), key article reference searches, and existing OECD literature. To conduct the search on online portals a combination of different keywords were used: “school”, “size”, “scale”, “economies of scale”, “school consolidation”, “rural schools”, “small schools”, “remote schools”. Once the search was conducted, the inclusion of the articles as part of the review was based on an analysis of the abstracts. The sources included as part of the review can be divided into two main types: empirical research on the effects of school size policies based on both quantitative and qualitative data; and policy papers describing the implementation of school size and school consolidation policies in different contexts. While the former consist mostly of journal articles, the latter are mainly conference proceedings or government or corporate reports. Only sources referring to primary or secondary education are included in this review, evidence on tertiary education has been purposely excluded from it.

The literature review is mainly based on studies published in English. Most of the empirical studies that assess the effects of school size on school effectiveness, efficiency and equity are based on data from the United States, where size is considered as part of a wide range of analyses on economies of scale in schools and school districts. The description of specific country practices, trends and challenges provides a wider geographical coverage and also drew on documents published in Spanish, French and German. These additional sources in other languages were extracted from the references in the articles found through the main search.

There are two main strands to the literature on school size: one is composed of mainly analytical papers attempting to assess the effects of school size policies, and the other, more descriptive strand, considers the implementation of these policies. It is important to note that the analytical strand is mainly composed of studies conducted in the United States. Considering that the implications of school size policies are strongly context-dependent (as will be set out in the next sections) this is a crucial limitation to the transferability of these results to other local or regional contexts. Even if the descriptive strand covers a wider variety of country and regional contexts, this research mostly engages in a description of practices without attempting to assess the impact of such policies. For this reason, when reading the results from the existing studies the limited external validity of these results should be considered. Unfortunately, the limited amount of evidence and assessments from projects in other regions impedes the comparison of the US results to other contexts. An analytical research agenda about the effects of school size in other regions should be developed further before conclusions are made on how context dependent these US-based results are, and to what extent they are transferable to other contexts.

This review of existing research also exposes some fundamental methodological challenges that scholars in this area have had to face, as well as some shortcomings in this work. Firstly, the literature on school size effects and policies lacks a comprehensive theoretical model on how size impacts school efficiency and effectiveness. This has led to certain inconsistencies between studies, since scholars often

include different variables and measures in their analysis (to account for the inputs, outputs and outcomes of school size policies). Moreover, different specifications of cost and production functions are used across the literature, which impairs the comparability of the results of these models.

There are also considerable endogeneity threats to school size and consolidation studies, which are inherent to the issue of school size. Variation in school size is frequently related to variation in contextual factors, as well as to varying composition of the student and teacher population. This impedes disentangling school size effects from selection effects. When possible, researchers have attempted to analyse longitudinal data, implement value-added models, or study exogenous shocks to school size to eliminate some of these potential threats, but most studies are based on observational data and correlational analyses.

The challenges to school size research also arise from the difficulty of quantifying all of the costs and benefits of these policies, given that most of them are strictly non-monetary. Researchers face the challenge of measuring school outcomes in a context where school size policies are very likely to generate externalities that affect the local community beyond the school. The poor measurement of school outcomes is manifest in the frequent reliance on average text scores or graduation rates. The measurement of costs also faces considerable challenges.

The consideration of methodological challenges and shortcomings in existing research on school size and school consolidation policies is crucial to assessing and comparing the results of recent research. For a more detailed discussion of these methodological challenges, please see section 6.4 of this paper.

3. TRENDS AFFECTING SCHOOL ENROLMENT

The demand for schooling varies across countries and regions, but economic, demographic and social developments in the last decades have particularly shifted the demand towards urban areas, whilst rural and remote areas have increasingly faced declining student rolls. These exogenous forces have raised the issue of consolidation in many rural areas.

Industrialisation and urbanisation processes over the last decades have triggered migration from rural into urban areas, causing population decline in the former and thereby falling student rolls in many rural schools. Due to the rise of industry in urban areas and the rural economic decline, many individuals, mostly young people, left the rural environment where they were born and moved to urban areas (Bard et al., 2006). In fact, one of the most visible trends in the latest decades is a move to a more urban world, with more and more people living in cities (OECD, 2013). This has considerably reduced the population density of many rural regions. This migration wave, combined with decreasing fertility rates, lowered student enrolment in many rural areas. The ratio of school age population to the local population declined steeply in rural areas around the world (Budde, 2007; Im, 2009; Kenny and Schmidt, 1994; Riew, 1986; Sigsworth and Solstad, 2005; Solstad, 2009). As an example, some regions in Eastern Germany faced a reduction in the number of children entering primary school (Grundschule) of about 40 percent between the years 1990 and 1998 (Budde, 2007). This decline in enrolment rates and school-age population increased per-student costs of education in rural regions, thereby putting the sustainability of these schools into question.

Together with urbanisation and rural economic decline, the development of better highway and road systems, as well as improvements in motorised vehicles improved the conditions for school consolidation (Howley et al., 2011; Kenny and Schmidt, 1994). With a better transportation network it has become possible to cover longer distances in shorter times, which has permitted sending students to schools further away from their homes (Bard et al., 2006)

The advancing integration of the world markets also increased the pressure on educational systems to provide the human capital needed to be competitive in a globalised world (OECD, 2013). In the United States this pressure was already evident during the Cold War (Bard et al., 2006) and it pushed governments to reform and rationalise the education system. In the 20th century, national and regional governments played an increasing role in the design and implementation of educational policies (Kenny and Schmidt, 1994) with the objective of professionalising schooling and reducing quality differences among schools and districts (Killeen and Sipple, 2000; Strang, 1987). This pressure for the bureaucratisation and standardisation of schools led to an extensive reorganisation of schools and schools districts, frequently entailing consolidation and closure (Killen and Sipple, 2000). Centralisation and rationalisation explain the consolidation trend taking place in the United States between the 1950s and 1970s, a period of increased student enrolment (Berry and West, 2010; Killeen and Sipple, 2000). Facility design standards, and the objective of combining elementary and secondary school districts created supportive institutional pressure for consolidation (Killeen and Sipple, 2000; PSBA, 2009). This early consolidation of schools attempted to implement an education model in accordance with the increasing urbanisation of the time, and to "transform the small, informal, community controlled schools of the 19th century into centralised, professionally run educational bureaucracies" (Berry and West, 2010, p.8).

Already by the 1930s, research on school size advocated an increase in the size of schools justified by its presumed positive impact on effectiveness (Howley et al., 2011). Moreover, during the following decades, and until the 1970s, research further indicated that unit costs of schooling also decreased as school size increased, indicating that larger schools were not only more effective but also more efficient (Bradley and Taylor, 1998). The benefits of larger schools were usually affirmed by research conducted at

that time, and the last major report favouring larger sizes for districts or schools appeared in 1970 (Howley et al., 2011). After that, studies conducted in the 1980s and 1990s indicated that there were limits to the benefits of larger schools, and that smaller schools also reported academic and social benefits (Stewart, 2009). Nevertheless, shrinking public economies in the 1990s, and the privatisation of public services continued to produce pressures for consolidation and closure (Sigsworth and Solstad, 2005).

In the United States, the attempts to rationalise and standardise the school system, with the support of the research conducted at the time, explain why the number of schools and school districts decreased rapidly from the 1930s to the 1970s. The number of districts decreased most rapidly in the 1950s and early 1960s (Strang, 1987), and the pace of consolidation has slowed considerably since the 1970s (Killeen and Sipple, 2000; Strang, 1987). An example suffices to illustrate the developments occurring at that time in the United States: between 1940 and 1990 the number of elementary and secondary public schools in the United States declined by 69 percent, in spite of a 70 percent increase in the population (Cotton, 1996). This trend towards a reduction in the number of schools and school districts is also visible in other countries. In England, the closure of rural schools started early in the 20th century, the rate of consolidation increased in the 1970s and reached a peak of 127 closures per year in 1983, continuing at around 30 a year up to 1997 (Lipsett, 2008; Rule, 2005). In Norway from 1950 to 1970, the number of primary schools in rural municipalities was reduced to less than a half (Solstad, 2005). School closure and consolidation also dominated rural schooling in Canada for most of the 20th century (Mulcahy, 2009). School closures were also frequent in some Eastern German regions in the 1990s, where one third of schools closed, in parallel to a 60 percent decline in the overall student population in primary schools (Budde, 2007). The number of small schools was also reduced in Sweden and in Greece during the 1990s and 2000s (O Slatara and Morgan, 2004).

However, in recent decades, the trend for consolidation has reversed in some areas, where small schools have emerged as a favoured reform model in urban communities. In the 1990s the number of high schools in New York City nearly doubled, as new small schools opened and large high schools were reorganised into smaller learning communities (Iatarola et al., 2008; Stiefel et al., 2000; Stiefel et al., 2009). The first wave of this small school movement had already started in New York City by the late 1960s, as a form of alternative and experimental education. Later, the second wave took place in the mid-1990s (Iatarola et al., 2008). From 1993 to 2003 the number of high schools in New York City nearly doubled, with the average high school enrolment decreasing from 2179 to 1220 over the decade (Iatarola et al., 2008). Due to evidence in support of the social and academic benefits found in smaller schools, based on large-scale studies from the late 1980s and early 1990s, a range of researchers and educational leaders are calling for policy makers to create an environment that fosters smaller schools (Stewart, 2009)

4. HOW SCHOOL SIZE INFLUENCES SCHOOL EFFECTIVENESS AND EFFICIENCY

Arguments for consolidation and larger school size stem from two presumed benefits of larger schools: first, larger schools promote better quality teaching and learning and, second, they do so at lower costs than smaller schools, that is, larger schools are more economically efficient. The literature on school size and consolidation has developed quite separately for these two issues. While some scholars have focused on the effects of school size on student outcomes (effectiveness studies), others have placed a larger emphasis on how size relates to schooling costs while keeping student outcomes constant or even improving them (efficiency studies). However, school size is a debated and controversial issue, and the purported benefits of larger schools are questioned by some studies. Moreover, it is likely that larger school size will trigger negative effects on some aspects of quality and costs of schooling, even if the overall effect remains positive. This section provides an overview of the different mechanisms through which school size may affect the quality and cost of education.

4.1 The effects of size on school effectiveness

School size may affect students' academic outcomes through its influence on: the quality and the breadth of the academic curriculum offered, the possibility to implement ability streaming, students' attitudes towards learning, the possibility to implement single-grade grouping of students, the offer of special needs education, students' attendance and dropout patterns. School size is also likely to affect other non-academic aspects of students' lives and the learning environment, which will ultimately have an impact on students' outcomes and school effectiveness. Such is the case of social behaviour and students' well-being, involvement in extra-curricular activities, the links to the surrounding community and the family, students' attitudes, and the interpersonal relationship between students and teachers outside the classroom.

4.1.1 Effects on students

Academic curriculum

One of the most consistent claims in the literature on school size is that larger schools provide students with a broader range of subjects to choose from, including specialised courses, and that this improves student outcomes (Barnett et al., 2002; Bradley and Taylor, 1998; Cotton, 1996; Iatarola et al., 2008; McVicar, 2000; Meyer, 2000; Leithwood and Jantzi, 2009). By providing students with a varied curriculum (e.g. advanced courses in mathematics, sciences, or foreign languages), students are able to specialise in those subjects in which they perform best, and this should ultimately lead to better results. Students would not just reach higher levels of achievement, but also benefit from the possibility of taking specialised courses for further education (e.g. tertiary education). However, not all scholars agree on this beneficial effect of size on curriculum variety. A small school that focuses on a few core and high quality courses can also achieve high student outcomes, and much of the material covered in specialised courses in large schools can also be taught at regular courses in small schools (Slate and Jones, 2005). Moreover, increases in size do not simply entail a broader range of subjects available. A closer examination of the research indicates that there is no reliable relationship between school size and curriculum quality, and that the strength of this relationship decreases as schools become larger, i.e. there are decreasing marginal returns to school size on this specific matter (Corbett and Mulcahy, 2006). In fact, Monk (1987), studying New York State schools found that scale economies can be exhausted and that increases in school size were related to broader curriculum only in schools up to 400 students.

A broader curriculum does not necessarily benefit all students equally. In fact, only a few students are likely to take advantage of additional courses (Slate and Jones, 2005), and a more varied curriculum is

likely to benefit students already achieving better results (Meyer, 2000). Smaller schools with a narrower curriculum emphasising core academic outcomes may help achieve more equitable results for all students (Nguyen et al., 2007).

Student grouping

School size has an impact on the extent to which schools are able to group students into single-grade groups or into homogenous groups according to their ability or age, both of which, in turn impact on students' learning environments. Very small schools usually do not have sufficient students to implement single-grade grouping, and, frequently, only larger schools are able to implement ability streaming among their students (Bradley and Taylor, 1998; McVicar, 2000; Nguyen et al., 2007). Hence, school size has a direct effect on the organisation of students into learning groups. The literature on this matter has debated extensively whether some forms of organisation (such as ability- streaming or multi-grade teaching) promote better student achievement than others. A detailed overview of such debate is out of the scope of this paper. Nevertheless, it should be noted that school size policies have a direct effect on the viability of strategies to group students and, for this reason, one can find some overlap between the literature on school size and on ability grouping.

Some research has emphasised the benefits of large schools in permitting ability grouping, and hence the formation of homogeneous groups based on students' achievements, which are supposedly easier to teach (e.g. Bradley and Taylor, 1998). Other scholars have argued against ability grouping and in favour of smaller schools, by arguing that tracking in larger schools would involve ethnic and class segregation (e.g. Nguyen et al., 2007). This, however, refers to a controversial and specific debate in the literature on tracking and ability streaming that remains out of the scope of this literature review (for further references on tracking see also: Dronkers, Van der Velden and Allison, 2011; Erikson, 2007; Lucas & Berends, 2002, 2007; Lucas & Gamoran, 2002; and Shavit, Arum & Gamoran, 2007).

Single- versus multi-grade grouping is a salient issue in the school-size debate. Small schools with multi-grade classes can be found in most countries around the world, and in the early 2000s they represented between 21% and 53% of classes in European countries (O Slatara and Morgan, 2004). Sörlin (2005) indicates that in Sweden, for instance, the method of teaching in mixed age groups has become a trend even in large central schools. In these schools, multi-grade organisation has been focused on primary pupils aged 6 to 9 years old. As with other aspects of the organisation of students into learning groups there is a considerable amount of research analysing the implications of multi- and single-grade grouping for students' cognitive and non-cognitive outcomes.

A review of the existing evidence suggests that multi-grade teaching does not necessarily have negative effects on students' outcomes, and that it could have positive implications for their attitudes and social behavior. Multi-grade teaching is frequently presented as a tool for promoting independent and individualised learning by enhancing students' self-reliance, but also as a form of organisation that provides opportunities for students' social development and peer- and cross-age learning and cooperation (Johnson et al., 1985; Little, 1995). However, as multi-grade teaching frequently appears in the context of school size reduction and population decline, the special needs and requirements of multi-grade schools are rarely recognised by educational authorities. As a consequence teachers and administrative staff usually lack the resources and knowledge to work effectively in this environment. Training and support for teachers in these roles, as well as specific school plans, instructional materials and methodological guidelines are often scarce; which can impair teaching and learning and ultimately negatively affect students' academic performance (Little, 1995).

Empirical evidence comparing the cognitive and non-cognitive outcomes of multi-grade and single-grade teaching is mixed, with most studies showing inconclusive results or no difference between these

two types of teaching (Little, 1995; Veenman, 1996). While a meta-analysis of the existing literature (which is mostly based on evidence from the United States and a few studies based on England) lead Mason and Burns (1996) to argue that multi-grade classes have a slightly negative effect on student achievement, Veenman (1996) contends (also from a meta-analysis of the literature) that the average weighted effects of multi-grade teaching tend to be zero or close to zero. Hence, existing evidence seems to indicate that children perform no better and no worse in multi-grade classes, as most evidence is either inconclusive or quite balanced. In terms of the non-cognitive outcomes of multi-grade teaching (analysed in the form of friendship patterns, self-reliance and esteem, social development, willingness to cooperate with other students, or work attitudes) evidence is also mixed (Little, 1995; Johnson et al., 1985). One of the only most unanimous conclusions in the field is that for multi-grade teaching to work effectively in promoting students' wellbeing and academic achievement it is necessary that teachers are well organised, resourced and trained. A more detailed analysis of the implications of multi-grade teaching or a review of the existing policy practices is out of the scope of this paper, for further information the reader may refer to Little (1995), Mason and Burns (1996) or Veenman (1997).

