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Educational Effectiveness Research (EER): A State of the Art Review

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Introduction

Educational effectiveness research (EER) has shown rapid growth in the quantity and quality of the research answers it can produce to its core, foundational questions, which can be simply summarized as:

- What makes a “good” school?
- How do we make more schools “good”?

It seeks to investigate all the factors within schools in particular, and the educational system in general, that might affect the learning outcomes of students in both their academic and social development, which means it encompasses a wide range of factors such as teaching methods, the organisation – formally and informally – of schools, the curriculum, the role of leadership and the effects of educational “learning environments” in general, whether schools, districts or nations.

To undertake this complex task, EER involves distinguishing the effects of schools from other effects such as those of student intake and educational background, which therefore requires modelling tools that involve comparable complexity (Creemers, Kyriakides & Sammons, 2010); (Goldstein, 2003). Thus, the methodological issues of how we analyse complex data from multiple levels of the educational system have had, and continue to have, a salience in EER more than in many other educational specialities.

In this review we address the following:

- The history of EER;
- Methodological and Theoretical advances in EER;

- The scientific properties of EER on the size of school effects, differential effects, their consistency, their stability over time, the different outcomes of education, school compositional effects and international educational effects;
- The processes of educational effectiveness, and ineffectiveness;
- The links between EER, policy and practice;
- The future research needs of EER;
- The future directions for EER, in a changing international society.

We cannot be exhaustive – no ‘state of the art’ can be – but we do aim to properly acknowledge the international contributions of all contributing countries. We are also not a ‘meta-analysis’ of findings, although we will be reviewing what we think the findings in key areas of our field are. What we will be doing additionally to meta-analytic approaches is to situate the EER field in terms of history, its interaction with broader educational changes and its possible – and to us desirable – future development. Improving the quality of our scholarship in the EER field, and its impact for good upon children, is much more likely to be produced by people who know where they have come from than those ignorant of this. If the way to understand something is to change it, then the way to change something is also to understand it.

We should finally note that we are using the term “Educational Effectiveness Research” rather than “School Effectiveness Research” here as a reflection of the wide breadth of topics that the field now covers (Muijs, 2006; Creemers, Kyriakides & Sammons, 2010).

The History of Educational Effectiveness Research

There are a large number of publications which review the field’s history (Creemers, Kyriakides & Sammons, 2010; Gray et al., 1996; Mortimore, 1991; Reynolds, 2010b; Reynolds et al., 1994; Sammons, 1999; Scheerens & Bosker, 1997; Teddlie, 2010; Teddlie & Reynolds, 2000; Townsend, Ainscow & Clarke, (1999); Townsend, 2007), so we will only summarize the five main phases that EER has evolved through here.

The first phase emerged as a reaction to the seminal studies of Coleman et al. (1966) and Jencks et al. (1972) that concluded that schools had little effect upon the outcomes of their

students in comparison with the effects of students' own ability and social backgrounds. The belief was commonplace that "schools make no difference" net of family conditions and that "education cannot compensate for society" (Bernstein, 1968). This conclusion was counter-intuitive and constituted a clear antithesis to the previously comfortable assumption that choices among schools and school processes are important to children's destinies (Stringfield & Teddlie, 2011). This antithesis was so disquieting to many educators and educational researchers that responding studies began to appear almost immediately. Relatively small scale studies were published by Weber (1971), Reynolds (1976) and Edmonds (1979) and these were followed by larger studies by Rutter et al. (1979), Smith and Tomlinson (1989), and Mortimore et al. (1988). Each of these studies of "school effects" found consistent (and, taken together, overlapping) correlates of school effects¹.

A second phase in the evolution of EER began in the mid-1980s and was characterized by the use of multilevel methodologies (Goldstein, 2003) and methodologically sophisticated studies which began to show the scientific properties of school effects in such areas as the stability of school effects over time. These areas also included their consistency upon different outcome domains, their differential effects upon students of different background characteristics, their size and their impact in the long-term (see review in Reynolds, 1996 of these studies internationally from mid 1980s to early 1990s).

Beginning probably in the early 1990s was EER's third phase, in which there were numerous attempts to explore the reasons *why* schools had their different effects. This is the move from 'input/output' to 'input/process/output' studies noted in Teddlie & Reynolds, (2000). Influential work here was the Louisiana School Effectiveness Studies of Teddlie & Stringfield, (1993) in the US, and work in the UK into subject department effects upon performance and also upon school effects (Sammons, Thomas & Mortimore, 1997). These years also saw a number of influential reviews of the field such as by Scheerens and Bosker (1997), Reynolds et al. (1996) and Teddlie and Reynolds (2000). The importance of the classroom level was also noted by Creemers, (1994).

A fourth phase, which began subsequently is still in evidence today. This shows the marked internationalisation of the field, together with the merger or synergy of approaches

¹ A parallel response began at the same time, with early studies by Brophy, Evertson, Gage, Good, Stallings and others covered in the Muijs et al. review in this issue.

generated by having, for example, school effectiveness researchers in close intellectual proximity to school improvement researchers and practitioners. The international opportunities for networking, for joint research in multiple countries and the powerful effects of different research and country traditions in EER being opened up for learning from, for view, and for choice, meant that the field developed rapidly. Also, after calls for a merger of school effectiveness (SE) and school improvement (SI) concerns (e.g. Chrispeels, 1992; Reynolds, Hopkins, & Stoll, 1993), many SE researchers became more comfortable with SI's typically qualitative methodology, its commitment to more cultural views of school processes instead of to the formal organizational factors that had been the SE commitment, and its commitment to the importance of seeing teachers as something other than mere "empirical/rational" educational actors. In this phase, there was growing concern to develop the theoretical underpinnings of the field and to develop theoretical models. Methodologically, there was pioneering mixed method work involving large-scale quantitative analysis combined with in-depth case study work into particular schools and departments.

A further characteristic of this phase is of seeing EER as a dynamic, not static, set of relationships and moving away from seeing education in particular as an inherently stable set of arrangements towards one that sees the various "levels" of the educational system interacting and achieving variable outcomes (Creemers & Kyriakides, 2008). Additionally, and linked with this more dynamic perspective, is a commitment to newer forms of statistical analyses that can permit the establishment of indirect as well as direct relationships between educational factors and student outcomes, and which can permit reciprocal relationships between educational factors to be established, both permitted by the increased popularity of Structural Equation Modelling (SEM). Finally, studies now axiomatically blend together multiple levels of analysis. Examples of some large-scale studies that blended levels include Brandsma and Knuver (1988) on primary schools and those of Bosker and van der Velden (1989) on secondary schools in the Netherlands, the study of Grisay (1996) on secondary schools in France, of Hill and Rowe (1996) on primary and secondary schools in Australia and those of Van Damme et al. (2006), De Fraine et al. (2007) and Verachtert et al. (2009) in Flanders, and Stringfield, Millsap and Herman (1998) in the U.S.

EER Evidence and Evaluation

At the same time as EER has been developing, there has been an international affirmation of the importance of ‘evidence based education’ (see Bosker’s (2011) Plenary at ICSEI, Cyprus).

Partly this builds upon the early ‘best evidence’ reviews of people such as Slavin, (1986), on the evidence based programmes such as ‘Success for All’ (Slavin et al. 1996) and the experiments in class size reduction in Tennessee in the STAR experiments (Hanushek, 1999; Word, 1990).

There has been correspondingly greatly increased interest within the EER field, then, into experiments in education in cluster-randomised controlled trials, and into reviews to inform practitioners and policymakers about the ‘evidence’ on ‘what works’ (Borman, Hewes, Overman & Brown, 2003). The ‘What Works’ Clearing House and the ‘Best Evidence Encyclopaedia’ in the USA are examples of this, as from New Zealand are the Interactive Best Evidence Synthesis sponsored by their Ministry of Education and the work of Hattie (2009).

In EER, the enthusiasm for ‘evidence’ has spawned considerable interest in ‘meta-analysis’ techniques, that seek to draw robust conclusions about the impact of educational factors upon children. The usefulness of these approaches can be seen in the areas where they have been most used, namely the contribution of school and teacher process variables to educational outcomes, with useful reviews coming from Hattie, (2009), Scheerens, (2012) and Scheerens et al, (2011). There are powerful reasons for wanting meta-analysis techniques to spread more widely through EER, but progress could currently be faster.

International Studies.

Another way to try to inform the policy makers has been the international studies of educational achievement, from IEA and the OECD. These studies are mostly cross-sectional, but the analyses can also be longitudinal at the country level (Gustafsson, 2007). In many countries where the results were unexpectedly low, these studies were a major stimulus to do more research on the effects of the educational system at all levels. This was especially the case in Germany, which started with extensions of PISA (PISA – Konsortium Deutschland, 2006), and followed this by a series of longitudinal studies.

Efforts To Share Findings Internationally

The early phases of EER laid down foundations that may have critically affected the intellectual and practical growth of EER. EER generated an international organisation – the International Congress for School Effectiveness and Improvement (ICSEI) – a journal (*School Effectiveness and School Improvement*) located in the ISI *Current Contents* databases within six years of its launch, a special interest group in the American Educational Research Association (AERA), and a large number of research-based books. These and papers justified over 1,500 references in the Teddlie and Reynolds (2000) *International Handbook of School Effectiveness Research*. In more recent years, new organisational structures were created, especially the Society for Research on Educational Effectiveness (SREE) in the USA, with first one and now two annual conferences in Washington DC, the SIG on Educational Effectiveness in the European Association for Learning and Instruction with bi-annual conferences, and the network on Educational Effectiveness and Quality Assurance of ECER, the other European conference. ICSEI has also developed a strand of researchers involved in the Methodology of Research in Educational Effectiveness (MORE). All these factors suggest considerable scientific success, which is also indicated by new journals such as the *Journal of Educational Effectiveness*, *Effective Education*, the *Journal of Educational Change*, and, in Germany, the *Journal for Educational Research/Journal für Bildungsforschung* online.

The Problems of EER

EER led to a dramatic flow of studies of educational effects; however, much of the content of the “paradigm” of the discipline was in retrospect reactive, not purposive, and that aspect may have had negative consequences. Firstly, the commitment to quantitative methods within EER was easy to understand, given that the fundamental attacks on the idea of educational effects had been quantitative. Hence, the need to demonstrate clearly that schools varied in their effects upon student outcomes. The methodological apparatus that was necessary to sort out the varying influences of school intakes of students upon outcomes, the need for large sample sizes, the need for individual data on each student at intake and outcome and the increasingly

recognized value of multiple measures of educational outcomes that reflected the multiple nature and goals of schooling, all necessitated sophisticated quantitative methods and approaches.

However, the absence of much qualitative data that would have fleshed-out what the quantitative data were showing, and the absence of many “mixed methods” studies where quantitative data could “*demonstrate*” relationships between educational factors and qualitative data could “*explain*” the relationships, made the field and its findings difficult to access, for policy makers and practitioners. EER lacked rich, thick descriptions. Even where factors were used which had often been the concern of qualitative educational researchers historically – teacher attitudes, school ethos, learning environment, school culture and students’ views, for example – and which had been the subject of their “rich, thick descriptions”, many EER studies substituted questionnaires, formal interviews and standardized systems of measurement, very few of which even had qualitative data as examples of what the quantitative instruments were measuring, although there were some innovative mixed methods approaches (e.g. MacBeath & Mortimore, 2001; Sammons, Thomas & Mortimore, 1997; Stringfield & Teddlie, 1991; Teddlie & Stringfield, 1993; Townsend 1994; Mortimore et al 1988). Over time, the intention of a growing number of quantitative studies was to “explain” why certain educational processes may be working by analysing data from intervention studies and including “mediators” to explain how the observed effects can be explained (e.g., Raudenbush, 2011).

Second, because EER grew up in a climate where it was being argued “schools make no difference”, our assertion that schools *did* make a difference meant that EER locked itself into an almost exclusive concern with the school, rather than with the District/Local Authority and particularly rather than with the classroom and with the teacher. This is despite the separate tradition of teacher effectiveness that has developed in parallel. Teddlie and Stringfield (1993) and Creemers (1994) were among the first to point this out, but it has taken another decade for “teaching” to receive anything like the attention given to “schooling” in EER. Given the clear evidence that teacher effects exceed school effects when progress over time is studied (Muijs & Reynolds, 2010; Scheerens & Bosker, 1997; Teddlie & Reynolds, 2000), this school-based concern may well have hindered the explanatory power of EER and possibly its practitioner take-up too.

In Europe, the study of teacher effects has been hampered by the lack of suitable data, given the need to collect data at the start and end of the school year to assess student progress. The clearest contrasting case is the US, where many Districts (and, under No Child Left Behind legislation, all States) test all students in several consecutive grades every year, thus explaining why the US moved ahead more rapidly in the area of teacher effects (Brophy & Good, 1986; Rosenshine & Stevens, 1986). Many assessment systems only collect data at particular ages and, the concerns that value-added studies on teacher effects may feed into judgements of teacher performance make this whole area a difficult one. It is increasingly recognized that, due to the numbers of students in classes and issues of statistical uncertainty, value-added estimates of teacher effects are much better used for research and improvement purposes to establish the features of effective practice than for decisions about teacher competence, pay or progression (McCaffrey et al., 2004). For some recent examples of attention given to teacher effects and their implications for improving practice, see Day et al. (2006; 2008); Muijs and Reynolds (2010); Opdenakke and Van Damme (2006); Teddlie et al. (2006); and Van der Grift (2007).

Third, the rise of Multi-level Modelling (MLM) was clearly essential to faithfully represent the reality of educational systems in which students learned or not in accordance with variation in their background characteristics, and in which they attended classes nested in schools, which in turn were nested in Districts/Local Authorities, and which in turn were nested in regions and nations. MLM made possible much more than the simple historical analysis of a “means on means” variety that the multiple regression methodologies of the early studies had utilized – it made possible the handling of multiple variations, differential effects and cross-level interactions.

However, the early MLM approaches tended to study *direct* educational effects – of teachers on students, for example – rather than indirect or reciprocal relationships, of students on teachers through their behaviours, for example. Additionally, in its early development MLM did not itself permit study of the interaction *between* levels that could be seen as the true “black box” of education – the decisions made at school level, for example, that have major effects upon the classroom level through the allocation of teachers, their professional development or their “empowerment”. The transactions between levels were not a focus of early MLM, since MLM was “sold” to EER quite consciously as a solution to the “means on means” problem.

In more recent years as MLM and its users have developed in sophistication, there has been increasing interest in the study of cross-level interactions and reciprocal relationships, although the demands in terms of sample size are limiting factors. In addition, the use of cross-classified models has enabled the simultaneous study of primary and secondary school effects, and of neighbourhood influences also (e.g. Leckie, 2009). We deal with MLM in more detail, and comment on individual studies when we consider the scientific properties of EER later. Fourthly, the very rapid growth in the number of researchers and studies over a thirty-year time period probably made it difficult for EER to be cumulative in its knowledge base. Studies in EER often conceptualized the factors involved differently – each study often then measured the factors differently, and then often employed different analytic methods. Whilst none of this is surprising in the development of a young discipline, the sheer variability and its lack of cumulative work made the “body of knowledge” in EER a difficult one to assess and weigh. The *International Handbook* (Teddle & Reynolds, 2000) provided a good foundation and more recent work has further strengthened this through a focus on international research (Townsend, Ainscow & Clarke, 1999; Townsend, 2007), theory (Creemers & Kyriakides, 2008) and methodological advances (Creemers, Kyriakides, & Sammons, 2010). Note that these reviews all came relatively late in the development of the field.

Theoretical and Methodological Advances in EER

Recent years have seen considerable advances in both theoretical formulation and in methodology. Firstly, possessing theories that explain the relationships between variables – like those between schools and students – is essential for any successful field. Theories “organize” findings in ways that help new entrants, they provide clear explanations for people inside and outside a field and provide rationales for any practitioner or policy take-up of findings. But having “theory” that moves beyond associations to “causality” is a problem throughout the social and behavioural sciences, and in this regard EER is not an exception.

EER in its early stages only had theoretical perspectives that were the results of the borrowing of theories from other disciplines (like contingency theory, used to discuss contextual variation, or coalition building from political science, used to discuss successful leadership in

effective schools), together with some preliminary attempts to “causally order” educational effectiveness factors (Scheerens & Bosker, 1997; Bosker & Scheerens, 1994).