Students' attitudes towards learning

Students' attitudes towards learning and motivation for achievement are expected to be more positive in smaller schools (Cotton, 1996; Iatarola et al., 2008). In small schools, teachers and students have a closer relationship, and the former are able to respond to the individual needs of students. Teachers, parents and the students themselves tend to have higher academic expectations (Cotton, 1996). The individual attention and the recognition of merits achieved can also increase the motivation for achievement. Cotton (1996) claims that smaller schools are especially beneficial for low socioeconomic status and minority students. Duncombe and Yinger (2001) indicate that in small schools it is easier for the personnel to identify and assist students at risk of dropping out. Notwithstanding these theoretical claims, Leithwood and Jantzi (2009) argue that evidence on this matter is meagre and the results from prior research remain inconclusive.

Attendance and dropout rates

Cotton (1996) found evidence in the literature (mainly conducted in the United States) that smaller schools are associated with higher attendance rates, and that students who change to smaller schools improve their attendance. This is likely to be a consequence of the personalised attention available in small schools that allows for a prompt identification of students frequently absent, or with a risk of dropping out. In fact, school size is positively related to dropout rates in nine of the ten studies reviewed by Cotton, and in five of the thirteen studies reviewed by Leithwood and Jantzi (2009). Moreover, three of the studies reviewed by these authors reported evidence favouring midsize schools. Minority and low socioeconomic status students appear to benefit most from the advantages of small schools (Cotton, 1996). Another important factor to be taken into account is that school dropouts and truancy may increase in rural and remote areas in case of consolidation, especially if transportation time is high or convenient transportation means are absent (Bard et al., 2006). Hence, an unintended outcome of consolidation may be an increase in dropouts (Slate and Jones, 2005).

Social behaviour and students' well-being

One of the comparative disadvantages of larger schools frequently mentioned in the literature is that they may suffer from management difficulties and problems with discipline (McVicar, 2000). In small schools, teachers typically know students more closely and can identify possible discipline problems, which can be more easily and quickly addressed before they reach a crisis stage (Nguyen et al., 2007). Teachers can hence serve as advisor and mentors (Nguyen et al., 2007), and the close ties between the faculty and students, as well as among students are expected to remove anonymity and create an

environment where students and their concerns are visible, and teachers can share responsibility for responding to troubled students (Corbett and Mulcahy, 2006). Another advantage of smaller schools in relation to discipline issues is that there are fewer students to monitor (Nguyen et al., 2007). According to Meyer (2000), small schools are more effective in preventing disruptive behaviour, and provide a social environment supportive of adolescent development. Research on this topic conducted in the United States has found reduced incidence of misbehaviour in smaller schools (Leithwood and Jantzi, 2009), as well as fewer fights and incidents of serious violence, and lower rates of bullying and crime (Nguyen et al., 2007). Evidence from prior research also indicates that discipline problems increase as rural schools increase in size due to consolidation (Slate and Jones, 2005).

In larger schools, when discipline becomes a major concern, administrators tend to implement more restrictive and disciplinary actions (Meyer, 2000), which have been associated with higher dropout rates (Slate and Jones, 2005). Moreover, the prejudicial conditions of larger schools appear to affect especially lower socioeconomic status and minority students (Cotton, 1996).

Participation in school and extra-curricular activities

A set of studies on school size in the US have found that smaller schools promote participation in extra-curricular activities among their students more than larger schools do. Although larger schools can frequently offer a broader and more varied set of extracurricular courses for their students, according to Slate and Jones (2005), it is more likely that these activities will be overcrowded. This reduces the possibility for participation for some students. In their review of existing literature Leithwood and Jantzi (2009) refer to four different studies based on the case of the United States, all published between 1996 and 2007 and using three large, national US, longitudinal datasets. According to these, smaller schools tend to promote a more equitable participation in extracurricular activities, while larger schools are typically more polarised with a group of very active participants and a large group of students who do not participate in any activity. This finding is replicated in Cotton's (1996) review of the US-based literature. Similarly, Ornstein (1990) argues that smaller schools are more likely to give students more opportunities to engage in leadership roles, in school activities but also in school-community functions. Moreover, Cotton (1996) claims that the advantages that small schools may create in terms of participation could especially benefit low-socioeconomic status and minority students.

Links to the surrounding community

One of the most frequently mentioned advantages of smaller schools is that they forge stronger links with the school's surrounding community, including the parental community. In smaller schools, teachers and students are more likely to interact frequently with parents and other people outside the school, and this creates a stronger climate of cooperation between teachers, parents and peers. Smaller schools are in greater physical and psychological proximity to students' homes (Slate and Jones, 2005), and frequently have less formalised rules and procedures, which promotes a flexibility that facilitates the interaction of teachers and administrators with the parental community (Andrews et al., 2002). Also in smaller schools, parents have a better perception of the impact of their engagement in school activities, which may remain unnoticed in larger schools (Andrews et al., 2002). The stronger links between the school and the parental community are expected to enhance students' outcomes. A special feature of very small schools is that they may benefit from implicating the local community in learning activities. In Norway, some small rural schools keep records of educationally relevant people in the local community, which serves teachers as a resource to involve local people in learning activities (Solstad, 2005).

In a study on school consolidation taking place in Arkansas, Nitta et al. (2010) found that, with larger school size, teachers and parents report a reduction in the interaction with each other. After consolidation, the school authority is perceived by parents as being more distant, centralised and concentrated (Strang,

1987). The larger distance to the school organisation and to decision-makers makes interaction more costly and reduces parental attempts to take part in school activities (Berry and West, 2010; PSBA, 2009; Strang, 1987).

Students' attitudes

The closer ties between smaller schools and their surrounding communities relate to another positive feature of small schools: students are likely to show a stronger sense of belonging in these schools. With fewer students, teachers and administrators typically know all students personally and can give more personalised attention to them. It is less likely that a student will be unnoticed or unattended (Cotton, 1996; Iatarola et al. 2008). In a survey of students in small schools conducted by Corbett and Mulcahy (2006), students appreciated the family-like atmosphere of small schools where teachers know them very well. Moreover, because of the close interaction between school and community, teachers know where students come from and their particular context very well. This feeling of belonging is also partially explained by the larger participation of students in school and extracurricular activities in smaller schools. In large schools problems of student and teacher alienation can result in more frequent discipline problems (Meyer, 2000). The benefits of small schools are especially evident for younger children in the early years of schooling, when the transition from home to school takes place (Ornstein, 1990).

Interpersonal relationship between students and teachers

One of the disadvantages found in larger schools is that they tend to dilute the possibilities for interpersonal relationships between teachers and students outside the classroom as the plant size is larger, and this could have negative effects on the learning process (Bradley and Taylor, 1998). The argument is that teachers and schools administrators in smaller schools can invest more personal time and provide more interaction outside the classroom, and that this would make them better advisors and mentors for students (Nguyen et al., 2007). Cotton (1996) also finds evidence in the literature indicating that smaller schools favour the interaction between students and the faculty outside the classroom.

Evidence from schools that have been subject to consolidation indicates that teachers in consolidated schools experience difficulties in forming relationships between each other and with students, even years after consolidation occurred (Nitta et al., 2010). In these schools, students and teachers experience a more impersonal environment and less one-on-one student teacher interaction, also outside the classroom.

4.1.2 Effects on teachers and administrators

Teacher specialisation

Having a larger number of students and courses, larger schools also allow for teacher specialisation. Whilst in large schools teachers could potentially choose the classes they teach, in smaller schools they will often be obliged to teach a wider range of subjects, hence reducing the benefits from specialisation (McVicar, 2000). In large schools teachers can even choose to teach specialised courses within subjects (Bradley and Taylor, 1998).

Administrative burden on teachers

Another benefit teachers can obtain in larger schools is a reduction in the number of administrative tasks they need to perform (Bradley and Taylor, 1998). Larger schools can invest in specific administrative personnel, reducing the administrative burden on teachers and allowing them to focus on teaching. This could improve their effectiveness as teachers. In small rural schools teachers usually spend more time on activities other than teaching and class preparation, since they usually lack extra administrative or para-professional help (Solstad, 2005). Nitta and colleagues (2010) found that teachers in schools that have

consolidated benefit from a reduction in the number of classes they had to prepare daily as well as a reduction in the amount of administrative tasks, and hence they had more time to prepare these classes.

Teacher satisfaction

Prior literature reviews have found that teacher satisfaction tends to be lower in large schools (Cotton, 1996; Slate and Jones 2005). This difference may be related to discipline problems and a more negative environment prevailing in larger schools (Bradley and Taylor, 1998). Another common argument in the literature is that there is a higher degree of cooperation among teachers in small schools (Cotton, 1996; Leithwood and Jantzi, 2009; Slate and Jones, 2005). Nguyen and colleagues (2007) also argue that when small schools develop a cooperative and community-like environment, teachers enjoy their work more and display high morale. An additional reason for teachers to show higher motivation and effort in small schools stems from smaller organisations being flatter organisations with fewer layers of middle management, which encourage more input from all personnel (Duncombe and Yinger, 2001).

Nitta and colleagues (2010) also found some negative consequences of consolidation on teachers' attitudes and morale. In their survey carried out in consolidated schools, teachers reported experiencing difficulties in establishing relationships with other teachers in the new environment. This research indicates that the personal costs of consolidation on teachers are quite high, with the threat of consolidation layoff and turnover causing stress among them. Consolidation was especially prejudicial for teachers coming from smaller schools annexed to a larger one. However, teachers also reported a positive aspect of consolidation: it allowed them to broaden their professional network and interact with more teachers on a daily basis.

Availability of adequate teaching material

As mentioned earlier, for students, multi-grade teaching may also present difficulties for teachers. Teachers are frequently prepared for large urban schools, and face pedagogical and curricular challenges when confronted with multi-grade teaching, which is more common in small schools (Mulcahy, 2009; Yarrow et al., 1999). Teachers also frequently complain about the lack of adequate material for multi-grade classes, since textbooks and curriculum remain grade-based (Sigsworth, 2005). Multi-grade teaching often involves more planning, preparation and organisation; and teachers may suffer from inadequate support and a lack of time for preparation of class materials of some subject areas (O Slatara and Morgan, 2004). These difficulties accompanying multi-grade teaching can create frustration and lower teacher morale in smaller schools in comparison to larger schools, where single-grade teaching is the norm and teachers find themselves in an environment for which they have been prepared.

4.1.3 Issues affecting rural and remote areas, with implications for effectiveness

In addition to the advantages and disadvantages related to school size, schools located in rural and remote areas display special characteristics that may have an effect on student performance and that do not just depend on the size of the school in itself, but also on its geographical isolation. For this reason some of the implications of school remoteness on students' outcomes will be treated separately, as they are a consequence of both smaller size and distance to other schools.

Professional development for teachers

The issue of professional development and the availability of a professional community is a frequent concern of policy makers and school staff in rural and remote schools. Staff working in these schools often mention feeling isolated from their professional community, and from opportunities and activities for professional development. There are few activities teachers and other staff can engage in because of larger distances and transportation difficulties to the centres where these activities are organised (Boix, 2007;

García Cantó et al., 2008; Mulryan-Kyne 2005). Geographic isolation entails a lack of opportunities for face-to-face interaction and collaboration with other learners and the wider community. Teachers in remote schools generally showed greater need for opportunities to attend conferences (Reading, 2009). This issue is especially pressing if one considers that initial teacher education may be insufficient for teachers in remote schools, because instruction is mostly focused on practices pertaining to larger schools. Hence, professional development is unavailable where it is most needed (Koulouris and Sotiriou, 2006). This lack of professional training and development opportunities also affects school principals (O Slatara and Morgan, 2004). Evidence from consolidated schools presented by Nitta and colleagues (2010) indicates that teachers experienced an improvement in professional development opportunities after consolidation, and more chances for interaction with other teachers.

Teaching staff shortage

Another frequent concern in small remote schools is teacher shortage and lack of continuity of teachers. Different scholars have found that fewer teachers want to serve in rural and remote areas in different countries (e.g. Greece, Hungary, Iceland, Korea or Canada) (Horn, 2006; Im, 2009; Koulouris and Sotiriou, 2006; Moulton, 2001; Mulcahy, 2009; Sigbórsson and Jónsdóttir, 2005). Seventeen countries and economies out of the 65 that participated in PISA 2009 experienced teacher shortage more frequently in non-urban than in urban areas (OECD, 2010a). Difficulties to recruit and retain teachers in rural areas stem from the isolation and lack of support for teachers in these areas, as well as from the inadequacy of the training they receive to teach in this context (Moulton, 2001). Moreover, the shortage and rotation of teachers leaves an extra workload on the qualified and stable members of staff (Sigbórsson and Jónsdóttir, 2005).

As a consequence of the disincentives to teach in smaller rural schools, and the rotation of teachers, teachers with larger experience and better credentials tend to concentrate in city and town schools (O Slatara and Morgan, 2004; Iatarola et al., 2008). Iatarola and colleagues (2008) found that the percentage of licensed experienced teachers and teachers with master's degrees were lowest in very small schools. In Hungary, Horn (2006) found that highly educated teachers tended to be employed in cities not only due to financial reasons, but also to better living conditions and 'less problematic' students in these schools.

Lastly, rural and remote schools are often confronted with the challenge of providing quality special needs education. Due to the isolation and the shortage of specialised teachers that this type of schools face, many of them do not have qualified special needs teachers (Sigsworth, 2005) and the teachers only rarely have the opportunity for professional development or the extra-support needed to respond to special needs students.

The arguments presented so far indicate that there can be benefits in terms of effectiveness for both large and small schools. It is hence difficult to ascertain overall whether the advantages or the disadvantages to size prevail. Initially, research reported greater effectiveness in larger schools. However, later research found many benefits to smaller sizes. It is necessary to analyse empirically whether the advantages or the disadvantages to larger sizes prevail, and how different mechanisms interact. The last section of this literature review will present some of the results of studies relating size to effectiveness. However, it is important to remark at this point that while there are different mechanisms through which school size may affect effectiveness, most of these pathways are only rarely tested individually. Most research will try to relate school size to different student outcome measures, without empirically testing how mediation by the factors mentioned above takes place.

In spite of the different benefits that both larger and smaller schools entail, there is a consistent claim that smaller schools may be better able to close the achievement gap between students from different socioeconomic status. Small schools tend to promote a positive environment characterised by tight

community links and personal attention to students' needs that are especially beneficial for low-socioeconomic status and minority students. Moreover, some of the main positive advantages of size, namely subject specialisation and choice, seem to mostly benefit students showing already better performance and coming from advantaged socioeconomic backgrounds. Hence, small schools may be a tool to narrow the gap between students from affluent and poor communities. In practice, evidence indicates that smaller schools can counteract the effect of poverty on student achievement (Howley et al., 2011; Howley and Howley 2004). Howley and Howley (2004) found that increased school size favoured middle and upper class students (with an effect equivalent to an extra 0.25 years of schools) while it negatively affected low social class students (with an effect equivalent to a loss of 0.67 years of school). Hence, when analysing the effects of size on student achievement and school effectiveness, it is fundamental to consider socioeconomic status as a mediating variable, with its consequences for achievement equity (Corbett and Mulcahy, 2006).

4.2 The effects of size on school efficiency

One of the most common arguments in favour of larger school sizes, which is also frequently mentioned as a reason for consolidation, is that larger schools are more cost-efficient than smaller schools. The main reason for efficiency increasing with size is that schools face economies of scales, so that larger schools can reduce costs while maintaining their effectiveness or even improving it. Nevertheless, larger school sizes usually come with certain difficulties and changes that can actually increase schooling costs. This section will present the reasons for economies of scale in schooling (separately for capital spending and operating costs) and it will also cover possible implications of consolidation in terms of transportation costs and staff salaries.