However, explaining in an integrated theoretical fashion the associations between variables has recently been the focus of the dynamic theory of educational effectiveness of Creemers and Kyriakides (2008). Their theory is comprehensive in nature and looks simultaneously at the different levels of the educational system – the student, the classroom, the school and the context. Crucially, it is dynamic and seeks to place the study of change at its heart, since its proponents rightly believe that the lack of appropriate models of change has hindered the uptake of EER by practitioners in schools. Longitudinal research is favoured, obviously, as this makes the study of change easier, and each educational factor is argued to possess five dimensions – frequency, focus, stage, quality and differentiation. Factors at different levels are seen as having both direct and indirect effects upon student outcomes. There is also a particular focus upon the classroom, and upon teachers’ behaviours there. The theory is being tested in multiple studies (e.g. Kyriakides, 2008; Kyriakides & Creemers, 2008, 2009), with promising results. Recently, an international study was set up in six European societies to further develop and test the validity of the dynamic model. Despite some limitations, the results support the international validity of most teacher, school and contextual factors of the dynamic model, but also recorded that some factors are more country-specific than others (Creemers et al, 2013). Other interesting theoretical speculations of a different kind are in Luyten et al. (2005) and Van De Grift (2009).

Second, at the same time as the move towards increasing theoretical sophistication, methodological advances have been taking place of which the main ones have been multilevel modelling, meta-analysis, structural equation modelling, growth curve modelling and mixed method research. A Special Issue of the *SESI* journal has been devoted to this topic (Sammons & Luyten, 2009). Creemers, Kyriakides and Sammons (2010), have also discussed methodological issues and new advances in depth.

- **Multi-level Modelling (MLM).** We noted earlier that there have been a number of important methodological achievements in EER, particularly related to the use of multilevel models and large-scale longitudinal research that recognizes the complexity and hierarchical structure of most educational systems. The advent of software packages

such as HLM (Raudenbush & Bryk, 1991, 2002) and MLWin facilitated proper measurement of change over time and encouraged improvements in the size, scale and statistical approaches used in EER during the late 1980s and 1990s (for example, see work examining both teacher and school effects by Hill and Rowe (1996, 1998) that demonstrated not only that teacher effects tend to be larger than school effects but also that, in combination, teacher and school effects could account for a substantial proportion of the variance in student outcomes).

Improvements in the modelling of measurement error and interaction effects, and cross-classified models that examine multiple institutional membership and regression discontinuity to study the size of the schooling effect and its variation in the absence of longitudinal data, provide examples of recent developments in EER that are proving fruitful.

- **Meta-analysis.** Meta-Analysis (Cooper, Hedges, & Valentine, 2009) has greatly enhanced scholars' ability to seek generalizations across large numbers of often diverse studies. Meta-analysis uses statistical results from a range of studies that address a similar research question and often seeks to establish an average effect size and estimate of the statistical significance of a relationship. In EER this might be the effects attributable to a particular approach to teaching or of a school reform programme. This can be seen as a major advancement in the field. It has promoted the refining of theory and enables researchers to identify generic and more specific factors, the impact of which is dependent on the educational setting in which they are operating (Scheerens & Bosker, 1997). Further refinements include multilevel meta-analysis that has the potential to provide better estimates of the size and variation in educational effectiveness for a range of outcomes, phases of education and contexts (Hox & De Leeuw, 2003).
- **Structural Equation Modelling (SEM).** We noted earlier that SEM permits the study of indirect and reciprocal effects, and is increasingly popular in social and behavioural science. SEM has also become central to many EER studies in seeking to measure the construct validity of the instruments that have been employed. SEM is often used as an umbrella concept to denote a wide range of models.

- **Growth Curve Modelling.** Growth curve modelling is becoming more widely applied and represents a further refinement on more traditional multilevel analysis by modelling student growth in academic or in attitudinal or social and behavioural outcomes across more than two time points. Guldemold and Bosker (2009) illustrate the curvilinear nature of growth curves for children’s academic outcomes from kindergarten through to Grade 6 and show how growth rates differ for low SES students compared with others. Van de gaer et al. (2009), by contrast, examine non-cognitive outcomes and secondary age students using multivariate latent growth curve approaches to the study of developments in student motivation and academic self-concept. This has been particularly important in identifying non-linear processes over time.
- **Mixed Methods Research.** Teddlie and Sammons (2010) argue that the flexibility of mixed methods research in simultaneously addressing multiple and diverse questions through integrated qualitative (QUAL) and quantitative (QUAN) techniques is one of its attractions. Mixed method research data adds “extra value” to EER research that seeks to better describe, predict and understand the variation in, and contributors to, differences in educational effectiveness. The integration and synthesis of QUAL and QUAN evidence can foster mutual illumination and so has the potential to enable the development of EER theories and is also necessary to inform and support closer links with applied research and evaluations that can promote effective school improvement initiatives and teacher development programmes. For examples of such mixed methods research, see Sammons (2010b).

We now move on to consider EER’s findings in terms of what can be called the scientific properties of school effects, and, after this, its descriptions of effective school and classroom processes.

Scientific properties of school effects (including consistency, size, stability, differential effects, the different outcomes of education, compositional effects and international studies).

School effects generally have been measured through the application of cross-sectional multilevel models, correcting for student background characteristics and usually also prior achievement. These classic value-added models yield an estimate of the percentage of the total variation in students' scores that is situated at the school level, which gives an idea of the relative importance of schools to the outcomes of individual students.

Student achievement is still the predominant effectiveness criterion in EER. However, in recent years, researchers have been investigating a broader range of outcomes of education. These include non-cognitive outcomes such as student well-being (Konu, Lintonen & Autio, 2002; Van Landeghem, Van Damme, Opdenakker, De Fraine, & Onghena, 2002) and achievement motivation (Van de gaer, De Fraine, Van Damme, De Munter, & Onghena, 2009; Van der Werf, Opdenakker & Kuyper, 2008).

Long-term effects across phases of schooling are increasingly studied in EER. Here, the effect of the school is studied on a student outcome that is measured after the students have left the school. This is related to the issues of predictive validity and the generalizability of school effects across time (Teddlie & Reynolds, 2000). It was found that the primary school can have a long-lasting, but small, effect on student achievement in secondary education (Goldstein & Thomas, 1996; Sammons, Nuttall, Cuttance, & Thomas, 1995; Thomas, 2001), while Leckie (2009) has used cross-classified models to study primary, secondary and neighbourhood effects simultaneously. Secondary schools have been shown to differ in the extent to which their students obtain a degree in higher education (Pustjens, Van de gaer, Van Damme, & Onghena, 2004).

The two general dimensions of school effectiveness, quality and equity, are still at the heart of the research domain. School quality is seen as the degree to which a school scores better than other schools, corrected for student intake characteristics. The equity dimension refers to the compensatory power of schools, indicating that some schools are better at compensating for input characteristics (such as SES, gender and ethnicity, and low achievement levels for incoming students, especially in secondary school studies) than others. Thus, the quality dimension refers to between-school differences, while the equity dimension refers to within-school gaps (Strand, 2010).

Recent studies in educational effectiveness stress the importance of (1) studying growth in student achievement and (2) studying absolute school effects. Growth in student achievement has been gaining acceptance as the essential criterion for assessing school effectiveness because learning involves changing (Teddlie & Reynolds, 2000). In this way, the terms “progress”, “growth” and “learning gains” are often regarded as synonyms. Longitudinal data (at least two measurement occasions, with more data points clearly desirable) are a necessary condition for measuring the learning gains of students and schools (Singer & Willett, 2003). Many educational effectiveness researchers are convinced that learning gains should be measured using growth curve models over several time points. As early examples, Raudenbusch and Bryk (1991) found that when examining data from a large national study that had gathered achievement test scores at six time points, over 80% of the explainable variance was between schools. Similarly, Ross et al. (2001), using multi-year value added analyses, were able to demonstrate effects of the New American Schools designs in Memphis, Tennessee that were not detected using more traditional methods. These models are becoming increasingly popular (e.g. De Fraine, Van Damme & Onghena, 2007; Palardy, 2008; Van de gaer et al., 2009; Van der Werf, Opdenakker & Kuyper, 2008) and show that change in outcomes is often non-linear, with the possibility for social and affective outcomes of relative decline at certain time points.

There is also a trend to investigate absolute school effects instead of only relative school effects. EER has traditionally focused on variation in learning outcomes between schools (relative effect or comparative effect) and the value-added measures from these studies express to what extent learning outcomes deviate from the performance level expected (Van de Grift, 2009). However, there is a growing interest in assessing the impact of education on the development of children in its own right. The regression-discontinuity approach allows for the assessment of the absolute effect of schooling (Luyten, 2006; Luyten, Peschar & Coe, 2008; Luyten, Tymms, & Jones, 2009). In addition, it can study relative variation between schools in this absolute effect (in other words, what is the absolute effect of an extra year of schooling and how does this vary between schools).