4.2.1 Capital costs

In terms of scale economies in capital spending, larger schools (and also larger school districts) may benefit from price benefits of scale, i.e. the necessary resources can be purchased at lower unit costs when bought in larger quantities by negotiating bulk purchases of equipment or facilities, and by influencing producers (Duncombe and Yinger, 2001; Louis and McNamara, 1973; Tholkes, 1991). Hence, an investment in equipment made in large schools may result in lower unit costs than in smaller schools. Large schools can also benefit from scale economies of increased dimension and the benefits associated with larger units of capital (Duncombe and Yinger, 2001; Tholkes, 1991). For a large school it may be profitable to employ more efficient equipment, like a heating plant or a communications system, while in smaller schools such an investment would not be profitable given the reduced size of operation.

Larger schools can also face scale economies owing to indivisibilities or the use of facilities to greater capacity. This allows spreading the fixed costs of schools over a larger student body (Louis and McNamara, 1973; Stiefel et al., 2009). For example, savings can be obtained from the use of fewer buildings (Meyer, 2000). Scale economies also arise from the possibility of specialisation. Larger schools can invest more widely in facilities such as libraries, computer rooms, laboratories and sports facilities, when there are a sufficient number of students to efficiently utilise these specialised facilities (Andrews et al., 2002; Bradley and Taylor, 1998).

4.2.2 Operating costs

The opportunities for scale economies present in capital spending also affect operating costs (such as salaries for staff and instructional aides, and costs of administration, maintenance and operations). Larger schools can benefit from bulk buying and acquire more material supplies per student to lower unit costs (Andrews et al., 2002; Bradley and Taylor, 1998; Louis and McNamara, 1973). Indivisibilities also affect operating costs, since some of the services provided to each student do not diminish in quality as the

number of students increases (at least over some range), e.g. school administrators and support staff (such as librarians or counsellors) may provide a public good over some range of enrolment (Andrews et al., 2002; Duncombe and Yinger, 2001). However, diseconomies of scale may appear once a certain threshold in enrolment is reached. Taking administration as an example, there is a limit to the capacity of a fixed number of principals and administrative staff to manage a large school (Stiefel et al., 2009).

Within their operating costs, schools may also benefit from economies of scale due to specialisation. Larger schools have more opportunities to deploy their resources more efficiently. They can achieve appropriate class sizes across the entire curriculum and in specialised subject areas (Taylor and Bradley, 2000), and this allows for the specialisation of labour to increase productivity (Andrews et al., 2002; Duncombe and Yinger, 2001; Louis and McNamara, 1973). Smaller schools may not reach a sufficient number of students to efficiently provide specialised classes with specialised teachers.

4.2.3 Capacity Utilisation Rate

Another source of savings for schools are changes in capacity utilisation, but these do not depend on school size, rather on whether schools are operating at full capacity or suffer from under-utilisation. Even though capacity utilisation rate is not strictly related to school size, it remains an important issue in this literature review because it relates to the specific situation of rural or remote schools. These schools will usually be under-utilised due to declining rolls, and under-utilisation will result in higher overhead costs (Riew, 1986; Taylor and Bradley, 2000). While scale economies can only be achieved in the long term by changing the capacity of schools, the inefficiencies associated to low utilisation rates can be solved in the short term by increasing enrolment levels.

4.2.4 Transportation costs

Offsetting the benefits from scale economies and high capacity utilisation are transportation costs and possible increases in salary costs. These are frequently mentioned as the main disadvantages of school consolidation and merger in terms of costs.

Consolidated school districts and schools have to confront higher transportation costs since students and staff have to travel longer distances to reach the schools (Andrews et al., 2002; Duncombe and Yinger, 2001). Nevertheless, many studies fail to include transportation costs in their analyses, which leads to a bias towards overstating scale economies. Holland and Baritelle (1975), who include transportation costs in their analysis of consolidating districts, point to another flaw of existing research: it often fails to include the opportunity cost of commuting time. The value of children's commuting time would reduce the savings available from consolidation. Transportation is, surprisingly, one of the most understudied issues in the consolidation debate (Corbett and Mulcahy, 2006).

In sparsely populated areas, the increase in travel time resulting from consolidation may make consolidation unfeasible (Andrews et al., 2002). Transportation expenditures will vary across regions depending on population density and infrastructures. Killeen and Sipple (2000) found that, for the United States, the proportional increase in transportation expenditures between 1930 and 1980 exceeded the growth rates for overall enrolment and for the number of students being bussed to school.

The communities experiencing school consolidation often cite increased bus ride time as one of the most problematic aspects of consolidation (Killeen and Sipple, 2000). Besides the cost of transportation, longer commuting time may negatively impact students' lives by increasing fatigue, reducing attentiveness in class, or reducing the time available for recreational activities and interaction with the family. Additional disadvantages are caused by transportation schedule arrangements that do not allow students to participate in extra-curricular or sport team practices (Corbett and Mulcahy, 2006). Long commuting time,

unaffordable or unsafe transportation options could even increase the risk of dropping out of school, especially for those individuals who expect lower returns from education (Berry and West, 2010).

4.2.5 Staff costs

Another important source of increasing costs in schools after consolidation are teachers' and staff payrolls. Consolidation provides teachers and unions with comparison groups for collective negotiation, thereby making it more likely that salaries and benefits will level up to those of the most generous consolidating school or school district where teacher unions or associations have leverage in salary negotiations (Duncombe and Yinger, 2001; PSBA, 2009). This upward shift in staff payrolls is less likely to occur in settings where salary structures are more rigid and less subject to collective negotiation. Another reason for an increase in payroll costs could be that (depending on the specific regulation) post-consolidation layoffs will probably occur among the least senior people, and those who remain will tend to be higher on the salary structure (Duncombe and Yinger, 2010). Moreover, consolidation could also increase the base for the organisation of unions, which may prevent the kind of staff layoffs that constitute one of the major sources of costs savings associated with consolidation (Duncombe and Yinger, 2001). In fact, an analysis of school district consolidation in Pennsylvania found that total payroll costs increased after consolidation (PSBA, 2009). The changes in staff costs stemming from consolidation will depend on contextual factors, but the elements considered above should be taken into account for a detailed calculation of these costs.

4.2.6 Reduced competition between schools

Lastly, there is one aspect that may affect the efficiency under which schools operate: the number of schools. Facing a constant demand for schooling, school size and number will be intrinsically related, i.e. a choice for smaller schools entails a larger number of them. Kenny and Schmidt (1994) argue that a larger number of smaller schools is more desirable than a few large ones because these circumstances will allow a school choice matching parental preferences. Broader choice implies more competition among schools for students, which is expected to lead to more efficient provision of education. Hence, an adverse effect of larger schools is the erosion of competition for students and a reduction in the incentives for schools to perform well in comparison to the nearest competitors (Bradley and Taylor, 1998; Kenny and Schmidt, 1994). This will compromise overall school efficiency. However, school size is not necessarily related to competition. Isolated rural areas typically have smaller schools that face almost inexistent competition since the school supply is reduced and transportation costs undermine the possibility of opting for schools in other areas.

4.3 Effects of school closure and consolidation on the surrounding community

An efficiency analysis of school consolidation, closure or merger should consider the non-educational impacts of schools as possible costs or benefits of consolidation. Some of the effects that have been covered in the literature are: the implications of schools on social capital and community cohesion; the use of school facilities as a centre for non-school activities; and the impact of schools on the community's economy.

Social capital

Schools, especially in small rural and remote areas, are a source of social capital and community cohesion. Schools act as a meeting point and a place for interaction and the forging of bonds within the community. Their impact is especially visible when students engage in community-based learning that serves the needs of the community while addressing the needs of students (Koulouris and Sotiriou, 2006). This is the case in small remote schools that frequently resort to the community to compensate for the lack

of other school resources. Schools play a crucial role in maintaining community cohesion, and also in maintaining and transmitting local history and culture (Berry and West, 2010). By providing a space for interaction and bonding and by promoting a community identity, schools increase the amount of social capital within the community, thereby facilitating cooperation and coordination for mutual benefit among community members (Nguyen et al., 2007). The social capital the school promotes is expected to have a positive impact on the social life of the community, and this will especially be the case when the community supports and is involved in school activities (Moulton, 2001).

Other services provided by schools

In rural and remote areas, schools frequently provide expanded services in their amenities. These activities can be related to education, e.g. in the form of a study centre for young people and adults, or a kindergarten, but they can also be used for other activities, as an information centre for municipal services, a work place for very small businesses, a space for the organisation of local cultural activities, or a polling station (Sigsworth, 2005; Koulouris and Sotiriou 2006).

Impact on the local economy

Lastly, school consolidation and closure may have an impact on the vacated community's economy. One of the claims in favour of maintaining small schools in rural and remote areas is that schools can have a positive economic impact by partly hindering the tendency of loss of young economically active adults through migration (Koulouris and Sotiriou, 2006). Moreover, it has been argued that consolidation may lead to lost taxes, declining property values and lost businesses (Duncombe and Yinger, 2010; Lyson, 2002; Meyer, 2000). Lyson's (2002) study of rural communities in the state of New York indicated that housing values were higher and municipal structures more developed in small villages with schools, than in villages without them. However, the results presented by Lyson show a mere association between these variables, which is insufficient to designate consolidation as the cause of these developments.

Sell and Leistritz (1997), with their research based on personal interviews with community leaders, school administrators and school board members, and on a mail survey in eight school districts, argue that the negative economic trends present in some consolidating districts were already in place prior to consolidation. Reductions in services, businesses and retail sales occurred already before consolidation, probably as a consequence of declining population trends. Communities where schools closed already had only very basic community services available before closure. Respondents of communities that had lost their school did perceive that there was a reduction in retail sales and number of businesses, but it is not clear that this was an effect of school consolidation or a trend already existent prior to consolidation.

Scholars have found several advantages and disadvantages of size in terms of its implications for school effectiveness and efficiency. An estimation of optimum school sizes should take all these factors into account, as well as any other context, school and students' characteristics that could mediate the relationship between size and school outcomes, or size and costs. As will be shown in the next sections, the school context will frequently limit the extent to which certain costs and benefits of size will actually manifest themselves.

5. SCHOOL SIZE POLICIES IN RURAL AND URBAN AREAS

While there are advantages and disadvantages associated with different school sizes, school size will always be constrained by the number of potential students attending the school. As a consequence, creating larger schools will not be an option in certain environments where the number of potential students is very limited. Demographic and economic decline have constrained school size in many rural areas, where authorities now face a situation of declining rolls and increasing difficulties to overcome the economic and performance costs of small remote schools. This section will present how countries and regions differ in terms of the school size policies implemented in their territories, and what options are available to them to overcome isolation of small remote schools and to guarantee the quality of education in these institutions.

5.1 Country approaches to school size policies

While different countries have adopted individual approaches to the issue of school size, and specifically to the challenge of providing quality education in rural and remote areas, there are similarities in the policies implemented. In some countries the issues associated with small schools are more pressing than in others, simply because the number of such schools is larger. Scotland, Finland, Sweden or Norway are among the countries with a larger number of small schools in Europe (Wilson, 2008), and they have adopted different policies in this area.

Differences in countries' approaches to school size policy are related to differences in population dispersion patterns and histories of school closure and consolidation. While some countries have accepted the higher costs of sustaining the quality of small schools in rural communities and isolated areas, others have carried out consolidation policies up to the point where further consolidation was no longer possible due to geographical isolation. As discussed below, cross-national variation in school size policies is grounded not only in average size of schools or number of small schools, but also in how authorities go about the process of closure or consolidation, whether it seeks to involve the surrounding community or to implement mechanisms that favour collaboration and sharing of resources among schools to prevent closure.

Norway and Sweden show resemblances in their experiences with small schools. Due to the geographical dispersion of the population in these countries, policy makers have accepted that in order to keep sparsely populated areas populated they will have to incur the higher costs associated to keeping quality education in rural and remote areas (Solstad, 2009). In Norway, with the population dispersed in fjords and mountain valleys, about 650,000 people live in peripheral municipalities, where travel time to a larger town or city is more than 45 minutes (Bonesronning and Rattso, 1994; Solstad, 2005). Norway currently displays a very decentralised pattern of schools, in which multi-grade classes are particularly frequent, with more than 35 percent of all primary schools having such an organisation (Bonesronning and Rattso, 1994; Solstad, 2005). Despite the compromise to sustain sparsely populated areas, many small schools have experienced increasing pressure from the municipalities (Solstad, 2009). Initially, the grant system basically covered the costs involved in providing quality education in rural schools and local authorities had few incentives to exploit economies of scale (Bonnesronning and Rattso, 1994). With the decentralisation of block grants from the national to the local level in 1986, municipalities had to determine themselves their own priorities for spending (Solstad, 2005, 2009). This created increasing pressures for efficiencies, and favoured the option of consolidating schools (Solstad, 2009).

In Sweden, similarly to what occurred in Norway, the price of sustaining rural community was accepted, but school reform in the 1990s granting local authorities more freedom actually increased pressure for school consolidation. In 1993, the block grant system was transferred from the national to the

local level and this created pressures on local authorities, which experienced increasing financial difficulties, to take advantage from economies of scale (Solstad, 2009; Sörlin, 2005). As a consequence schools experienced bigger threats of consolidation.

In Finland, as in Norway and Sweden, policy decision-making for the retention or closure of schools resides at the local level, and while some municipalities give a minimum number of pupils as guideline for the board of education, other municipalities evaluate the situation of small schools on a case by case basis (Syväniemi, 2005).

In contrast to many other European countries, the existence of small schools has traditionally been accepted as inevitable in Iceland due to its geographical characteristics and the dispersion of its population (Sigbórsson and Jónsdóttir, 2005). However, this situation started to change in the last decade of the 20th century, and the viability of small rural schools has become a subject of debate. In 2005, 60 out of 180 compulsory schools in Iceland were small schools with fewer than 120 students (Sigbórsson and Jónsdóttir, 2005). In spite of the considerable number of small schools existing in this country, there are no national regulations on school and class size or staffing. These matters have to be negotiated between the head teacher and the local authorities (Sigbórsson and Jónsdóttir, 2005).

Canada underwent a process of school closure and consolidation for most of the 20th century. As a consequence, most of the remaining small schools are located in remote areas where transporting students to other schools is unfeasible (Mulcahy, 2009). These are remote and isolated schools, most of them covering both primary and secondary education and with fewer than 100 students, some with as few as 10 to 20 students. Moreover, many of these schools are under economic distress since the educational resourcing policy is mostly based on student enrolment (Mulcahy, 2009).

In Quebec, where public primary and secondary schools have experienced continuous school roll decline, the government has developed innovative initiatives to sustain the quality of the educational services offered in rural areas (OECD, 2010b). A first step in that direction was the recognition that resources cannot be distributed based on student rolls in the area, but that a certain level of staff and resources need to be sustained to guarantee access to quality educational services across the territory (OECD, 2010b). In Quebec, as in England and Scotland, school closure or consolidation must be preceded by a process of consultation. Particular efforts have been made to sustain ‘last village schools’ and to create networks of rural schools so as to revitalise and professionalize small rural schools (OECD, 2010b). As will be shown below, information and communication technology has played a crucial role in the articulation of school networks.

Rural school closures and consolidation were quite common in England during the 1980s and 1990s. However, in 1998 a legal figure was introduced to make the process of school consolidation a more open process, and to only turn to school closure as the last resort: the ‘presumption against the closure of rural schools’ (Perry and Love, 2013). This resource was strengthened through 2004 guidance requiring local authorities to provide evidence that they have considered the likely effects of school closure on transportation and on the local community, as well as alternatives other than school closure (Perry and Love, 2013). In fact, in England, school inspection reports show that small schools provide levels of student achievement at least equal to those yielded by larger schools (Rule, 2005). In spite of the presumption against school closure, and the high levels of performance produced by small schools, public education systems in rural areas continue to be under pressure, and small schools are frequently subject to reviews due to declining student rolls, and hence under constant threat of closure or restructuration (OECD, 2010c; Rule, 2005).

In Scotland, approximately 20 percent of primary schools have school rolls below 50 students each (Wilson, 2008). As the Commission on the Delivery of Rural Education (CDRE) (2013) indicated, due to

its geography there will always be a need for rural schools in Scotland. Very small schools are frequently located in rural and island areas, and the majority of them have stable or increasing school rolls (Wilson, 2008; CDRE, 2013). In 2008 the Scottish Government initiated a consultation on proposals for changes to legislation on school closures (Perry and Love, 2013). In 2010, the Schools Act introduced changes to protect schools in rural areas (Perry and Love, 2013). The Schools Act 2010 was intended to improve the consultation process before school closure and to establish a presumption against closure of rural schools, but the presumption was not explicit in the Act (CDRE, 2013). Due to differences and inconsistencies in the interpretation of the Act, a Commission on Rural Education, with support from the Scottish Government, was established in July 2011 (Perry and Love 2013). Simultaneously, a moratorium was declared on rural school closures (Hepburn, 2013). Following the Schools Act 2010, before initiating a consultation on school closure, the education authority must consider whether there is any viable alternative to closure. It also has to consider the likely effect of closure on the local community, as well as any effects on transportation costs and arrangements (CDRE, 2013). The intention of the Schools Act 2010 was to promote a more open, transparent and participatory process of consultation taking place before closure can occur (The Scottish Government, 2008). In spite of the requirements and the process that need to be complied with before closing a school, schools still experience the threat of consolidation. Some Scottish local authorities have instituted automatic reviews of schools, if their roll drops below 25 or when the number of early year students falls below 10 (Wilson, 2008). As was the case in Canada, frequently it is the smallest and most remote schools that are secure against closure because there are no options for transporting students to another nearby school (Wilson, 2008). In fact, the Scottish Borders Council identifies some schools which are considered as strategic schools in their area because of their remoteness, the isolation of their community or the difficulty to access them (CDRE, 2013).

In Wales, many Local Education Authorities have closed small schools as a response to declining populations (Evans, 2005). A third of Welsh primary schools have fewer than 90 students, and 15 percent have fewer than 50 (Rural Development Sub-Committee, 2008). During recent years, the Welsh Assembly Government has put increasing pressure on Local Education Authorities to address surplus school places in their area (Rural Development Sub-Committee, 2008). Local Education Authorities have claimed that in many instances this is what has led them to develop a policy of school closures (Perry and Love, 2013). The Welsh Assembly Government has placed much relevance in examining school efficiency and 'Best Value' policies. Local Education Authorities are required to pay particular attention to: primary schools with fewer than four teachers, year groups regularly containing less than eight to ten students, head teachers with substantial teaching loads, mixed age classes containing more than two year groups, or schools with more than 25 percent surplus places (Evans, 2005). During the last years Local Education Authorities have actively carried out schemes for closure and reduction of surplus places, even in urban areas (Evans, 2005).

In Ireland there are more two and three teacher schools than in any other category, and multi-grade classes are common in the primary school system (Mulryan-Kyne, 2005). Although schools are mainly funded through a capitation grant based on the school roll, small schools receive a higher grant because no school receives a capitation grant based on fewer than 60 students (Mulryan-Kyne, 2005). In Ireland there is currently a 'value for money' review of small primary schools underway, because of earlier recommendations that schools with fewer than 50 students should be consolidated (Perry and Love, 2013). As in the case of Scotland, the government is considering creating a new category of school, that of 'isolated schools', to identify those schools in the most isolated communities (Perry and Love, 2013).

Portugal is an example of a country that went through a thorough process of school restructuring and articulation of school clusters. In the school year 2005/2006 Portugal had an extremely disperse network of schools, with many small isolated schools (Portugal Ministry of Education, 2008). Many of them had higher retention rates than the national average. In 2005/2006 the first cycle school network was reorganised, which also entailed the closure of many underperforming schools. In coordination with the

local government and the school executive boards, the schools to be closed were selected between October 2005 and March 2006. Simultaneously, financial support was provided for local governments to build new school centres and receive students from the closed schools (Portugal Ministry of Education, 2008). This reform intended to rationalise the provision of education in a context of administrative decentralisation, and to eradicate local and regional inequalities (Portugal Ministry of Education, 2008). Another objective of the implementation of school clusters was to integrate the different levels of compulsory education in the same organisational unit, since clusters may provide for two or more levels of education (Matthews et al., 2008; Portugal Ministry of Education 2008).

In Korea, starting in 1982 and continuing through the 1990s, education policy was driven to maximise the efficiency of investment in education, and rural areas experienced strong pressures to merge and close schools (Youn, 2009). The recommendation was that all schools with fewer than 180 students should be closed, but frequently schools opted to be organised into hub schools, where two to four schools would be grouped, with one of them taking the lead in managing educational programs and facilities (Youn, 2009). Since 2004 policies have shifted their focus from maximising efficiency at all cost, and have attempted to improve the quality of education in rural areas. The government pursued an intensive development of excellent high schools in rural areas, giving financial support to rural schools and facilitating public boarding schools. It also promoted the cooperation and support among schools; and it provided financial assistance to improve kindergarten education in rural areas (Youn, 2009). Huge investments were made to modernise school facilities in rural areas, although these focused mostly on some merged schools and certain regions (Youn, 2009). Due to differences in the regions supported, critics point out that the measures made the students in the rural area move to certain schools, while schools in other districts suffered from great student losses (Youn, 2009).

5.2 Policy options to confront declining rolls and disadvantages related to small schools

In recent decades, it has been a frequent concern for policy-makers to design education policies that take into account declining school rolls in rural and remote areas. The specific geographical location of these schools, and the relevance they have for their communities, make it difficult to come up with solutions to address the under-utilisation of these schools and to be able to guarantee quality education for students in sparsely populated areas. Where the transportation of students to other locations has been possible, many countries, regions and municipalities have carried out consolidation and school closure policies. As discussed below, consolidation can occur as a consequence of direct mandates, but also as a response to policy incentives and disincentives. Depending on how consolidation is carried out, it may face opposition by different actors, but if the decision of consolidation is well argued and the result of a larger consultation process, it can earn the community's support. Given that school closure has severe consequences for students, school staff and the surrounding community, policy-makers and school leaders have resorted to other responses to the problems associated to small schools and have experienced with different forms of organisation and cooperation, such as school clusters, school federations, and more informal patterns of cooperation. Information and communication technologies have also provided new tools to offset the isolation of rural and remote schools.

5.2.1 School closure and consolidation

One of the most common responses to declining student rolls has been school closure and consolidation. Through school consolidation, one or more schools are closed, and students from these institutions are transferred to other institutions which then increase the total number of students they enrol. Countries, regions and municipalities have promoted consolidation through various combinations of incentives, disincentives and also direct policy interventions (Howley et al., 2011).

There are different instruments through which authorities can create incentives for school and school district consolidation. One of the most common practices is to offer direct aid programs for consolidating schools, as well as providing building and transportation aid, to cover the capital investments and the changes in operating costs occurring after consolidation (Andrews et al., 2002; Duncombe and Yinger, 2010). National or regional authorities can offer direct financial support for consolidating schools, via one-time incentive grants or multi-year commitments, to cover the immediate costs of consolidation (Howley et al., 2011). Overall operating spending displays a large upward shift in per student costs during the years immediately following consolidation, followed by a gradual decline in the next years (Duncombe and Yinger, 2010). For this reason, policies seeking to incentivise consolidation need to cover at least the costs incurred during and immediately after the consolidation process.

In the United States, some states have used financial compensation as an incentive for consolidation. This can take the form of direct revenue compensation to school districts that choose to consolidate, or also offering these districts the possibility to raise optional taxes (Meyer, 2000). Other options consist of offering consolidating schools compensation for the difference in financial aid received if after consolidating the schools qualify for less aid than they did separately before being merged; or on paying for the differences in teachers' salaries in case they are raised after consolidation (which occurs frequently) (Meyer, 2000). States can also offer schools with limited financial resources to carry out capital construction projects to build new consolidated schools (Howley et al., 2011).

Other incentives for consolidation may come indirectly from changes in the administrative structure of a country or region. In Iceland, for instance, the amalgamation of municipalities resulted in new larger municipalities, in some cases with several schools not very far from each other. This created incentives for local politicians to profit from economies of scale and close some schools down and transfer students to schools formerly belonging to a different municipality (Sigbórsson and Jónsdóttir, 2005).

Pressures to consolidation can also arise from disincentives to sustain small schools. If central or regional authorities require new accreditations, minimum levels of achievement, or a given level of input resources (such as a minimum number of specialised teachers, or certain school facilities like a laboratory or library) without supplemental funding, this can promote consolidation between schools to be able to benefit from economies of scale and comply with those requirements (Sell and Leistritz, 2009). Facilities construction policies mandating minimum enrolments or not permitting renovations of existing structures, and mandates related to staffing or curriculum offerings can also result in the need for additional and specialised resources that smaller schools cannot afford (Howley et al., 2011).

Other disincentives to consolidation may arise from the system established for funding educational policies. In the example of Sweden and Norway, the decentralisation of funding in the form of block grants from the central to the local level created pressures on local authorities (frequently facing economic difficulties) to reduce spending. This decentralisation of funding led to a drastic local centralisation of rural schools, and this happened without any shift in national attitude or policy towards small schools (Solstad, 2005; Sörlin, 2005). School closure and consolidation was a response to the need to increase efficiency of spending after reforms in the funding system. These incentives could be counterbalanced by an earmarked state grant to compensate for the extra per student costs which small rural schools incur (Solstad, 2005, 2009).

Funding systems primarily based on the number of students enrolled in a school also discourage the maintenance of small schools. In Hungary, for instance, the financing of the school system is mainly based on government-financed, per-student, lump-sum grants which hinders small schools since this enrolment-based funding system does not compensate for the larger per-student costs faced by smaller schools (Horn, 2006).

Sometimes school consolidation and closure can take place as a result of a direct policy intervention, such as eliminating all districts or schools with enrolments below an arbitrary number (Howley et al., 2011). For instance, in Korea, in 1981 the government recommended that schools with fewer than 180 students should be either merged or closed, but the government provided only a small amount of financial support (such as a subsidy for transportation) (Im, 2009). Sometimes authorities can offer schools or school districts the possibility to avoid consolidation, but at the cost of financial penalties (PSBA, 2009). And in some occasions, when given the choice, the local districts choose to accept the financial penalty and maintain their schools (PSBA, 2009).

In other contexts, consolidation is not mandated when enrolment falls below a certain level, but instead a process of review of the school is started. There are different criteria other than enrolment or under-utilisation that can trigger a process of school reviews. As an example, in England, counties will have to consider the reorganisation of a primary school if: a head teacher plans to leave a school; the school has difficulties in appointing a head teacher or adequately qualified staff; enrolment is likely to decline to a level which would result in there being only one class in the school; the school shows continuing poor educational standards; surplus places reach 25 percent or more (Rule, 2005). In Scotland the situation is similar. The Scottish Borders Council developed a process with criteria that will initiate a review of a small schools: a reduction in the number of teachers the school requires; a roll that is forecasted to fall below 13 students in the next three years; an operating cost that is three or more times higher than the authority average; an occupancy level of 45 percent or less; a significant decline in student performance; the need for urgent investment which is considered disproportionate (CDRE, 2013). This review process does not necessarily end in closure or consolidation, but it may create pressures and incentives leading to a later consolidation. Repeated reviews can dissuade parents to send children to the school, and it could enter into a vicious circle of declining school rolls (Hepburn, 2013).

Portugal provides another example of direct policy intervention, where the Ministry of Education, in coordination with the local government and the school executive boards, defined which schools should be closed down based on the identification of those institutions with retention rates higher than the national average (Portugal Ministry of Education, 2008). In this case, consolidation was met with financial support for the necessary investments in host schools and school transport (Portugal Ministry of Education, 2008). The reduction (around 30 percent) of the number of state establishment providing pre-school and first cycle education was embedded in a larger process of restructuration of the school network (Portugal Ministry of Education, 2008).

When and where is consolidation more likely to occur?

Given the incentives and disincentives for consolidation, not all schools or school districts will be equally likely to embark on a consolidation process. Consolidation means that the schools that consolidate will lose control over the educational agenda, and that the level of educational provision may move away from the desired level of the two (or more) school communities involved (Brasington, 1999). Hence, schools (or school districts) with more similar desired levels of schooling will be more likely to consolidate; and this may partly depend on the socio-demographic characteristics of the different school communities (Brasington, 1999). School consolidation presents a trade-off between the possibility to benefit from economies of scale or the financial benefits offered to the institution and the risk of providing levels of education further away from those desired. Brasington (1999) found that smaller and bigger schools are more likely to consolidate than medium-sized schools. Smaller schools are more likely to form a joint school because they have the most to gain from scale economies (assuming decreasing marginal returns to scale), even if they lose part of their independence. Bigger schools on the contrary do not have to fear losing independence when joining a smaller school, and they will also benefit (although less) from economies of scale. Medium-sized communities may be large enough so that the additional scale economies gains do not compensate the loss of control over educational provision (Brasington, 1999).

Other factors that affect the likelihood of consolidation are those related to transportation costs. A better highway and road network as well as shorter distances and fluid traffic flows between the communities to consolidate are likely to favour consolidation (Kenny and Schmidt 1994; Sell and Leistritz 2009). Communities or districts sharing borders will also be more likely to consolidate (Sell and Leistritz 2009).

Consultation processes prior to consolidation

Some countries have implemented consultation processes that take place before consolidation, so as to involve all major stakeholders in the process and give them the possibility to voice their opinion on the school restructuration process. Allowing other actors to intervene before consolidation occurs can help reduce opposition to this action.

Scotland provides a good example where the government has attempted to create a set of guidelines and directions to articulate a process of consultation before any local authorities decide to proceed with school restructuration, consolidation or closure. This process intends to involve the community in the assessment of viable alternatives to closure, giving them confidence in this assessment and the opportunity to bring other factors into consideration (The Scottish Government, 2008). The aim is that, in case closure is to take place, parents, students, school staff and other actors involved understand what educational and economic benefits the local authority believes will result from the closure (CDRE, 2013). The local authorities are advised to publish an educational benefit statement that presents the likely impact on students and other users of the school or school facilities. Throughout the process of consultation it is necessary to clarify which different policy alternatives were available, and why one particular option was chosen, taking into consideration both short and long-term effects (CDRE, 2013). If there is clarity in the process of school restructuration, then the public can understand and judge the viability of different proposals. In some cases socioeconomic studies are commissioned to external consultants to assess the likely impact of a school closure on a community (CDRE, 2013).

The consultation process in Scotland attempts to include all stakeholders affected by the school restructuration process: parents of the students of the school proposed to be closed, parents of every child who would be expected to attend the school within two years of the proposed date of closure, the Parent Council of the schools affected, relevant church or denominational bodies where appropriate, students of the school to be closed, teachers and staff working at the schools affected, or trade unions (CDRE, 2013).

It is important that if financial issues are a relevant factor in the choice for school closure over other options for school reorganisation, this must be made clear and must be based on accurate and transparent data. School closure proposals should be accompanied by transparent, accurate and consistent financial information, justifying all financial arguments deployed in favour of closure (CDRE, 2013).

Quebec emphasises the importance of consultation in the process of school restructuration. Before any decision to close a village school can be made, parents and the local community must be consulted about this policy. This is a reflection of the government's effort to include stakeholders in the debate on the quality and access to local education services, and to give them the possibility to express their voice on issues of school system restructuration (OECD, 2010b).