In terms of the size of school effects, in the field of EER nowadays there is no doubt that schools can make a difference. Even rather small school effects are considered important, because they might be cumulative and they refer to a large number of students. Moreover, when

measurement error is controlled, as in studies that have significant #s of data points, as per Raudenbusch and Bryk (1991), estimates of school effects tend to be larger, suggesting that historic EER may have underestimated the size of the overall school effects.

Recent studies differ in the size of the school effect they report. Generally, this size is estimated as the percentage of the differences in the student outcome that can be attributed to the school (the intra-class correlation). The size of the school effect is affected by the outcome under study. Schools tend to have a larger effect on student achievement than on non-cognitive outcomes (Martin et al., 2011; Opdenakker & Van Damme, 2000; Thomas, 2001). Three main hypotheses have been generated to explain the relative small effects on non-cognitive outcomes. First, these non-traditional outcomes may be given less emphasis in the curriculum. That is, societies create schools largely to teach specific cognitive skills, such as reading and mathematics. Second, the measurement of these non-cognitive outcomes is less precise than the measurement of achievement. Third, students' out-of-school time is focused less on academics and more on the other, non-cognitive activities. Martin et al. (2011) suggest that, to improve our understanding, research needs to focus more on teaching and schools as experienced by individual students to improve their understanding.

Not surprisingly, there is variation in the size of school effects for different academic outcomes. School effects tend to be larger for subjects such as mathematics and science, which are typically learned largely at school, as compared with school effects for language (Thomas, Sammons, Mortimore & Smees, 1997a). Also, longitudinal studies examining student growth are more likely to demonstrate school effects of greater magnitude (Teddlie & Reynolds, 2000; Van de gaer et al., 2009). Additionally, it seems school effects are larger in subject areas in which the school forms the main avenue of exposure – as with mathematics, for example, where exposure is limited in the family and the community (Mortimore et al., 1988; Teddlie & Reynolds, 2000).

Moving on to look at consistency across outcomes, several criteria can be used to investigate differences between schools. Consistency refers to the correlation between school effects on these various outcomes. Consistency helps to answer whether school effects are an overall or a specific phenomenon.

In general, school effects seem to show some degree of coherence. Small to moderate correlations are found, so we can conclude that effective schools in one area tend to be more

effective in other areas. However, some studies (especially in secondary education) found that in spite of this general trend some schools can be effective for one subject but ineffective for another (Thomas, 2001; Thomas, Sammons, Mortimore & Smees, 1997b). Inconsistency in primary school effects could indicate that the teacher is better at teaching in one subject than another (Mortimore et al., 1988) or that a school is more focused on improving, for example, reading than mathematics. Inconsistency in secondary schools could indicate differences in teacher effectiveness or departmental effectiveness. Van de gaer et al. (2009) investigated consistency between two non-cognitive outcomes and found that the consistency between school effects for motivation and academic self-concept resulted largely from intake differences between schools.

Researchers in EER are often interested in the consistency between cognitive and non-cognitive outcomes. A negative correlation might indicate a trade-off (competition between cognitive and non-cognitive goals), whereas a positive correlation would support the occurrence of complementarity (Van der Wal & Waslander, 2007). However, the results remain inconclusive (*ibid*), suggesting that a school's effectiveness in one domain is largely dependent on effectiveness in the other. This finding is consistent with earlier work by Teddlie and Stringfield (1993), in which schools that were identified as "positive outliers" tended to also have friendlier atmospheres, better school-home relations, and a range of other positive attributes.

To summarize, since there is not perfect consistency, the evaluation of a school's effectiveness should be based on more than one effectiveness criterion, because a single criterion can only highlight one particular aspect of schooling (Sammons, 1996; Teddlie & Reynolds, 2000).

Stability over time is displayed by the correlation between school effects at different moments in time (Doolaard, 2002; Thomas et al., 1997b). Most studies indicate rather stable school effects. Thomas et al. (1997b) found correlations between school effects in three successive years between 0.82 and 0.85. There was high stability over three years for general secondary school academic results, but fluctuations for specific subjects that are interpreted as departmental effects (Sammons, Thomas & Mortimore, 1997; Thomas et al., 1997b).

Absolute stability over several years is extremely unlikely, because schools are changing organisations. There can be changes in schools' policies, a new school leader, changes in staff and student body, etc. Instability can thus indicate changes or improvements in schools. Many education systems have strong pressures to improve school results, especially for those seen as weak or poorly performing, and this is likely to reduce stability in schools' results over time, especially at the lower achievement range.

It is important to note that long-term changes in any given school's level of effectiveness are separate issues from the stability of the relationships between achievement levels and EER characteristics. In an 11-year follow-up to the Louisiana School Effectiveness Study, Stringfield (2000) noted that detailed case study data on schools correctly predicted which schools would remain positive or negative outliers, and which schools had moved to being more (or less) effective in their levels of service to elementary school students.

We conclude that school effects are typically relatively stable over short periods of time. The correlations between overall effects across several years are high but far from perfect, which makes it difficult to predict results (Mangan, Pugh & Gray, 2005). Thus, judging a school's effectiveness should be based on data from several years (Sammons, Thomas & Mortimore, 1997; Thomas, 2001) and a range of measures, including careful observations.

When considering differential effects, a schools' overall effect refers to the impact of this school for an 'average' student. But the schools' effect can vary across students. Schools may be more effective for one group of students than for another group. Several studies have investigated differential school effects, addressing effects for different student groups in terms of prior achievement, gender, ethnicity and socioeconomic status (Scheerens & Bosker, 1997). School effects can be a function of student ability level or prior achievement (Sammons Nuttall, & Cuttance, 1993; Strand, 2010; Thomas, 2001; Thomas et al., 1997a), which means that the relationship between prior achievement and later achievement is smaller in some schools than in others.

With regard to gender, some studies have found that schools are equally effective for boys and girls (Sammons et al., 1993; Thomas, 2001), whereas others found that the gender gap differs from school to school (Strand, 2010). For ethnicity, some studies found that a school can be more effective for one ethnic group than for another group, while other studies found no

evidence of differential effectiveness regarding ethnic background of students. For example, Strand (2010) found that schools that were strong in facilitating the progress of White British pupils were equally strong in facilitating the progress of Black Anglo-Caribbean pupils. And several studies found only modest differential effects with regard to student socioeconomic status (Strand, 2010; Thomas, 2001; Thomas et al., 1997a).

A last area of interest is called ‘the school composition effect’. Ever since the famous 1966 Coleman report denoted that “the social composition of the student body is more highly related to achievement, independent of the student’s own social background, than is any school factor” (Coleman, 1966; p. 325), school composition has been a popular research subject in the field of educational effectiveness research (Hattie, 2009). In addition to the socioeconomic makeup of schools, also other school compositional features have been examined in relation to student achievement, such as the mean prior achievement level of a school, the gender composition (single-sex schools versus co-educational schools), and the proportion of ethnic minority students in a school. The majority of these studies have established that it is generally beneficial for all students to be a part of a school with a high average achievement level (e.g. Cheung & Rudowicz, 2003; Kang, Park & Lee, 2007; Opdenakker, Van Damme, De Fraine, van Landeghem & Onghena, 2002), a high proportion of girls (e.g. Wong, Lam & Ho, 2002; Van de gaer, Pustjens, Van Damme & De Munter, 2004; Van Houtte, 2004), and a high average socioeconomic status (e.g. Caldas & Bankston, 1999; Rumberger & Pallardy, 2005; Thrupp, 1999). Most studies investigating school ethnic composition could not detect any effect on student achievement once the socioeconomic makeup of the school was taken into account (e.g. Driessen, 2002; Strand, 1997; Van der Silk, Driessen & De Bot, 2006).

However, the nature of school composition effects is still controversial (e.g. Dumay & Dupriez, 2007, 2008). Researchers such as Nash (2003) and Harker & Tymms (2004) have argued that school composition effects may be artifacts of poorly specified data at the individual level. Under specification at the individual level can lead to spurious school composition effects. Another criticism on school composition research has been that the majority of this research has been cross-sectional by nature. Verhaeghe, Van Damme & Knipprath (2011) have argued that studies using one measurement occasion only, are bound to be inconclusive about the nature of the school composition effects found. This is because in such studies, the effects of school

composition prior to any process occurring in schools (school composition effect associated with initial achievement status) are collapsed with school composition effects that affect those processes (school composition associated with learning gains). Verhaeghe et al, (2011) have therefore suggested that longitudinal research is necessary in order to draw valid conclusions regarding school composition effects. Indeed, longitudinal studies investigating school composition have demonstrated differential school composition effects on achievement on the first measurement occasion and subsequent learning growth. Most of these studies have found significant school composition effects on achievement on the first measurement occasion and no or considerably smaller school composition effects on learning growth (Belfi et al, 2013; Guldemond & Bosker, 2009; Luyten, Schildkamp & Folmer, 2009; Verhaeghe et al, 2011).