Opposition and dissatisfaction with consultation processes may appear where consultations are not detailed and exhaustive enough, so that communities have confidence in the decisions regarding the school and the wider plans and commitments of the local authority. This is what the Rural Development Sub-Committee (2008) observed was happening in Wales, where stakeholders expressed mixed views in relation to the effectiveness of the way in which local educational authorities conducted consultations on school reorganisation proposals. Consultations appeared to parents and the community involved as a hurdle

through which local authorities were obliged to go through before they could carry out the pre-determined decision of closure and consolidation (Rural Development Sub-Committee, 2008). Parents felt ignored by the local authority during this process, which moreover only included school governors and parents instead of the whole community. As a consequence the report produced by this institution recommended the development of a code of practice for consultation and meaningful community engagement in Wales (Rural Development Sub-Committee 2008).

Opposition and obstacles to the implementation of consolidation and closure policies

School consolidation is frequently met by opposition. Both the public and school personnel tend to receive plans to consolidate schools with general distrust. Students, school staff, parents and the community in which the school is located frequently oppose consolidation arguing that the quality of education and the stability of the community are sacrificed only to reduce educational budgets (Meyer, 2000). Due to the frequent opposition of rural communities to consolidation it is necessary that all stakeholders are consulted before proceeding to close a school, so as to minimise obstacles to consolidation (Thai World Affairs Centre, 2013).

When consolidation is mandated from central authorities it might face opposition by local authorities and organisations. In this case the intervention of the central government threatens the rationality of local control and the attention to local conditions (Strang, 1987). This may nourish the antagonism between the centre and the periphery (Solstad, 2009). Opposition from local authorities will be stronger if closure brings additional school transport and building improvement costs that are not financed by the central government. This type of conflict can also appear at a smaller scale within the municipality, where the individual schools threatened by consolidation oppose the intervention of the local authority.

In some occasions school principals also oppose the idea of consolidation, mostly because they value the independence of their schools and do not want to compromise it (O Slatara and Morgan, 2004). Interviews with school principals conducted by O Slatara and Morgan (2004) show that they strongly reject the consolidation option, and that they have a strong sense of the link between the school and the local community. It is a widespread belief that better education is found in small schools. Moreover, school principals argue that to be acceptable, an initiative of school closure should be flexible enough to take into account the very different circumstances of schools (O Slatara and Morgan, 2004).

Teachers can also organise to oppose consolidation. Solstad (2009) presents the results from a comprehensive survey of schools facing closure carried out in Norway in 2005-2006. In this study, in eight out of ten cases teachers mobilised to protect the school under threat of consolidation. The most important reason for fighting for the school was the likely detrimental effect for the local community as a whole, perceived by staff and local people alike. In the study by Nitta et al. (2010) conducted among Arkansas high schools between 2003-2006, teachers' worries also included the difficulties in adapting to a new working environment, and the possibility of layoffs taking place as a consequence of consolidation.

Parents and the surrounding community also frequently oppose consolidation, and they show strong attachment to their school. They tend to strongly oppose closures even when the proposed alternative school is only a short distance away (CDRE, 2013). Corbett and Mulcahy's (2006) detailed study of small schools in the province of Nova Scotia (Canada) shows interesting examples of how communities organise and articulate a well-argued position to retain the school, also gathering research data to confront the authority's arguments. Educational communities frequently mention the fear that longer distances to school will reduce time with the family, that consolidation will lead to job losses, and that it will further impoverish small villages (Mathews et al., 2008). Moreover, if an effort is made to campaign against school closure but then the campaign is unsuccessful, this could leave more negative feelings in a

community (besides those associated to the school loss) (CDRE, 2013). Whether those feelings have a long-term impact on the community's wellbeing has not been addressed by research yet.

Even if opposition is often articulated under the argument that authorities are undermining education quality only to reduce budgets, it is important that authorities still refer to financial aspects if they are part of the reason for closure. Requiring an education authority to base its school closure proposals solely on educational benefit is neither helpful nor realistic. Excluding financial reasons prevents an honest debate and can damage educational authorities' credibility (Hepburn, 2013).

Other than opposition by parents, students, staff or the school community in general, there are other aspects that can pose obstacles to consolidation. The possibilities for consolidation are limited by the distance to possible host schools, the conditions of the road network, the means of transportation available, and the capacity of host schools to accept students from other schools. These obstacles may impede school consolidation in some areas. That is the case, for instance, of some remote schools in Canada or Scotland mentioned above.

Even if consolidation is usually met with opposition, studies on merged schools indicate that consolidation can end up being positively valued by teachers, parents and students. In their survey on teachers and students in consolidated schools, Nitta and colleagues (2010) found that nearly all students and teachers, both moving and receiving, reported experiencing benefits from consolidation. In another example, citizens from vacated communities also felt that consolidation actually improved their fiscal circumstances (Killeen and Sipple, 2000).

To achieve positive consolidation experiences, it is advisable not only to include stakeholders in the decision-making process, but also to implement mechanisms that will make the transition easier for students, parents and staff. Portugal, for instance, accompanied the comprehensive restructuring policy taking place in 2005/2006 with support measures for parents whose children would be transferred to other schools, such as free transport to and from school, a free mid-day meal at school for children who benefit from social support, or enhanced facilities in the new school (Portugal Ministry of Education, 2008). The opportunity to review arrangements after a given time may also increase support among the community (O Slatara and Morgan, 2004).

5.2.2 School clusters

School clustering is a common response to the disadvantages associated with smaller schools. In some instances it appears as a voluntary form of cooperation and collaboration between schools, which is then extended to other municipalities or regions. Clustering brings together groups of small schools which, while maintaining their identity and their institution, choose to share resources, experience or best practices (Moulton, 2001). Schools in a cluster will maintain their institutions and establish formal links of cooperation with other institutions, sometimes sharing a common management or direction (Moulton, 2001). School clusters also implement a more horizontal management model, one that encourages peer-level exchanges.

The establishment of clusters helps to overcome professional isolation and amplifies the opportunities for face-to-face professional discussion among teachers in small schools (Rule, 2005). It also allows schools to pool resources and expertise, and establish best practice in curriculum and planning implementation (O Slatara and Morga, 2004). Under this logic of formal cooperation different countries and regions have adopted different specific forms of clustering.

Cornwall (England) promoted in the 1980s an initiative to invite clusters of small schools to apply for support for joint initiatives. Clusters ranged in size from two to about eight schools, and they received an

education support grant (Rule, 2005). What is interesting about this example is that once the Education Support Grant ended, school principals had seen the value of cooperation between schools and were willing to allocate resources from their own budgets to continue the cooperation (Rule, 2005).

Clustering has become the most popular approach to development and support in English primary schools. Moreover, in contrast to other countries with more sparsely populated regions, schools constituting a cluster are quite close to one another, often less than thirty minutes car drive apart (Rule, 2005). This allows for more frequent cluster meetings and exchanges between schools. Regular meetings of clusters allow teachers and staff the opportunity to meet, plan future activities, and discuss matters of relevance at the time. It is also quite common for clusters to organise an annual conference, where individual cluster groups come together to discuss a previously agreed-upon topic of common interest (Rule, 2005). Cluster meetings increase the opportunities for face-to-face interaction among teachers and reduce professional isolation. Some well-established clusters have even come to develop specific materials for teaching, which take into account the locality or the small school context (Rule, 2005).

In Norway, some neighbouring small schools have organised themselves into formal clusters that pools material and human resources (Solstad, 2005). Due to the geographical dispersion of rural schools in Norway it is not always possible for teachers and students from different schools to meet on a regular basis, but where travel conditions permit, cluster schools include arrangements of direct meetings between the students from the different clustering schools (Solstad, 2005).

In Portugal, school clusters were articulated not only as a means of formal cooperation and coordination between different schools (so as to rationalise the administration and management of schools), but also to provide a sequential and coordinated path between the different levels and cycles of compulsory education (Portugal Ministry of Education, 2008). Portuguese school clusters are composed of pre-school establishments and one or more education cycles, with a common administrative and management body (Portugal Ministry of Education, 2008). This facilitates transition between different levels of education in one specific geographical area, and it also helps overcome the isolation of the different establishments and rationalise the use of resources (Portugal Ministry of Education, 2008).

In Catalonia and other autonomous communities in Spain, clustering schools share peripatetic teachers that travel between the different rural schools in the cluster, a system that helps overcome the scarcity and the high costs of specialised teachers in rural areas (Boix Tomás, 2007). These supra-school structures are named Rural Education Zones (ZER). They attempt to optimise the use of material and human resources. Within each cluster, schools share a common educational project and curriculum (Boix Tomás, 2007; O Slatara and Morgan, 2004). Each ZER is coordinated by a common direction body including a cluster principal (one of the principals of the clustering schools), a chief of studies and a secretary. This team dedicates 25 weekly hours to the task of coordinating and directing the ZER. ZERs also set up a school council to govern the cluster. It is composed of representatives of management, teachers, administrative and service staff, parents, and administrative representatives of the municipality where the schools are located (O Slatara and Morgan, 2004). Each ZER has at least three peripatetic teachers who teach a foreign language (mostly English), music and physical education. ZERs with seven or more groups of students have a fourth peripatetic teacher of special needs education. Peripatetic teachers will commonly teach in one school per day, to avoid travelling between schools during the day. In most ZERs teachers come together from the different schools every two weeks to plan school activities (Boix Tomás, 2007). This also helps teachers overcome the sense of isolation prevalent in small rural schools.

Depending on the level of formalisation that cooperation between schools takes, schools can also organise into federations. In school federations two or more schools are closed to create a single split-site school with one principal and one government body (Rural Development Sub-Committee, 2008). In this case individual schools do not function as independent units, but the principal and the governing body still

can decide to operate each institution as a relatively independent unit (O Slatara and Morgan, 2004; Rural Development Sub-Committee, 2008). When schools constitute a federation, an issue to be dealt with is where the administrative base and the principal will be located. If the administrative base school is perceived by the parental community as the 'best school', this school may attract students from other units in the federation. In some school federations in the Netherlands this was solved by having the principal rotate between all schools in the federation (Rule, 2005).

In practice, school clustering has expanded to different countries and settings. Cluster organisations can make important contributions to school and professional development in rural areas. Where possible it can also allow students from the different clustering units to come together at a school to have classes or activities that need many students or specific material (sports classes, activities in experimental labs or in music centres) (Choi, 2009). However, in some contexts geographical isolation makes the formation of school clusters more difficult and more costly (in Iceland, for instance) (Sigbórsson and Jónsdóttir, 2005). In these situations, schools and local authorities need to find other mechanisms to overcome the disadvantages associated to small remote schools.

5.2.3 Use of information and communication technologies

In remote areas, where transportation of students to other schools is not possible, or where clustering is difficult to organise because of great distances between schools, some of the disadvantages of small size and remoteness can be partially overcome by the use of information and communication technologies. Increasingly, one can find examples of utilisation of ICTs for distance learning and teaching, as well as for collaboration between teachers and professional development. The advantage of programs using ICTs is that they can be implemented simultaneously in several schools, even if located at great distance from each other.

For remote teaching and learning

Web-based or videoconference distance learning can be implemented with individual students or within groups, it may be synchronous or asynchronous and it can be based on one-way or two-way technologies (Hobbs, 2004). One of the main advantages of distance learning is that it can enrich the curriculum offered by small remote schools, allowing them to overcome the difficulties of providing specialised courses when the number of students and the supply of specialised teachers are scarce (Hobbs, 2004; Mulcahy, 2009). In Canada, many remote areas, where transporting students to other schools is not possible, depend heavily on web-based distance education for post-primary education where there are difficulties in recruiting specialist teachers (Mulcahy, 2009; Perry and Love, 2013). In some of these schools students must take one or more distance courses in order to graduate (Mulcahy, 2009).

Experiences with web-based or videoconference distance learning indicate that for distance learning to be effective, it is usually necessary to provide some level of support for students taking part in these programs. With this purpose in mind, Hobbs (2004) recommends that the implementation of distance learning should plan for school-based facilitators who can give students the possibility to engage in direct and one-on-one contact with someone personally present in the school in case of doubts or problems in the interaction with the web-based instructor. This school-based facilitator would act as a point of connection between students and the web-based teacher when necessary. Hobbs' suggestions on the implementation of distance teaching especially emphasise the relevance of personal assistance in distance-learning.

One of the problems associated with distance learning is that the educational benefits that students assimilate from these programs may depend on the individual characteristics and motivation of students. Examples from Canada show that, typically, distance learning will work well with highly motivated and independent learners (Mulcahy, 2009). Experience from Australia indicates that younger students may not

be able to work as independently as necessary, or that students will have difficulty concentrating and understanding the instructor when there are problems in the communication channel or when the teacher's voice was not synched with actions (Reading, 2009). To avoid these problems and promote achievement across a broad range of students it is suggested that distance learning takes the most similar form to the traditional classroom (Hobbs, 2004). It is also advisable that students have as much interaction with their distance learning instructor as possible, preferably in the form of real-time, spontaneous audio-visual interaction (Hobbs, 2004).

In rural Australia, the *Social Computing Enhancing Learning in Remote Australia* project aimed to show the possibilities of social computing on student learning (Reading, 2009). The initiatives within this project attempted to expand the network of students and teachers in rural schools, permit students to interact with a broader mix of students and an expanded audience, and give students the possibility to receive feedback on their work from more people (Reading, 2009). The specific experiences included students blogging and e-mailing between different remote schools, sharing stories with people beyond the school, creating collaborative documents and engaging in collaborative projects with students from other schools. The benefits most commonly reported across the schools were that students were more excited about learning and more motivated to work with a wider range of peers, as well about sharing their learning with wider audiences. Another reported benefit was that students were able to learn more about technology (Reading, 2009).

For professional development

Information and Communication Technologies can also be used to facilitate the professional development of teachers in remote areas and to reduce professional isolation. Primary and secondary school teachers in remote schools in Australia showed great needs in the areas of professional development, and the need to attend conferences (Reading, 2009). Cost-effective and convenient in-service education could be provided through a videoconferencing or web-based system (Broadley et al., 2009). Just as in the case of remote teaching, ICT provides a tool for professional development and continuing education opportunities for teachers across the country, especially in schools where geographical isolation causes a lack of opportunities for face-to-face interaction (Hobbs, 2004; Reading, 2009).

ICT also provides teachers the opportunity to communicate synchronously with teachers from other remote schools, and to discuss with them the common challenges they face (Reading, 2009). Teachers can hence be connected to a broader professional base and other like-minded educators. Another possibility raised by ICT is to facilitate the communication between teachers in pre-service training and teachers in remote areas, to establish mentoring relationships and facilitate the accessibility of a professional peer group to communicate the experience of teaching in small remote schools, a subject that is often absent in pre-service teacher training (Hobbs, 2004).

Difficulties and obstacles to distance learning

One of the biggest obstacles to implementing distance learning in rural education is the digital divide between rural and urban areas. Rural areas often have difficult access to broadband connection (Hobbs 2004). Often, those remote areas with most needs of strong link to broadband provision have the worst access (CDRE, 2013). The cost of providing the schools with the necessary technology and qualified personnel is another obstacle to the implementation of distance learning and teacher training. Schools interested in participating in this activity could also form a learning consortium partnership to share the costs of operations and to facilitate accessibility to a professional peer group (Hobbs, 2004).

6. EVIDENCE OF THE EFFECTS OF SCHOOL SIZE

6.1 Evidence for the relationship between school size and effectiveness

Given that there are a series of advantages and disadvantages associated to different school sizes, the overall impact of school size on effectiveness or efficiency is not apparent. For this reason, scholars and policy-makers have frequently researched into the question of whether schools size can maximise effectiveness or efficiency. Nevertheless, the results of these frequent enquiries are conflicting, and there is no 'one-size-fits-all' solution to the question of school size.

Educational researchers and policy-makers have attempted to measure school effectiveness through different operationalisations of outcome variables. The most frequently used variables are measures of the academic achievement of students (Slate and Jones, 2005). Some scholars have quantified the number or percentage of students passing certain tests, or the percentage of them attaining maximum scores in these tests; other scholars have also attempted to capture the distribution of results in these tests. Another common approach, especially in earlier research, has been to use measures of dropout rates or average daily attendance rates. In this research, small schools tended to show superior sticking power, with student attendance and retention rates significantly better in smaller than larger schools (Cotton, 1996; Leithwood and Jantzi, 2009; Slate and Jones, 2005). As shown below, one article has also addressed the impact of school size on labour-market returns to education (Berry and West, 2010).