It should be noted in conclusion to this section that international large-scale assessments (a.o. TIMSS, PIRLS and PISA) are now providing valuable information on the effectiveness of teachers, schools and educational systems in general. These data contain information on student achievement in different educational levels (i.e. primary and secondary education) and in different domains (e.g. science, mathematics, reading literacy). Additionally, student, parent (PIRLS), teacher (TIMSS) and (PIRLS), school and curriculum questionnaires are distributed to retrieve information on student background characteristics (e.g. socioeconomic status, study motivation, well-being) and the processes and contexts of classes and schools in which education takes place. Surplus, these data allow us to study the effectiveness of policy characteristics of educational systems by means of international comparisons.

Recent results of PIRLS 2011 and TIMSS 2011 show that schools within countries differ from each other concerning reading, mathematics and science performance (grade 4). For reading achievement, schools differ the least in Slovenia with 5% of variance, whereas variance between schools is greatest in United Arab Emirates, i.e. 43%. For mathematics achievement, the fewest differences between schools exist in Finland (9%) and the greatest in the United Arab Emirates (44%). For science achievement Norway shows the smallest differences between schools (8%), whereas Iran shows the greatest variance (43%). Further analyses of PIRLS and TIMSS 2011 elucidate three aspects of effective schools (Foy, 2013). A first aspect is the safeness of schools, in which schools are characterised as safe and orderly, with high school discipline and low numbers of students bullied in school. The second aspect is that schools are

well resourced, that teachers have good working conditions and that the minimum of shortages in school resources exist. Lastly, is the supportiveness of the academic success of schools, i.e. that both Principals and teachers emphasise academic success. Without taking into account control variables, these three aspects together account for around 8% of the variance in reading achievement between students, ranging from 0% in Czech Republic, Hong Kong and Slovenia, to 13% and 14% in Hungary and Qatar respectively. Taking into account students' home resources for learning and early literacy and numeracy skills and these three aspects, a large amount of variance in student reading achievement can be explained, ranging from 17% in Italy up to 39% in Hungary (Foy, 2013). In the analyses, the complex sample design is dealt with properly by taking into account sampling weights. The plausible values provided by TIMSS and PIRLS are used as a measurement of students' achievement (Foy, 2013).

Lastly, as these data assessments take place regularly (i.e. TIMSS is conducted every 4 years, PIRLS every 5 years and PISA every 3 years), it is possible to study changes over time of countries' educational effectiveness. Examples are Gustafsson (2007) and Van Damme, Liu, Vanhee & Pustjens (2010). These data and methodologies used make it possible to draw conclusions on the effects of change in multiple aspects of education, on the quality and equity of educational systems, nationally and internationally.

There is clearly a need for research on all the areas where we are trying to establish our scientific properties within EER. The next section considers the processes of educational effectiveness.

The Processes of Educational Effectiveness

A wide range of studies that collected school process data were mentioned in the review at the beginning of the History section of this paper. What is interesting is the extent to which the original five "correlates" of effectiveness at school level that featured in many of these like the foundational Edmonds (1979) work appear to have survived, in multiple countries and multiple settings within countries, as valid explanations, although research now is much more complex and multi-faceted in all these areas.

Edmonds (1979) noted five “correlates”: strong Principal leadership; an emphasis upon basic skill acquisition; an orderly climate that facilitated learning; high expectations of what students would achieve; and the frequent monitoring of the progress of students.

The later comprehensive Teddlie and Reynolds (2000) review, based upon analysis of the accumulation of literally hundreds of “process-based” studies, expanded and slightly modified Edmonds’ list to nine global factors:

- (1) Effective leadership that was: Firm, Involving, Instrumentally orientated, Involving monitoring, and Involved staff replacement.
- (2) A focus upon learning that involved: Focusing on academic outcomes, and Maximized learning time.
- (3) A positive school culture that involved: Shared vision, An orderly climate, and Positive reinforcement.
- (4) High expectations of students and staff.
- (5) Monitoring progress at school, classroom and student levels.
- (6) Involving parents through: Buffering negative influences and Promoting positive interactions.
- (7) Generating effective teaching through: Maximizing learning time, Grouping strategies, Benchmarking against best practice, and Adapting practice to student needs
- (8) Professional development of staff that was: Site located, and Integrated with school initiatives
- (9) Involving students in the educational process through: Responsibilities and Rights.

Interestingly, the recent review of even more contemporary literature by Marzano (2003, 2007), undertaken from the different paradigm of educational administration, shows remarkably similar findings.

Over time, however, there has been increasing interest in more complex formulations of the “correlates” that reflect the possible effects of variation in the contexts in which schools are situated – the so-called “context specific” models of effectiveness. Early work in this area tended to look at the school composition effect in terms of how the composition of the entire body of

students in a school had effects upon outcomes *in addition to* the effects of the students as individuals (Murnane, 1981; Willms, 1986).

Later work, particularly in the US (Hallinger & Murphy, 1986; Teddlie & Stringfield, 1993) focused upon the differences in the processes of effective schools that occurred in different socioeconomic status areas, with the particularly interesting finding that the schools in low SES areas actively pursued policies that focused almost no energy on involving parents from their children's education!

More recently, the distinct characteristics of what is needed to improve in very socially challenged communities has been a focus in the UK (Harris et al., 2006; Muijs et al., 2004; Reynolds, Hopkins, Potter, & Chapman, 2001) with hints that, whilst many of the effective practices needed are in line with the "global" correlates outlined earlier, three specific additional areas seem particularly important:

- Making the school a learning community that can in a lateral fashion identify and transmit "good practice"
- Support from outside the school in key areas
- Additional resources to potentiate innovation and change.

In recent years, the study of effective processes has been given an international "dimension" by the increased focus upon country differences emanating from the PISA studies, particularly. There have been productive reviews of the literature from multiple countries that show interesting similarities – and differences – in "what works" (Townsend, 2007). There have been ambitious attempts to look at the student experience in selected countries to see whether the same factors explain variance as in our above reviews (e.g. Reynolds et al., 2002). Interestingly, in this latter study the usual teacher or instructional level factors did "travel" internationally, both conceptually and operationally, but the school level factors only "travelled" conceptually, meaning for example that whilst the leadership of the Principal "mattered" in different contexts, the precise characteristics of that effective leadership (directive in Oriental cultures, more "lateral/vertical" in Anglo Saxon ones) is context-dependent.

Whilst another "state-of-the-art" review in this issue is concentrating upon teacher effectiveness and development, it is important to note that the study of effective classroom

practices has also been central to the search for “what works” in EER, with an increasing number of studies simultaneously studying the school and the classroom “levels”.

One of the most important historical studies in this area was that of Mortimore et al. (1988), that collected an immensely rich database of information on children, their classrooms, their primary schools and their individual background characteristics, using a cohort of children followed through the four years of British junior school education. Generally, Mortimore et al. found that teachers were in those days spending much more time communicating with individual children than they were doing whole-class teaching or facilitating collaborative group work. At classroom level, the effective teacher characteristics were teachers having responsibility for ordering activities during the day for students (i.e. structured teaching); students having some responsibility for their work and independence within working sessions; teachers covering only one curriculum area at a time; high levels of interaction with the whole class; teachers providing ample, challenging work; high levels of student involvement in tasks; a positive atmosphere in the classroom and teachers showing high levels of praise and encouragement.

Mortimore and his colleagues also showed that teachers who spent a lot of time with individual students were using most of the time in routine (i.e. non-work) matters and there was less use of higher-order questioning, while teachers who used class discussions as a teaching strategy tended to make rather more use of higher-order communication. In the late 1990s and early 2000s, major teacher effectiveness research studies were built on the evaluation of a specialist mathematics intervention, the Mathematics Enhancement Programme (see Muijs & Reynolds, 2000, 2003; Reynolds & Muijs, 1999). This work was based upon testing the entire student population of 35 British primary schools on mathematics and using a standardized observation instrument that measured teachers’ behaviours, students’ behaviours and lesson structure.