Earlier studies from the 1920s to the 1970s related school size to input measures of school quality (such as the quality of facilities, or teachers' qualification), since other measures of school outcomes were not easily accessible. This research provided evidence that larger schools were associated with better school inputs (Berry and West, 2010; Fox, 1981).

Later results of studies relating school size to students' achievement, have produced conflicting results, and the relationship between these variables tends to be small (Slate and Jones, 2005). Cotton (1996) reviewed 31 studies on this topic and found them to be approximately evenly divided between studies favouring small schools and studies that do not find a significant relationship between achievement and school size. None of the studies reviewed by Cotton (1996) provided results in favour of large schools. In their review, Slate and Jones (2005) argue that the majority of evidence indicates that students' achievement is better in small schools, but that there is also sufficient evidence in favour of large schools, so that the overall effect is not evident and may depend on mediating variables such as socioeconomic background or grade level.

Bradley and Taylor (1998) found an inverse U-shape relationship between school size and performance. They studied the performance of schools in national examinations in the United Kingdom between 1992 and 1996, operationalising school performance by the proportion of students obtaining five or more GCSEs at grades A to C. That is, they focused on high grades and did not tackle distributional or equity issues in performance. In their model, a positive coefficient on the variable indicating the number of students in the school, and a negative coefficient on the square of this variable indicate a non-linear relationship, with exam performance rising as school size increases, but at a decreasing rate, up to a point where the relationship is reversed and increases in school size are associated with diminishing performance. Setting control variables at mean values they find that exam performance is maximised at a lower level for 11-16 schools (maximum achievement is reached for 1 200 students) than for 11-18 schools (where performance is maximised at 1500 students). The relationship between the two variables is flat topped, so that increases beyond 900 students for 11-16 schools and beyond 1 200 for 11-18 schools have very little effect on achievement.

Leithwood and Jantzi (2009) found that out of the ten empirical studies focused on the relationship between school size and academic achievement in elementary schools that they reviewed, three found non-significant relationships between the two variables, and six reported a negative relationship between size and achievement. They also reviewed 19 studies on secondary schools. Five of those found that as school size increased so did achievement, six found an inverted U-shaped relationship between size and achievement, and eight found that as school size increased, achievement declined. In their review of the literature, Leithwood and Jantzi (2009) also indicate that overall elementary schools maximise performance at smaller school sizes than do secondary schools.

Instead of using achievement scores as measures of school performance, McVicar (2000) focused on the relationship between school size and career choice (i.e. early labour market entrance or continuation in the education system) in Northern Ireland. School size marginal effects yield an inverted U-shaped relationship between size and participation rate (although not statistically significant at standard levels), indicating that medium-sized schools favour students' continuing participation in the education system. The relationship between size and early entrance in employment is U-shaped and statistically significant, indicating that medium-sized schools discourage early entry into the labour market. For his data on Northern Ireland, McVicar (2000) found that the optimum size in terms of discouraging early entry into the labour market was around 500 students per school.

Berry and West (2010) also approached the issue of school effectiveness with a different measure of students' outcomes in the United States. In their study, they related changes in school and district size to students' labour market outcomes. They carried out a state-level analysis, comparing changes in school size over time within states. Their results indicated that students born in states with smaller schools obtained higher returns to education and completed more years of schooling. Increasing school size was associated with a decline in the returns to education. An increase of school size by 145 students was associated with about a nine percent decline in earning for high school graduates. The negative relationship between school size and returns to education appeared robust against an alternative approach, estimating differences in the rate of returns to education across states and cohorts. Moreover, the authors do not find any evidence of non-linearity in the relationship between these variables.

As Slate and Jones (2005) indicate, it is important to take into account that the relationship between school size and school outcomes may be mediated by other variables, such as social class or school grade. In the literature, size-related benefits and disadvantages are frequently construed as being enjoyed equally by all students, but this may not be the case. In fact research indicates that size tends to have a differential impact on student outcomes depending on socioeconomic status. Students from disadvantaged backgrounds tend to achieve better results in small schools (Slate and Jones, 2005; Leithwood and Jantzi, 2009). Small schools are also associated with greater achievement for students of lower grades, while student outcomes of higher grades are maximised in larger schools. The literature indicates that elementary and middle school grades were more adversely affected by school size, while secondary school students may benefit from the advantages offered by large schools (Slate and Jones, 2005).

In his study on the percentage of students passing the student achievement TAKS test in Texas and school size, Stewart (2009) found that, after dividing schools into four quartiles according to the socioeconomic status of their students, in all but the first socioeconomic status quartile, smaller schools experience higher percentages of students passing the test.

Bickel and Howley (2000) also investigated the effects of school size contingent on socioeconomic status. They found that smaller schools help maximise achievement for schools serving impoverished communities, and that larger schools serve the same function for more affluent communities (Bickel and Howley 2000). They performed a multi-level analysis with cross-level interaction effects that yielded an upper limit of about 250 students per grade for 9-12 high schools, and about 100 students for elementary

schools (with these limits applying to communities where the poverty rate was set to zero). Their research indicates that larger schools in larger districts promote inequalities of outcomes in comparison to smaller schools and smaller districts (Bickel and Howley, 2000). Howley and Howley (2004) provide further evidence that small size yields an achievement advantage on all but the highest socioeconomic status students and that smaller size mediates the association between socioeconomic status and achievement. Moreover, they find that the relationship between school size and achievement is predominantly linear.

6.2 Evidence for the relationship between school size and efficiency

Similar to research on the effectiveness of schools of different sizes, enquiries into efficiency also show conflicting results. Many scholars and policy-makers have posed the question of whether larger schools can achieve the same levels of effectiveness as schools of smaller size but at lower costs. The aim of this strand of research is to assess the relationship between school size and costs of schooling, keeping levels of effectiveness constant. In practice this has been attempted mainly through the estimation of either cost or production functions (Fox, 1981). Cost functions are more frequently used than production functions, although due to unavailability of data, cost function approaches usually use expenditure instead of cost data. Production functions are especially difficult to use for services such as education, because the relationship between inputs and outputs has not been clearly defined in conceptual terms (Fox, 1981). Some studies have used other approaches to studying the efficiency of differently sized schools, such as Data Envelopment Analysis.

As in the case of effectiveness studies, efficiency studies have mostly used achievement test scores to operationalise school outcomes. Other commonly used proxies for school outcomes are average daily attendance, and graduation and dropouts rates (Andrews et al., 2002). As mentioned earlier, this strand of research relies mostly on expenditure data (usually per student spending) to operationalise the cost of schooling. Most studies usually include operating and capital expenditure, and only very few attempt to account for transportation costs. Measures of cost also need to be included as regressors in cost functions to account for possible differences in cost structures across different schools or school districts, this is usually operationalised by teacher salaries, or staff hours per student (Duncombe and Yinger, 2001; Taylor and Bradley, 2000).

The results of the research on school size and efficiency can be divided into those studies that found a negative relationship between size and costs, indicating that schools face scale economies, and those studies that found a U-shaped relationship between size and costs, indicating that while smaller schools initially face economies of scale when increasing school size these turn into diseconomies of scale beyond a critical number of students.

Negative relationship between school size and costs

Earlier studies on efficiency studied the costs of schooling inputs instead of the costs of achieving certain levels of outcomes. In his study of 1981, Kenny found evidence supporting the argument that schooling inputs were more expensive in smaller schools, specifically; inputs were 17 to 37 percent more expensive in a high school of 300 students than in one of 1 448 students.

Lewis and Chakraborty (1996), estimating cost functions for 40 school districts in Utah, found that operating cost per student is inversely related to school size. In their study, average spending per student fell as size increased; a one percent increase in enrolment was associated with a 0.15 decline in costs per student (Lewis and Chakraborty, 1996). Bowles and Bosworth (2002) using a data set from Wyoming also estimated cost functions, including test scores as a proxy for school outcomes. They found a negative relationship between cost and size, with a one percent increase in school size associated with a 0.2 percent decrease in costs per student (Bowles and Bosworth, 2002).

Bonesronning and Rattso (1994) using value added measures of output and implementing Data Envelopment Analysis on Norwegian data, found that school size and efficiency were clearly positively correlated. With smaller schools located further away from the efficiency frontier. They argued that small schools could increase the number of graduates by more than 25% given their teacher input if they operated according to best practice.

Taylor and Bradley (2000) using number of graduates as an output measure of effectiveness estimated two different models relating school size to cost per student. Their results indicate that costs per student are highly significantly and negatively related to school size. In their study, the quadratic function specification did not provide better results than logarithmic specification, indicating that costs decrease monotonically with increases in size (Taylor and Bradley, 2000). The results from the initial model are confirmed with a first-difference model estimated with data between 1993 and 1997. Using changes in cost as the dependent variable, and changes in the explanatory variables over time, yielded the same results: unit costs of secondary school decreased monotonically as school size increased.

Barnett et al. (2002) carried out a Data Envelopment Analysis with teaching staff, support staff and non-labour resources measured on a per 100 student basis as measures of school costs. In their sample, the largest size schools consistently attained the highest mean cost-constrained best-practice performance score in all models, indicating that larger schools perform relatively better than smaller schools.

Andrews et al. (2002) noted in their review that functional form and specification has not received the same attention in production function approaches as in the cost literature. For this reason, school-level studies employing the production function approach have mostly found either constant returns to scale or decreasing returns to scale (Andrews et al., 2002).

U-shaped relationship between school size and costs

Other studies have found U-shaped relationships between school size and costs, always keeping effectiveness constant. Cohn (1968) analysed expenditure data on school districts in Iowa through a cost function approach, using incremental test scores on the Iowa Tests of Educational Development and average daily attendance as output variables in the model. He found economies of scale and a U-shaped average cost curve in the long-run (Cohn, 1968). Riew (1986) also found a U-shaped relationship between school expenditures and enrolment, with the lowest expenditures achieved in elementary schools with 200 to 400 students.

Duncombe and Yinger (2001), analysing data from consolidation of rural school districts in New York over the 1985 to 1997 period and employing a non-equivalent control group design, found evidence that school district consolidation substantially lowered operating costs, particularly when small districts were combined. The operating cost savings ranged from 22 percent for two 300-student districts to eight percent for two 1.500-student districts (Duncombe and Yinger, 2001). Consolidation only lowered capital costs for relatively small districts, and capital costs increased substantially when two 1500-student districts came together (Duncombe and Yinger, 2001). The estimated relationship between per-student spending and school size was U-shaped. In operating spending, the minimum costs were achieved at 4699 students (in the district), which is near the maximum enrolment observed in their data. For capital spending the minimum-cost enrolment was achieved at 751 students per district.

Stiefel et al. (2009) also found evidence in favour of a U-shaped relationship between enrolment and costs. Their analysis relied on a panel data set covering over 200 high schools in New York City from 1995-1996 to 2002-2003. Their analysis further differentiated between two different types of schools: themed and comprehensive schools. Multiple measures of school outcomes were included as regressors in the cost function: average math and verbal scores on SAT examinations, SAT test-taking rates, and cohort

graduation rates, and percent of students passing the state 8th grade math exam. Their model was tested with a continuous and a categorical operationalisation of school size. Both specifications found cost-functions U-shaped with respect to size, with different curves for themed and comprehensive schools (Stiefel et al., 2009).

In their review of cost function studies, Andrews et al. (2002) found that sizeable economies of scale are available up to district enrolment levels between 2000 and 4000 students, for districts above 15000 students sizeable diseconomies of scale begin to emerge. At the school level, production function studies provide evidence that moderately sized elementary schools (300-500 students) and high schools (600-900 students) may balance economies of size with the negative effects of large schools (Andrews et al., 2002). In their review, they find that for most types of expenditures a U-shaped cost curve is found, but minimum costs are found at different levels of enrolment. For total costs, the cost-minimising district enrolment is about 6000 students, for operating or instructional costs the optimal size is in the 2000 to 3500 range, and for transportation costs the optimal enrolment is just over 1000. Nevertheless, Andrews et al. (2002) criticise the fact that none of the studies they reviewed took into account the increase in opportunity costs for travel time for parents and students when several districts consolidate. In sparsely populated districts the increase in travel time resulting from consolidation may make consolidation unfeasible.

6.3 Implications of the research results

The evidence presented in the works reviewed indicates that size affects different schools in different ways. There is no educationally-relevant absolute lower or upper limit to school size; much depends on the context (Howley and Howley, 2004). Nevertheless, when considering issues of school effectiveness and efficiency it seems that the point of diminishing returns to educational outcomes occurs with fewer students than is the case for economic efficiency (Slate and Jones, 2005). That is, effectiveness-related research recommends smaller schools than efficiency criteria would indicate.

Even though initial research advised against smaller schools due to their limited curriculum and teacher specialisation, more recent results have shown that smaller schools with a strong required core curriculum could also produce students' achievement at high levels. This later research has indicated that students did not necessarily register for the specialised courses or extracurricular activities offered by large schools, or that enrolment in these activities might be limited to specific student populations (Slate and Jones, 2005).

School size acts as a facilitating factor for other desirable or undesirable practices and features. Small schools may facilitate personalised teacher-student relationships, but they can also create professional isolation among teachers, or more reduced social networks for students. The advantages and disadvantages of size need to be evaluated against a specific context. It seems clear from the existing debate in the literature and from the disagreement around specific policy proposals that there is no 'one-size-fits-all' solution to the question of school size. Researchers and policy-makers should substitute the predominant question of "What size is best?" by the alternative "Best size for whom, and under what conditions?" (Bickel and Howley, 2000). The effects of size on achievement are conditioned by multiple factors, and one size is shown more clearly than ever before not to fit all cases (Bickel and Howley, 2000). This suggests that context and circumstances vary to such an extent from one school or school district to another that each setting can be understood as unique, and ought to be studied in its singularity.

Research has tended to overlook the interaction of school and district size with other characteristics of the schools or the student population. The effects of school size are usually construed as affecting equally all students. Socioeconomic background is one of the few moderators of school size effects to be found in the literature.

Large schools are considered to act more as a sorting mechanism for children, allowing students from socioeconomically advantaged families to profit from the advantages that larger size offer (Nguyen et al., 2007). In contrast, because staff in smaller schools can focus on a core academic curriculum and they know every student; small schools can offer success for each of them (Nguyen et al., 2007). For this reason small schools are likely to benefit children of lower socioeconomic status.

Howley and Howley (2004) and Bickel and Howley (2000) focused their research on the differential effects of school size depending on the socioeconomic background of the school community. As part of their research they found that consolidation affects communities with different socio-demographic characteristics differently. Low-wealth and minority populations tend to be negatively affected by consolidation initiatives, while larger schools improved achievement in schools in affluent communities.

As a result of their research, these scholars suggested that if consolidation is proposed in low-wealth and minority communities, this proposal needs to be carefully reviewed, and with strong participation from the community (Howley et al., 2011). They also recommended that small schools in poor communities should be sustained, as well as appropriately and adequately supported (Howley and Howley, 2004). In affluent communities, secondary schools may be larger, but they should remain under 1000 students. Howley and Howley (2004) also recommended that the issue of school size be considered with equal care in rural and urban areas, since consolidation could have considerable negative consequences in impoverished urban areas. In spite of the beneficial effects of smaller schools for students from disadvantaged background, segregation by school size should be avoided. The concentration of low socioeconomic status students in smaller schools should be prevented (Howley and Howley, 2004).

The level of education is another factor that has been considered as a relevant mediator of school size. Students in primary schools tend to be more adversely affected by larger sizes than students in secondary schools (Slate and Jones, 2005), which suggests that primary schools should be kept proportionally smaller than secondary schools (Howley and Howley, 2004).

Another contextual factor relevant for school size policies is population density. Surprisingly, this variable has been frequently disregarded in studies of consolidation and efficiency, which also closely relates to the absence of transportation costs considerations in many analyses. As it has been discussed when referring to country approaches to school size policies, population density is a fundamental factor that determines the extent to which school size is an option. The geographical distribution of schools in relation to the population of school age is an important constraint to possibilities of closures or mergers (Taylor and Bradley, 2000).