Nearly sixty different behaviours by teachers in classrooms, concerning their classroom management, management of behaviour, the quality of their direct instruction, the interactivity of their teaching, the attention given to individual review and practice, the variation in the teaching methods, the use of “connectionist” teaching methods and the classroom climate created in lessons, were related to improvement in performance over the year. Rather than any single

teacher behaviour being strongly related to achievement, lots of small correlations were found, indicating that effective teaching is not being able to do a small number of “big” things right but is rather doing a large number of “little” things well. In more advanced analysis, the factor of “effective teaching” was the most important determinant of how children did, after the influence of their own achievement level, reinforcing what we noted earlier about how important teaching is.

In these studies, though, teaching behaviours were not the only factor of importance to student achievement. Teachers’ beliefs about teaching, their subject knowledge and their self-efficacy (or their views about their own power as teachers) all also mattered, in the way that they encouraged teachers to adopt the more effective teaching methods that have powerful effects in improving students’ achievements.

Further recent research (Day et al., 2008) involved mixed methods work in English primary and secondary schools that described, analysed and sought to explain the variation in primary and secondary teachers’ classroom practices using two different observational instruments (the ISTOF instrument of Teddlie et al, (2006), and the Quality of Teaching schedule developed by Van de Grift, 2007) and pupil and teacher perceptions, focusing on English and mathematics teaching. It also explored typical and more effective classroom practice of teachers across different school contexts, career phases and ages.

Results reveal that the sample of effective teachers scored highly in terms of the following factors, based on observation of the quality of their teaching: having a supportive lesson climate; proactive classroom management; clarity of objectives and well-organized lesson structure; environmental and teacher support; engaging students with assignments and activities; positive behaviour management; purposive learning and high-quality questioning and feedback for students.

In the last decade there has been considerable growth in research, in reviews of research and in models about effective practices in this area (see, for example, Campbell et al., 2004; Muijs et al., 2004). As an example, the Teddlie and Reynolds (2000) review of school effectiveness research had no chapter on teacher effectiveness, but the upcoming replacement volume will have two. The Effective Pre-School and Primary Education 3-11 Project (EPPE) shows that the influence of overall teaching quality upon mathematics and reading outcomes is

stronger than the net influence of some background factors such as gender and family disadvantage. In detail, this covers and relates to the richness of instructional methods, a positive classroom climate, productive use of instructional time, the use of feedback to students, teacher sensitivity to their students and a lack of teacher detachment. An organized classroom where there is a calm, orderly climate is also important (see Sammons et al., 2008).

The Variation in Teachers Work, Lives and Effectiveness Project (VITAE) has also found an association between teachers' commitment to their jobs, their resilience in resisting stressors and the improvement of their students on the English national tests at ages 7, 11 and 14 (Day et al., 2006, 2007).

One of the key research needs – as with the school level – is to explore the extent to which effective teaching is a set of “generic” behaviours and attributes that “work” across all kinds of educational contexts, and the extent to which a more differential model, in which effective teachers have to do different things in different contexts, may be necessary (Campbell et al., 2004). In this latter perspective, teaching effectiveness is seen as a multi-dimensional construct and a variable factor rather than a universal “given”. Interesting attempts have been made to study the extent that different aspects of effective teaching apply in different national contexts using the ISTOF instrument (Teddlie et al., 2006).

Generally, more and more evidence is accumulating of the need for differentiated explanations of good teaching, as shown in the following areas:

- Differences between subjects – the major studies on teacher effectiveness commissioned by the British Teacher Training Agency (Askew et al., 1997; Wray and Medwell, 2001) showed that subject knowledge mattered less in teaching numeracy than literacy. Classroom grouping of tasks by ability was more prevalent in literacy teaching that was effective.
- Differences between students of varying SES – low SES students generally need teacher behaviours that generate a warm and supportive climate by letting children know help is available, elicit a response (any response) before moving on to the next bit of material, show how bits fit together before moving on, emphasize knowledge and applications before abstraction (putting the concrete first), give immediate help (through use of peers

perhaps) and which generate strong structure, ground-flow and well-planned transitions (from Borich, 1996).

- The effectiveness level of the school – with more effective institutions needing a more “collegial” approach to performance enhancement by comparison with the teachers in less effective schools, who require more “assertive” kinds of leadership (Hopkins & Reynolds, 2001).
- The trajectory that a school is on – with schools already on a steep curve of improvement needing less provision of basic foundations than those yet to start that journey (Hopkins & Reynolds, 2001).

A new focus has appeared in recent years, namely the effect of the organisations above the teacher and school level – the District/Local Authority. There has been attention to school boards and their effects (Alsbury, 2008; Stringfield & Yakimowski, 2005; Stringfield, 2008; Land, 2002), and similarly Glass and Franeschini (2007) generated a study and review of research on the American school superintendency. Marzano and Waters (2009) recently reviewed all the District/Local Authority effects studies in order to make recommendations integrating schools and district local authorities to generate High Reliability Organisations (HROs), although Tymms et al. (2008) show minimal District effects. Shelton (2010), by contrast, shows substantial District differences in the shape of student achievement over a 10 year period, related to school board/superintendent relationships. This is clearly a field ripe for further research, although in this area and in more general areas concerning school and teacher effects, the meta-analysis techniques may have sobering results.

Educational ineffectiveness

As long as the fundamental antithesis forwarded by Coleman et al. (1966) that schools had little to no differential effects on students’ levels of achievement held sway, there was little reason for an effectiveness field to evolve. From their roots, the various “effectiveness” fields have focused the great majority of their scientific endeavour on identifying characteristics of relatively more effective teachers, schools, districts and countries. Being a young and perhaps somewhat

insecure science, the effectiveness field has focused most of its energies – and writings – on the positive side of its discoveries.

Two important concepts have tended to be overlooked in this desire to please. First, the identification of relatively positive characteristics implies the presence of negative ones, but the negatives are not necessarily the polar opposites of positives. Second, in planning to respond to any problem it is as important to understand the specifics of the problem as the range of solutions. For example, in the evolution of the medical sciences, the field had to develop a deep understanding of the differentiating nature and causes of diseases before it could develop equally differential cures (Thomas, 1979).

In a groundbreaking but under-discussed paper entitled “Research on teacher effects: Uses and abuses”, Brophy (1988) observed that most of what was known about the “teacher effectiveness” field was drawn from process–product studies that more clearly described (but did not adequately discuss) what was known about teacher *ineffectiveness*. Similarly, Edmonds’ famous “five factors” are more accurately understood and sound less like truisms if they are used to implicitly describe characteristics of *ineffective* schools. Ineffective schools have weak Principal leadership, a lack of emphasis on the acquisition of basic skills, a disorderly climate, low or uneven expectations, and inconsistent or no monitoring of student progress.

In any science, it is important – if not always popular – to make the implicit explicit. A few studies have been conducted that have formally addressed the topics of school ineffectiveness, school decline and processes that kill school improvement efforts. Each of these areas is briefly noted below, and each area merits additional research.

Reviewing research on the topic of school ineffectiveness, Stringfield (1998) described ineffectiveness in schools as being observable at school, teacher and student levels. Students in ineffective schools were characterized as spending considerably less time per hour and day engaged in academic learning. Further, the time they did spend was more likely to be characterized as “intellectual anarchy”. Tasks were put in front of students with little explanation of why the students were being asked to complete the tasks or how the tasks related to the larger processes of understanding coherent fields of knowledge.

At the classroom level, ineffective schools were characterized by a leisurely pace, minimal moderate-to-long term planning, low or uneven rates of interactive teaching, a

preponderance of “ditto sheets” and other relatively un-engaging tasks, a failure to cover all of the year’s assigned content, and teachers teaching in isolation from one another.

Finally, at the school level, ineffective schools held most or all of seven characteristics: lack of academic focus, regular disruptions to and wasting of academic time, resources working at crossed purposes, Principals who were not conversant with the specifics of their schools’ curricula and were relatively passive in the key processes of recruiting new teachers and providing accurate feedback to current teachers, the inefficient use of school libraries/media centres, and a lack of public celebration of student successes.

Hochbein (2011) noted that Brookover and Lezotte (1979) conducted the first rigorous study that included schools in decline. While their sample included six improving and only two declining schools, Brookover and Lezotte noted that in declining schools:

The most pervasive finding was the one concerning teachers’ and Principals’ attitudes toward student achievement. The staff in the declining schools had low opinions of their students’ abilities, while staff in the improving schools had high opinions of student abilities (Brookover & Lezotte, 1979, abstract).

In an article largely focused on school improvement, Stringfield and Teddlie (1988) provided a somewhat detailed roadmap for the creation of ineffective schools. They described a process beginning with the introduction of a new Principal lacking academic focus, declining attention to student learning and coherence among school processes, the choices made by competent, experienced teachers to leave the increasingly dysfunctional environment, and a haphazard and often passive attitude toward hiring new professional staff.