While schooling does seem to benefit from economies of scale (at least over a certain enrolment range), consolidation cannot be counted on to provide large cost savings in sparsely populated areas (Holland and Baritelle, 1975). Creating large schools in rural areas with low population densities will increase the cost of transporting students, counteracting the savings from size economies (more so if the opportunity cost of transportation time is considered). Savings from consolidation will be available as long as schools are located in urban or more densely populated areas, where there are alternative schools from which parents can choose in case of school closure (Taylor and Bradley, 2000). Children's and teachers' commuting distance will place an upper limit to the true saving available from consolidation.

This argument holds true not only for cost savings, but also for those situations where consolidation can increase student achievement. In some cases, location and demographic issues will prevent the attainment of improved performance from which very small schools could benefit after consolidation. If this is the case, then small or very small schools will only achieve comparable levels of performance to larger schools if they are funded accordingly to their situation. Hence, guaranteeing equal opportunities for

students may entail higher levels of funding for small isolated schools, where the disadvantages of small schools for learning cannot be solved through consolidation (Barnett et al., 2002).

Educational decision-makers should keep the characteristics of their community and school in mind when examining school size policies. Authorities should take into account a wide range of factors before deciding on any changes in school size. Firstly, the educational benefits of changes in size should be considered, specifying which groups of students will benefit most and least from these changes. Next, travel distance and time as well as direct transportation costs are fundamental factors that need to be included in any assessment of likely policy effects. Other issues that need to be considered are demographic trends (in terms of population density, population projections) as well as any trends in community and urban planning or settlements. Financial and economic considerations should go beyond operating and capital expenditures and attempt to include, to the extent possible, the social costs of closing schools.

6.4 Deficiencies in existing literature and methodological challenges

The study of school size and its consequences for school effectiveness and efficiency is a complex issue often subject to the limitations of available data. A review of the literature on this topic suggests some common methodological challenges as well as certain limitations in the research that could be improved.

What is small?

The definition of what constitutes a large or a small school has often been vague, and has varied greatly from one study to the next, complicating the comparability of results. Definitions of large schools, for instance, range from schools with 800 students or more to schools hosting more than 2000 or even 3 200 students (Leithwood and Jantzi 2009; Stiefel et al. 2009). The same holds true for what scholars call small or medium schools. In fact, school size, representing the key independent variable of interest in this strand of research, is treated differently across studies. While some scholars choose to introduce it as a continuous variable, others create categories of sizes, some distinguishing between small, medium and large schools, others also referring to very small, and very large schools. Regardless of the operationalisation of size selected, Slate and Jones (2005) suggest researchers and policy-makers should refer to specific quantities of students instead of referring to notions such as small or large, since as the examples show two people talking about large and small schools may be talking about very different entities.

Lack of comprehensive theoretical models

Most of the research conducted on the relationship between school size and effectiveness and efficiency, and more generally research on school effectiveness, has not been based on theoretical models (Slate and Jones, 2005). The vast majority of the research in this area has not followed a comprehensive theoretical model that indicates and elaborates on the relationship between different factors explaining school effectiveness or efficiency. As a consequence, the literature frequently consists of piecemeal studies that lack integration (Slate and Jones, 2005). In practice, this is manifested in different specifications of production and costs functions. A developed theoretical framework would provide a justification to which variables should be taken into account when explaining school effectiveness or efficiency, and to the shape the relationship between the explanatory and dependent variable takes.

Most studies will include measures of student inputs, school inputs, and environmental factors, but the lack of a developed theoretical model will give rise to differences in the models implemented by different scholars. This will also impair the comparability of results, since omission of relevant explanatory

variables is likely to increase the significance of other explanatory variables (Fox, 1981). Stiefel et al. (2009), for instance, distinguish between different types of New York City high schools according to their mission, arguing that the mission and purpose of different types of high schools may have implications in determining their cost structure. This type of differentiation has not been included in any other research.

Research supporting consolidation provides another interesting example, since it often does not include population density as a variable to be considered in the analysis, even though this variable could have a profound effect on the costs and results of consolidation (Slate and Jones, 2005). Without a developed theoretical framework, researchers and policy-makers lack a benchmark against which to judge the specifications implemented in different studies.

Limited available measures of school outcomes

Another frequent shortcoming in the school size literature is the reduced number measures of school outcomes used in these studies. In spite of the multi-dimensionality of educational services and outcomes, most studies limit their analysis to one single measure of schooling outcomes, frequently average test scores in one subject (Andrews et al., 2002; Duncombe and Yinger, 2001). This is especially problematic in the context of the school size literature, where arguments in favour of smaller schools frequently refer to the non-academic benefits that these schools provide to their students and communities (e.g. in the form of social capital, positive teacher and student attitudes).

The most commonly used measures of school outcomes are average test scores (particularly in mathematics and reading), graduation rates, dropout measures, enrolment, or average daily attendance (Andrews et al., 2002; Fox, 1981; Stiefel et al., 2009). Moreover, research based on test scores frequently uses measures such as the percentage of students reaching high grades, or average tests scores, which is problematic because it neglects effects related to the distribution of such grades (Andrews et al., 2002; Bradley and Taylor, 1998). Using average measures of outcomes omits relevant distributional and equity issues. Future research should attempt to include more comprehensive measures of school outcomes that capture the multi-dimensionality of schooling. Moreover, research should also attempt to include value-added measures of education to be able to control for cumulative effects. In spite of the relative emphasis that value-added measures have experienced in education research, they are used in few studies (Andrews et al., 2002).

Limited available measures of costs

One particular limitation of the research relating school size to efficiency is the frequent use of average expenditure as a proxy for average costs of education. Economies of scale refer to the relationship between average costs and the quantity or level of services provided; it is a supply-side phenomenon (Fox, 1981). When using expenditures as a proxy for costs in cost production functions, this approach does not separate supply from demand side effects, and expenditures will differ from costs if resources are not allocated in a cost-minimising fashion (Stiefel et al., 2009). Considering the lack of specific cost data research on school size and efficiency will probably continue to be based on expenditure data, nevertheless, the limitations that this practice entails should be made explicit.

Even the availability of expenditure data is distant from what is necessary for these analyses. In most cases, school level expenditure data are not available, or available only for some categories of spending (Andrews et al., 2002). It is common that most studies will cover total expenditures or operating expenditures, but only a few of them have examined scale economies for capital spending, building expenditures, or administration costs (Andrews et al., 2002). Stiefet et al. (2009), for instance, exclude from their analyses building expenditures and transportation costs; and Osburn (1970) and Riew (1986) omit capital expenditure. This partial inattention in the literature to capital spending is especially

problematic if one takes into account that spreading capital costs over more units is often considered as one of the major sources of scale economies (Fox, 1981). On the other hand, the exclusion of transportation costs possibly underestimates the costs associated to consolidation and larger school sizes.

Especially problematic is, not only the omission of transportation cost data, but also the inattention to the opportunity costs for travel time for parents and students when several schools or districts consolidate. No study has made an attempt to capture the opportunity cost of travel time, and only very few scholars make this limitation on their research explicit.

Endogeneity

As with most research based on observational data, studies on school size and effectiveness and efficiency, as well as evaluation of the results of consolidation, are challenged by endogeneity threats. In general terms, schools that are smaller than average will likely share some features that separate them from larger schools, and many of these characteristics will not be included in the specified models, either because they are unobservable or because no measures of them are available. Absent random assignment of students, smaller and larger schools are also likely to differ in the population they draw. For instance, high-income families may be able to afford sending their children to schools located at a greater distance and which have a better reputation (Bradley and Taylor, 1998). If small and large schools differ in unmeasured characteristics, this may introduce bias to the estimated effects of size. Over time, highly effective schools may attract more students, creating a general bias in observational studies toward finding better results in larger schools (Berry and West, 2010). Even if researchers attempt to control for a great number of variables indicating school or student characteristics, without random assignment these studies will be under the threat of endogeneity.

The same problem appears in the evaluation of consolidation. Ideal assessments of the effects of consolidation should be based on pre- and post-consolidation data, where schools are randomly assigned to treatment or control groups (Duncombe and Yinger, 2001). Evidently, random assignment to treatment is not a characteristic of consolidation policies, which entails the possibility that consolidating and non-consolidating schools differ systematically in observable or unobservable factors (Duncombe and Yinger, 2001). This could bias any observed effects of consolidation.

Confronted with the problem of endogeneity, and having to work with observational data, some scholars have opted for using longitudinal data (to be able to control for time-invariant school characteristics), others have used non-equivalent control group designs opting for introducing a set of control variables as well as instrumental variables and two-stage models (Duncombe and Yinger, 2001). Berry and West (2010) resorted to long term and state level data to minimise the problem of families choosing where to live based on the size or quality of the school. Other innovative approaches have included the analysis of shocks to enrolment (Kuziemko, 2006).

Recent research has made more explicit the challenge presented by the endogeneity threat, and have attempted to solve it, even if research on school size will mostly continue to be correlational and based on observational data. Where random assignment to treatment is impossible or unattainable, robustness of results to different model specifications, methods or used data provide increasing credibility to these results (Howley et al., 2011).

Interaction effects

Researchers have tended to overlook the interaction of school size with other variables, whether pertaining to the individual characteristics of the student population, their parents or school specific characteristics. The only variables that have been treated in the literature as possible mediators of the effect

of size, are the socioeconomic background of students (or social class), school type or grade. But if enrolment affects other individual characteristics, such as students' attitudes, or degree of parental involvement in school activities, then this implies that the impact of student and parental characteristics on student outcomes are dependent on the size of the school. As a consequence, effectiveness, production and cost functions should include more interactions between student and parental characteristics and size (Andrews et al., 2002). Interactions between size and single-parent households or parental education provide examples of such cases. Even socioeconomic status, which has been recognised as an important mediator of size is frequently omitted in most studies.

Causal mechanisms of the effects of size remain a black box

While many studies have attempted to measure and quantify the effect of school size on the quality or the cost of the education provided, very few address the question of how school size may change the effectiveness or the efficiency of educational provision. There are very few enquiries into the mechanisms through which size is expected to affect students' outcomes in standardised tests or graduation rates. Even though we have reviewed some of the pathways of these effects, no study has attempted to assess the relevance of these different pathways or mechanisms. At best, some mediators have been linked to school size, but without further mention to the effects of these mediators (such as teacher's attitudes) on school outcomes. Moreover, those studies frequently focused on a single mediator variable at a time, not attempting to assess the main mechanisms through which the effects of size take place.

7. CONCLUSION

This paper discussed the likely effects of school size on school effectiveness and efficiency, identifying the mechanisms through which these take place, and describing country practices in terms of school size policies. It showed the frequent disagreements in the existing literature with regards to the advantages and disadvantages associated to size. Contrary to earlier claims arguing that larger schools were better, recent trends indicate there are benefits to smaller schools, and that there may be a limit to the positive effects of larger sizes.

This paper also presented how demographic trends are putting increasing pressure on national, regional and local authorities to make choices about school size policies. Size is a salient issue that frequently raises debates and confrontation between policy-makers and stakeholders. Even if consolidation has usually been met with opposition by local communities, an analysis of the literature indicates that there are also benefits to consolidation and that initial opposition can be overcome. Even if there may be benefits to larger schools, such as broader academic curricula with specialised courses or a wider choice of extra-curricular activities, these benefits can unequally affect student performance with some students benefitting more than others. This is also the case for consolidation practices. The benefits and costs of consolidation might be unequally distributed among those affected by it (students, teachers, parents) and it is fundamental to consider this distribution to reach a balanced assessment of the implications of school consolidation. Moreover, it is important to advance in the inclusion of transportation time and cost in studies on consolidation or school size more generally, particularly because this has been one of the main reasons for opposition to consolidation within the school community, but it has been frequently neglected in the existing literature. This is a factor that needs to be included in future research aiming to conduct a comprehensive analysis on the effects of consolidation.

One of the arguments that has appeared more consistently throughout this paper is that there is no ‘one-size-fits-all’ solution in school size policies. Even if consolidation may improve school quality and efficiency in some contexts, it is unfeasible in others, mostly due to geographical isolation. Other alternative forms of organisation have proven effective in counteracting the disadvantages of small remote schools, without having to remove the school institution of its community. School clusters and school federations, and other more informal forms of cooperation, have allowed smaller schools to obtain specialised teachers and courses, to organise larger groups of students for certain classes, and also to create a wider professional community for teachers and principals. For those cases where interaction with other nearby schools is unfeasible, information and communication technologies provide an innovative tool to combat isolation, and positive experiences of their implementation show that they could be a useful tool for very remotely located schools.

Any decision on changes in school size must be made carefully, and it needs to be exhaustive in including all of the mechanisms and variables that mediate size effects. In that respect, existing studies have insufficiently reflected on the possible interaction effects between size and other school and context related variables. Grade level and social class have proven to be two strong mediators of size effects. This indicates that policy-makers need to carefully consider which student populations will benefit or suffer from different school sizes. Changes in size policies should be conducted through an open and transparent process that permits the participation of the affected communities, and that clearly presents the arguments for changes in the school structure.

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*, Vol. 21, pp. 245-262.

Bard, J., Gardener, C. and Wieland, R. (2006), "Rural School Consolidation: History, Research Summary, Conclusions, and Recommendations", *The Rural Educator*, pp. 40-48.

Barnett, R. R., Glass, J. C., Snowdon, R. I. and Stringer, K. S. (2002), "Size, Performance and Effectiveness: Cost-Constrained Measures of Best-Practice Performance and Secondary-School Size", *Education Economics*, Vol. 10, No. 3, pp. 291-311.

Berry, C. R. and West, M. (2010), "Growing Pains: The School Consolidation Movement and Student Outcomes", *Journal of Law, Economics, and Organisation*, Vol. 25, No. 1, pp. 1-29.

Bickel, R and Howley, C. (2000), "The Influence of Scale on School Performance: A Multi-Level Extension of the Matthew Principle", *Education Policy Analysis Archives*, Vol. 8, No. 22, p.1-32.

Boix Tomás, R. (2007), "La escuela rural en Cataluña: problemáticas, propuestas y retos de futuro", *Aula Abierta*, Vol. 35, No. 1, pp. 77-82.

Bonesronning, H. and Rattso, J. (1994), "Efficiency Variation among the Norwegian High Schools: Consequences of Equalization Policy", *Economics of Education Review*, Vol. 13, No. 4, pp. 289-304.

Bowen, G. L., Bowen, N. K. and Richman, J. M. (2000), "School Size and Middle School Students" Perceptions of the School Environment", *Social Work in Education*, Vol. 22, No. 2, pp. 69-82.

Bowles, T. J. and Bosworth, R. (2002), "Scale Economies in Public Education: Evidence from School Level Data", *Journal of Education Finance*, Vol. 29, No. 2, pp. 285-299.

Bradley, S. and Taylor, J. (1998), "The Effect of School Size on Exam Performance in Secondary Schools", *Oxford Bulletin of Economics and Statistics*, Vol. 60, No. 3, pp. 291-324.

Brasington, D. M. (1999), "Joint provision of public goods: the consolidation of school districts", *Journal of Public Economics*, Vol. 73, pp. 373-393.

Broadley, T., Boyd, D. and Terry, E. (2009), "The Hot Topic Community: Videoconferencing to Reduce the Professional Isolation of Teachers in Rural Western Australia", in Lyons, T., Choi, J. and McPhan, G. (eds.), *Innovation for Equity in Rural Education. Symposium Proceedings*, University of New England, 11-14 February, Armidale.

Budde, H. (2007), "Die Entwicklung regionaler Schulstrukturen in peripheren ländlichen Räumen unter dem Paradgima demografischer Schrumpfung. Das Beispiel zweier Landkreise des Landes Brandenburg", *Zeitschrift für Pädagogik*, Vol. 53, No. 3, pp. 314-325.

Choi, J. (2009), "Clustering Rural Schools in Korea", in Lyons, T., Choi, J. and McPhan, G. (eds.), *Innovation for Equity in Rural Education. Symposium Proceedings*, University of New England, 11-14 February, Armidale.

Cohn, E. (1968), "Economies of Scale in Iowa School Operations", *The Journal of Human Resources*, Vol. 3, No. 4, pp. 422-434.

Coleman, P. and LaRocque, L. (1984), "Economies of Scale Revisited: School District Operating Costs in British Columbia, 1972-82", *Journal of Education Finance*, Vol. 10, No. 1, pp. 22-35.

Commission on the Delivery of Rural Education (CDRE) (2013), *Commission on the Delivery of Rural Education: Report*, The Scottish Government, Edinburgh.

Consejo Escolar Estado Español (2008), *Recopilación de Informes Anuales Escuela Rural*, Ministerio de Educación, Gobierno de España.

Corbett, M. and Mulcahy, D. (2006) "Education on a human scale: Small rural schools in a modern context", *Research Report 061 – Acadia Centre for Rural Education*, Report prepared for the Municipality of Cumberland County.

Cotton, K. (1996), "School size, school climate, and student performance", *School Improvement* Research Series *(SIRS)*, Retrieved July 15, 2013, from www.nwrel.org/scdp/sirs/10/c020.html.

DeYoung, A. J. and Howley, C. B. (1990), "The Political Economy of Rural School Consolidation", *Peabody Journal of Education*, Vol. 67, No. 4, pp. 63-89.

Duncombe, W. and Yinger, J. (2001), "Does School District Consolidation Cut Costs?", *Centre for Policy Research*, Paper 122, Maxwell School of Citizenship and Public Affairs.

Duncombe, W. D. and Yinger, J. M. (2010), "School District Consolidation: The Benefits and Costs", *The School Administrator*, Vol. 67, No. 5, pp. 10-17.

Evans, A. (2005), "Small Rural Schools: A Welsh Perspective", in A. Sigsworth and K. J. Solstad (eds.), *Small Rural Schools: A Small Inquiry*, Interskola, Cornwall.

Fox, W. F. (1981), "Reviewing Economies of Size in Education", *Journal of Education Finance*, Vol. 6, No. 3, pp. 273-296.

García Cantó, E., Peñalver Rojo, F. J., Rodríguez Castells, A., De Juan Cebollada and Navalpotro Pérez, L. (2008), "La escuela rural: ¿cierre o reorganización? Una comparación entre España y Grecia", *EFDeportes Revista Digital*, Vol. 119, Retrieved August 22, 2013, from www.efdeportes.com/efd119/la-escuela-rural-cierre-o-reorganizacion.htm.

Hepburn, H. (2013), "Rural schools report leaked", *Times Educational Supplement*, 11 January 2013, Retrieved 22 August 2013 from www.tes.co.uk/article.aspx?storycode=6313518.

Hirsch, W. Z. (1959), "Expenditure Implications of Metropolitan Growth and Consolidation", *The Review of Economics and Statistics*, Vol. 41, No. 3, pp. 232-241.

Hobbs, Vicki (2004), "The Promise and the Power of Distance Learning in Rural Education", *Rural Trust Policy Brief Series on Rural Education*, The Rural School and Community Trust.

Holland, D. W. and Baritelle, J. L. (1975), "School Consolidation in Sparsely Populated Rural Areas: A Separable Programming Approach", *American Journal of Agricultural Economics*, Vol. 57, No. 4, pp. 567-575.

Horn, D. (2006), "Do Small Schools Provide Education of Inferior Quality? The case of Hungary", *CEU Political Science Journal*, pp. 4-13.

Howley, C. B. and Howley, A. A. (2004), "School size and the influence of socioeconomic status on student achievement: Confronting the threat of size bias in national data sets", *Education Policy Analysis Archives*, Vol. 12, No. 52, pp. 1-35.

Howley, C., Johson, J. and Petrie, J. (2011), "Consolidation of Schools and Districts: What the Research Says and What It Means", *National Education Policy Centre*, School of Education, University of Colorado at Boulder.

Iatarola, P., Schwartz, A. E., Stiefel, L. and Chellman, C. C. (2008), "Small Schools, Large Districts: Small-School Reform and New York City's Students", *Teachers College Record*, Vol. 110, No. 9, pp. 1837-1878.

Im, Y. (2009), "Towards New Directions for Korean Rural Education Policy", in Lyons, T., Choi, J. and McPhan, G. (eds.), *Innovation for Equity in Rural Education. Symposium Proceedings*, University of New England, 11-14 February, Armidale.

Johnson, D. W., Johnson, R., Pierson, W. T. and Lyons, V. (1985), "Controversy versus concurrence seeking in multi-grade and single-grade learning groups". J. Res. Sci. Teach., 22: 835–848.

Kenny, L. W. (1982), "Economies of Scale in Schooling", *Economics of Education Review*, Vol. 2, No. 1, pp. 1-24.

Kenny, L. W. and Schmidt, A. B. (1994), "The decline in the number of school districts in the U.S.: 1950-1980", *Public Choice*, Vol. 79, pp. 1-18.

Killeen, K. and Sipple, J. (2000), "School Consolidation and Transportation Policy: An Empirical and Institutional Analysis", *Working Paper for the Rural School and Community Trust Policy Program*, Cornell University, Ithaca.

Klonsky, M. (2002), "Small Schools and Teacher Professional Development", *ERIC Publications*, Retrieved August 22, 2013 from http://files.eric.ed.gov/fulltext/ED470949.pdf.

Kolouris, P. and Sotiriou, S. (2006), "Exploring teacher's innovative leadership roles in small rural schools, in: *The Commonwealth Council for Educational Administration and Management (CCEAM)* Conference 2006, Nicosia, Cyprus, October 12-17.

Leithwood, K. and Jantzi, D. (2009), "A Review of Empirical Evidence about School Size Effects: A Policy Perspective", *Review of Educational Research*, Vol. 79, pp. 464-490.

Lewis, W. C. and Chakraborty, K. (1996), "Scale economies in public education", *The Journal of Regional Analysis and Policy*, Vol. 26, No. 1, pp. 23-35.

Lipsett, A. (2008), "Don't close rural schools, says Knight", *Education Guardian*, The Guardian 30 January, 2008.

Little, A. (1995), "Multigrade teaching: a review of practice and research", serial No. 12. Overseas Development Administration, London.

Louis, L. and McNamara, J. F. (1973), "Economies of Scale for a State System of Public School Districts", *Socioeconomic Planning Sciences*, Vol. 7, pp. 295-303.

Lyson, T. A. (2002), "What Does a School Mean to a Community? Assessing the Social and Economic Benefits of Schools to Rural Villages in New York", *Journal of Research in Rural Education*, Vol. 17, No. 3, pp. 131-137.

Mason, D, and Burns, R.B. (1996), "Simply No Worse and Simply No Better" May Simply Be Wrong: A Critique of Veenman's Conclusion about Multigrade Classes", Review of Educational Research, Vol. 66, No. 3, pp. 307-322

Matthews, P., Klaver, E., Lannert, J., Conluain, G. and Ventura, A. (2008), "Policy measures implemented in the first cycle of compulsory education in Portugal", *International Evaluation for the Ministry of Education 2008*, Office for Education Statistics and Planning, Lisboa.

McVicar, D. (2000), "Are Secondary Schools in Northern Ireland Too Small? A Microeconomic Analysis of School Size and Career Choice at Sixteen", *Northern Ireland Economic Research Centre*.

Meyer, E. T., "Big or Small? A Policy Analysis of School Consolidation", Retrieved August 22, 2013 from http://users.ox.ac.uk/~inet0080/iuarchive/files/BigorSmall.PDF.

Ministry of Education (Portugal) (2008), "Policy measures implemented in the first cycle of compulsory education in Portugal. Country Position Paper", *Evaluation of the ongoing reforms in the first cycle of compulsory education in Portugal – Country Position Paper*.

Moulton, J. (2001), "Improving education in rural areas: Guidance for rural development specialists", The World Bank.

Mulcahy, D. M. (2009), "Developing Government Policies for Successful Rural Education in Canada", in Lyons, T., Choi, J. and McPhan, G. (eds.), *Innovation for Equity in Rural Education. Symposium Proceedings*, University of New England, 11-14 February, Armidale.

Mulryan-Kyne, C. (2005), "Small Rural Schools: An Irish Perspective", in A. Sigsworth and K. J. Solstad (eds.), *Small Rural Schools: A Small Inquiry*, Interskola, Cornwall.

Nguyen, H., Schmidt, M. and Murray, C. (2007), "Does School Size Matter? A Social Capital Perspective?", *Review of Educational Policy Literature*, Faculty of Education and School of Communication, Simon Fraser University.

Nitta, K., Holley, M. and Wrobel, S. (2010), "A phenomenological study of rural school consolidation", *Journal of Research in Rural Education*, Vol. 25, No. 2, pp. 1-19.

OECD (2013), *Trends Shaping Education*, OECD Publishing, Paris, http://dx.doi.org/10.1787/trends_edu-2013-en.

OECD (2010a), *PISA 2009 Results: What Makes a School Successful? Resources, Policies and Practices (Volume IV)*, PISA, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264091559-en.

OECD (2010b), *OECD Rural Policy Reviews Québec, Canada 2010*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264082151-en.

OECD (2010c), *Strategies to Improve Rural Service Delivery*, OECD Rural Policy Reviews, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264083967-en.

O Slatara, T. and Morgan, M. (2004), "The Future of Small Schools and Teaching Principalship in Ireland", *Interim Report February 2004*, Retrieved August 22, 2013 from www.ippn.ie/index.php?option=com_mtree&task=att_download&link_id=2588&cf_id=24.

Ornstein, A. C. (1990), "School Size and Effectiveness: Policy Implications", *The Urban Review*, Vol. 22, No. 3, pp. 239-245.

Osburn, D. D. (1970), "Economies of Size Associated with Public High Schools", *The Review of Economics and Statistics*, Vol. 52, No. 1, pp. 113-115.

Ponce de León Elizondo, A., Bravo Sáinz, E. and Torroba Santa María, T. (2000), "Los Colegios Rurales Agrupados, Primer Paso al Mundo Docente", *Contextos Educativos*, Vol. 3, pp. 315-347.

Perry, C. and Love, B. (2013), "Rural schools", *Research and Information Service, Research Paper 27/13*, Northern Ireland Assembly.

PSBA (2009), "Merger/Consolidation of School Districts: Does it save money and improve student achievement?", *Education Research and Policy Centre*, Pennsylvania School Boards Association.

Reading, C. (2009), "Social Computing: Reducing Isolation in Remote Australian Schools", in Lyons, T., Choi, J. and McPhan, G. (eds.), *Innovation for Equity in Rural Education. Symposium Proceedings*, University of New England, 11-14 February, Armidale.

Riew, J. (1986), "Scale Economies, Capacity Utilisation, and School Costs: A Comparative Analysis of Secondary and Elementary School", *Journal of Education Finance*, Vol. 11, No. 4, pp. 433-446.

Rule, T. (2005), "Small Rural Schools: An English Perspective", in A. Sigsworth and K. J. Solstad (eds.), *Small Rural Schools: A Small Inquiry*, Interskola, Cornwall.

Rural Development Sub-Committee (2008), *Inquiry into the Reorganisation of Schools in Rural Wales*, Rural Development Sub-Committee Committee Service, Cardiff Bay.

Scheerens, J. (2013), "The use of theory in school effectiveness research revisited", *School Effectiveness and School Improvement: An International Journal of Research, Policy and Practice*, Vol. 24, No. 1, pp. 1-38.

The Scottish Government (2008), "Safeguarding our rural schools and improving school consultation procedures. Proposals for changes to legislation", the Scottish Government, Edinburgh.

Sell, R. S. and Leistritz, F. L. (1997), "Socioeconomic Impacts of School Consolidation on Host and Vacated Communities", *Community Development Society*, Vol. 28, No. 2, pp. 186-205.

Sigbórsson, R. and Jónsdóttir, B. (2005), "Small Rural Schools: An Icelandinc Perspective", in A. Sigsworth and K. J. Solstad (eds.), *Small Rural Schools: A Small Inquiry*, Interskola, Cornwall.

Sigsworth, A. (2005), "Summary and Reflections", in A. Sigsworth and K. J. Solstad (eds.), *Small Rural Schools: A Small Inquiry*, Interskola, Cornwall.

Slate, J. R. and Jones, C. H. (2005), "Effects of Size: A review of the Literature with Recommendations", *Essays in Education*, Vol. 13 (Spring 2005), Department of Education at the University of South Carolina Aiken.

Solstad, K. J. (2005), "Small Rural Schools: A Norwegian Perspective", in A. Sigsworth and K. J. Solstad (eds.), *Small Rural Schools: A Small Inquiry*, Interskola, Cornwall.

Solstad, K. J. (2009), "The Impact of Globalization on Small Communities and Small Schools in Europe", in Lyons, T., Choi, J. and McPhan, G. (eds.), *Innovation for Equity in Rural Education. Symposium Proceedings*, University of New England, 11-14 February, Armidale.

Sörlin, I. (2005), "Small Rural Schools: A Swedish Perspective", in A. Sigsworth and K. J. Solstad (eds.), *Small Rural Schools: A Small Inquiry*, Interskola, Cornwall.

Stiefel, L., Berne, R., Iatarola, P. and Fruchter, N. (2000), "High School Size: Effects on Budgets and Performance in New York City", *Educational Evaluation and Policy Analysis*, Vol. 22, No.1, pp. 27-39.

Stiefel, L., Schwartz, A. E., Iatarola, P. and Chellman, C. C. (2009), "Mission matters: The cost of small high schools revisited", *Economics of Education Review*, Vol. 28, pp. 585-599.

Strang, D. (1987), "The Administrative Transformation of American Education: School District Consolidation, 1938-1980", *Administrative Science Quarterly*, Vol. 32, No. 3, pp. 352-366.

Stewart, L. (2009), "Achivement Differences between Large and Small Schools in Texas", *The Rural Educator*, Vol. 30, No.2, pp. 20-28.

Syväniemi, U. (2005), "Small Rural Schools: A Finnish Perspective", in A. Sigsworth and K. J. Solstad (eds.), *Small Rural Schools: A Small Inquiry*, Interskola, Cornwall.

Taylor, J. and Bradley, S. (2000), "Resources Utilisation and Economies of Size in Secondary Schools", *Bulletin of Economic Research*, Vol. 52, No. 2, pp. 123-150.

Thai World Affairs Centre (2013), "Closing Small Schools: Issues for Consideration", *Special Reports*, Institute of Asian Studies, Thailand, Retrieved 22 August 2013 from www.thaiworld.org/enn/thailand_monitor/answera.php?question_id=1262.

Tholkes, R. J. (1991), "Economies of Scale in Rural School District Reorganisation", *Journal of Education Finance*, Vol. 16, No. 4, pp. 497-514.

Tholkes, R. J. and Sederberg, C. H. (1990). "Economies of Scale and Rural Schools", *Research in Rural Education*, Vol. 7, No. 1, pp. 9-15.

Trinidad, S. (2009), "Using Social Computing Tools to Connect Regional and Remote Teachers and Students in Western Australia", in Lyons, T., Choi, J. and McPhan, G. (eds.), *Innovation for Equity in Rural Education. Symposium Proceedings*, University of New England, 11-14 February, Armidale.

Veenman, S. (1996), "Effects of Multigrade and Multi-Age Classes Reconsidered", Review of Educational Research, Vol. 66, No. 3, pp. 323-340

Veenman, S. (1997), "Combination Classrooms Revisited", Educational Research and Evaluation: An International Journal on Theory and Practice, 3:3, 262-276.

Wilson, V. (2008), "Small Scottish Primary Schools: An Endangered Species", *Scottish Educational Review*, Vol. 40, No. 2, pp. 76-89.

Yarrow, A., Ballantyne, R., Hansford, B., Herschell, P. and Millwater, J. (1999), "Teaching in rural and remote schools: a literature review", *Teaching and Teacher Education*, Vol. 15, pp. 1-13.