Both Grant (1988) and Duke (1995) provided detailed case studies of American high schools that had fallen from excellence to sub-mediocrity. Both stories featured substantial declines in Principals’ leadership, declining academic standards among faculty, declining school climates, and increases in the percentages of students who were more at risk when entering the schools. In England the *Forging Links* research on academic effectiveness of secondary schools studied ineffective and more effective schools and subject departments (Sammons, Thomas & Mortimore, 1997), plus schools that might appear average but in which both effective and ineffective subject departments co-existed. The results drew attention to the importance of

Principal and head of department leadership, academic emphasis, quality of teaching and behavioural climate.

In terms of the processes which can kill school improvement efforts, Charles Payne's (2008) *So much reform, so little change* is a sobering reminder that most efforts to improve schools do not produce desired results in the first place, and/or are not sustained. In the educational effectiveness field, the need to study and understand why literally hundreds of well-intended and often seemingly well-designed school reform efforts have fallen into the dustbin of history is long overdue. From the "*Eight Year Study*" of the 1930s (Aikin, 1942) through to Tyack and Cuban's (1995) analysis of a century of reform efforts, to Supovitz and Weinbaum's (2008) *The Implementation gap*, a discouraging summary could be stated as, "There is a lot more said than done, and a lot more begun than sustained". A prudent would-be reformer would ask why this is so before initializing another reform effort.

After participating in a three-year study of diverse externally developed efforts to improve 25 high poverty schools, Schaffer, Nesselrodt, and Stringfield (1997) concluded that the 25 participating schools had experienced 10 potentially overlapping and over-determining potential causes of reform failure. Listed in order of frequency, the potential change killers were:

- inability to sustain funding (in 8 out of 25 schools);
 - inability to sustain teacher commitment (8);
 - unresolved issues with curriculum alignment (6);
 - challenges in recruiting and developing teachers and other key staff (5);
 - racial disharmony on the staff (3);
 - parent or community perceptions that the school faced too many deep problems (3);
 - management, communication and scheduling problems (3);
 - the schools' physical facilities presented challenges to offering the reform that the school and/or district did not address (2);
 - other contextual or political problems such as the arrival of a new district superintendant who saw no value in continuing the particular reform (2).
- (summarized in Stringfield, 1998).

After five years of leading a team studying six different, externally designed reforms in one large system, Datnow (2005) concluded that reforms that last actively assist school leaders in adapting to ever-changing district and state/national policy demands and make few long-term financial demands on the school and system. She observed that policy people need to be more aware of their impacts, intended and unintended, on schools and their various reform efforts. Datnow concluded with several pertinent observations. First, schools not firmly committed to seeing specific reforms through for the long haul probably should not begin the reforms at all. If a school's leaders believe a reform to be producing desired results, they would be well advised to keep their central administration apprised of the reform and what it takes to sustain it. "Finally, it would be wise to choose a reform that can help the school improve on state and district measures of accountability" (Datnow, 2005, p.148).

Having reviewed the scientific properties of EER, and the processes associated with effectiveness and ineffectiveness, we move to look at the extent to which EER has been successful in communicating these insights to broader constituencies.

EER, Policy and Practice

As a discipline that has generated a valid body of knowledge about "what works" at school, classroom and increasingly at country and educational system level, one might have expected a considerable take-up of EER insights internationally. That has not happened, except in a few individual countries. SER "boomed and busted" in the US in the 1980s, largely due to its adherence to a very simple model of effective school practice independent of context (Edmonds, 1979). It had influence through the national school effectiveness programme of the Australian Federal Government (in which the knowledge base was taken into all State systems), but was replaced later by emphases from the systemic change literature and the sociology of education.

In the UK, the "New Labour" government in the late 1990s used school effectiveness and teacher effectiveness research as the foundations of its National Strategies and some of its policies to improve weaker schools (see Reynolds, 2010b; Sammons, 2008), but the association with "prescription" meant that the influence was relatively short-lived. However, the English inspection agency OFSTED utilized EER in its Inspection Framework (see Sammons, Hillman &

Mortimore, 1995), and the documentation upon school improvement that each English school fills in for school self-evaluation drew on the evidence upon within school variation (Reynolds, 2007).

There have been links between EER and the Dutch National Inspection Framework, and some evidence of governmental interest in Germany, Finland and some Latin American societies, but it is only in Wales (with its educational outcomes apparently falling rapidly down the PISA “league table”) that there appears to be systematic use of EER findings currently (Reynolds, 2008). Townsend (2007) documented interest – but not mainstreaming – in many societies. EER is bolt-on, not bloodstream, for the policy making communities.

In addition, value-added measures of school effectiveness based upon multilevel analysis using EER approaches were introduced in 2002 and contextual value-added measures after 2005 to supplement raw league tables in England. However, after a change of government they were abolished in 2010, because they recognized the link between school results and student intake characteristics such as ethnicity and socioeconomic status, a topic regarded as politically unacceptable.

Reasons for this lack of policy/practice reach may be as follows:

- The quantitative statistical knowledge required to fully access some of the knowledge base;
- The considerable volume of criticisms of EER which has emerged, given that politicians may tend to gravitate to the popular;
- The reluctance to embrace a discipline that now repeatedly argues for the primacy of teacher effects rather than school effects, given that policy makers seem happier operating at school rather than classroom level;
- The reluctance to embrace a discipline which increasingly argues for “contextually specific” policies, given historic policy maker commitment to “steam press”, universal or “one size fits all” ones;
- The continued tendency for EER to generate findings that are, in the UK at least, “inconvenient”, from the Gray et al. (1999) finding of a negative association between school development planning and improvement in student achievement over time, to the

relatively small effects associated with factors such as school type, governance and practices such as setting and streaming. The most obviously leveragable variables do not appear to be the ones that matter most.

At the level of practice, it would also be difficult to find evidence of substantial take-up of the insights of EER at practitioner level in many countries although, of course, any practitioners doing award-bearing courses in areas such as educational administration, educational leadership and educational improvement would have been exposed to it. Training teachers may gain some familiarity with material on effective educational practices, but generally the volume of practitioner take-up does not match the volume of useful knowledge available. Again, EER is bolt-on, not bloodstream, for many in practitioner communities.

The reasons for this are likely to reside in:

- The historic, mostly quantitative, orientation of EER which makes access challenging to not-quantitatively trained professionals;
- The historic neglect of practitioners' core concerns which are likely to be their teaching methods;
- The limited attention given to theory that would help to explain patterns of results of individual studies;
- The static nature of the historic EER analyses, in a world that is dynamic and fast moving;
- The need to prepare practice constituencies for complex educational changes inherent in the EER knowledge bases;
- The slowly melting divide between educational effectiveness and educational improvement research fields (see Hopkins & Reynolds, 2001).

Greater understanding of how to improve policy and practice “reach” in the fields of EER, using insights from the fields of professional development, educational change, school improvement and related fields, may help us change this situation.

EER: Future Research Needs

Future directions for research probably grow naturally from the findings and emphases of EER over time. They involve:

- Further concentration upon teaching and teachers, moving beyond the historic focus upon only their behaviours to foci such as their attitudes and values, in which may lie some of the “levers” for changing their practices and behaviours. More cultural analyses may be particularly useful here (see Dumay, 2009; Dumay & Galand, 2012).
- The integration of leadership, its characteristics and its future possible changes fully into the field, since it has been seen as a stand-alone issue, and there need to be studies where leadership is integrated within a model of school effectiveness which is theorized and takes into account the ways in which leadership interacts with other key school factors. (Day et al., 2011). (See also Sammons et al, 2011).
- More longitudinal studies that examine the same students and teachers over time, that permit the study of the “naturally occurring experiments” that comprise the “day to day” and “year to year” life in educational systems, and that can detail the processes creating stability and change in schools.
- More international comparative work, which will benefit the field since the range of “school factors” and teacher behaviours is likely to be much greater in such work than within-the-one-country work that is still the foundation of the field. This expansion of variance in processes at the school level may indeed expand the variance explained at school level above the present rather low level. It may also show interesting educational factors for experimentation within different societies.
- More work into the links between the school and the classroom level, where much ignorance still reigns. It is clear that there is variation within schools according to the background of the students and indeed for all students attending different subject departments/faculties within schools (at secondary level, obviously, where teaching is organized by different groups of teachers). This variation is itself variable in different schools, but the research enterprise has continued to adopt a “whole school” perspective,

which fails to look at the variable processes actually experienced by different pupils of different background characteristics and in different subjects. Students do not experience a “whole school” – they experience different niches within it, yet in virtually all existing EER their schools are seen as a common factor.

There have been limited attempts to handle these issues, but none have been entirely satisfactory. In some of the American school effectiveness studies (e.g. Teddlie & Stringfield, 1993) there have been attempts to study the “range” or “dispersal” of teachers, and in the UK some acknowledgement of differences between departments (e.g. Sammons et al., 1997), yet this work focuses on the effective practices of the departments more than the school level factors associated with them. Range is utilized, but not the school-level factors that are associated with its scope. The theoretical modelling of Creemers and Kyriakides (2008) also studies within-school variation in terms of consistency, constancy and cohesion, but is less useful in terms of the factors at school level that may produce the range itself and where the cost of the absence of fine-grained understanding of the experience of different subjects, different student groups and different student groups within different subjects has limited our understanding of schools. It has also limited the extent to which EER is relevant for practitioners who work in the niches in “whole schools”, and impoverished school improvement even more, leading to a fondness for whole school solutions and/or school to school transfer in which policies are thrown at whole institutions in the hope that they reach all the (highly variable) internal school niches. Further speculations on these themes are in Reynolds (2007, 2010a, 2010b). The use of more specific measures of the educational environments inhabited by students could be a further step along the road towards “student specific” school factors, in which students *as individuals* accrue educational experiences that are measured and tagged to them individually, permitting a much fairer test of the power of the “educational” factors against those connected with the student and his or her social background. This would fit with the increasing tendency to listen to student “voice”.

- The adoption of further outcome measures in addition to those upon academic achievement, a cry that has been routinely made now for over a decade (Teddlie & Reynolds, 2000). These could cover:
 - educational “academic” outcomes such as attendance and behaviour
 - more social and affective outcomes.
- The utilization of “efficiency” as well as “effectiveness” orientations, which will have the effects of multiplying considerably the range of possible relationships that can be found in EER studies. If, for example, financial “cost” were factored in as an input – and it could be done easily at a whole-school level in terms of educational resources consumed in terms of staff salaries, books and equipment, and so on – then all the multiple relationships that can be seen in studies between educational processes and value-added achievement outcomes would be added to immediately, with the addition of the “cost” factor. If the “cost” factor could be calculated at class level, and particularly if the calculation could be made at individual student level (difficult, but not impossible) then even more interesting analyses could be done.

Efficiency measures do not, of course, have to be solely concerned with “cost” – they could involve “time”, – another scarce resource. If time were measured and used in the customary value-added fashion to generate time-adjusted effectiveness scores that reflected the volume of time it took to generate different levels of educational achievement, it might paint a different picture of the reasons behind supposedly high-achieving school systems, or highly successful individual schools.

- More studies of the long-term ineffectiveness of schooling and of the long term impact of reforms (Slavin, 2004; Stringfield, Reynolds & Schaffer, 2008, 2012) are required to understand their continued dysfunctionality (Teddlie & Reynolds, 2000) and how that cycle might be broken. Intensive longitudinal case studies of samples of these low performing schools might help us to better understand the complex relationship between ineffectiveness and effectiveness. One research question might concern the relationship patterns among teachers at less effective as opposed to more effective schools, which could be examined using sociograms and other measurement techniques. While Luyten, Visscher and Witziers (2005) initially called the suggestion to focus on dysfunctional

schools a radical recommendation, they later supported the call “to pay more attention to clearly ineffective schools as a starting point for expanding the school improvement knowledge base” (p. 267).

- Spanning studies of the effects of socioeconomic status, school effectiveness and school improvement, there is a great need for case studies and pro-active change studies of efforts to improve chronically low-performing schools. Herman et al. (2008) conducted a wide-ranging search for evidence of successful efforts at “turning around” schools in which the great majority of students had been performing at very low levels for several years. Tellingly, they could only identify a scattering of case studies and no focused, pro-active, multi-year research. Edmonds (1979) famously observed that we could turn around such schools “whenever and wherever we choose.” Four decades later, systemic data to substantiate that claim is in strikingly short supply, and is needed for both scientific and ethical reasons.

EER in a Changing International Society

Although EER can be traced back in origins to the middle to late 1970s, we noted earlier that the real impact of EER started to change how school systems operated in the 1980’s and 1990s. Townsend (2010) documents patterns of change in education over the course of time where education has moved from thousands of years of being an individual activity for the rich and privileged (Beare, 1997), to where communities have taken responsibility for education of their populations. This was first locally, for more than a hundred years, than more recently nationally, and now to the present where international comparative testing has created new imperatives for schools and school systems worldwide. The EER research has been used as justification for many changes in education, in governance, in the way schools are managed, the way in which school leaders and teachers go about their work and how that work is judged.

However, if we think back and look at the progress of the computer over its first 30 years (from 1943 until 1973) and then consider its progress over the last 30 years (from the 1970s on), we might start to ponder how the next 30 years of school effectiveness research might further alter the landscape of education. We need to think and act both locally and globally, so it might

be instructive to think of how that may play out when considering school effectiveness. There are different ways in which local and global can be interpreted and it is possible to do this at different levels of operation. In a classroom, local is the individual student and global is the class as a whole. So to think and act both locally and globally at this level is to consider how to cater to the needs of the individual in a world changing more rapidly than at any time in history while ensuring that the whole class moves forward. Similar perspectives might be given for individual classrooms (local) and the school as a whole (global), individual schools and the system (e.g. Local Authority, District) as a whole, individual systems and the country as a whole, and individual countries and groups of countries.

An international perspective is of vital importance, since EER may not mean the same thing in different parts of the world. Bisschoff and Rhodes (2011) provide ample evidence that the same rules cannot apply equally to western countries, which have had a hundred years of developing a universal education system before the whirlwind of recent change, and to other countries that are still dealing with the problem of access for every child. As Hans Rosling, a Swedish health professor, has shown for health improvements (TED, 2007), some countries have made more progress than others, with Asia and India particularly coming from far behind the OECD countries to having comparable levels of health data, but some countries (mostly sub-Saharan Africa) have remained far behind for fifty years. The same can be said for schooling. There are still many millions of young people who do not go to school, and EER as the West knows it has no impact on these young people. To think and act both locally and globally suggests that the developed world may have some responsibility to support poorer countries to enable their young people to attend school in the first place, and then to maximize their school quality. There is interesting EER evidence that disadvantaged children are more susceptible to educational effects. Similarly, for such children, high-quality pre-school can act as an effective intervention with lasting effects. The EER field's historic interest in promoting equity and effectiveness needs to receive more attention in their international implications (Sammons, 2010a).

The concern for education in all countries may need to be paralleled by a concern for addressing schooling for sustainability. The mechanism of "school choice" is the current way that many Western governments are responding to the individualization of responsibility for

economic prosperity and well-being, and it is interesting that parents and those choosing schools may have views about the importance of “schooling for sustainability” well ahead of those of governments and, possibly, educational professionals (Kelly, 2009). However, the school practices necessary to develop “eco-literacy” have not been developed, a consequence of little being done to connect students to ideas that see them as humans on an interconnected planet (Clarke, 2009).

However, sustainability, once thought of as being only about the environment, has now developed into a broader concept. Townsend (2010, pp. 23-24) argued:

Elkington’s (1994) definition of the triple bottom-line argues we must consider the economic and the social environment as well as the natural environment for true sustainability to emerge. If we consider only the natural environment and the economic environment we will have viability but not sustainability, if we consider only the natural environment and the social environment we will have bearability but not sustainability and if we consider only the social environment and the economic environment we will have equity but not sustainability. Only when all three are in balance can we have sustainability. If we suggest that the natural environment of education is schools, we can ask ourselves these questions:

- Are schools equitable for all students?
- Are schools bearable for all students?
- Are all schools viable in the current climate?

We might suggest that schools, as they are currently constructed, managed and operated, are not sustainable. Something needs to change and perhaps EER can contribute to this, by adding cost-effectiveness to its focus on equity and learning.

At a time of recession and public spending cuts in many societies, additionally, the importance of education for disadvantaged groups may be neglected and the challenges facing schools which serve disadvantaged groups are likely to increase. The bottom line for EER and the challenge for the future, locally and globally, is to deliver a quality outcome in ways that are cost effective and supportable by the community as a whole and by politicians. EER has the

potential to study such changes and to be an advocate to promote equity and opportunities for the disadvantaged. In the 1970s, EER stood against the currents of the time, intellectually and politically. Maybe it needs to rediscover that radical spirit again, in this and in other areas related to the future of international society.

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