Exploring Effective Pedagogy in Primary Schools:
Evidence from Research

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About the Authors

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Iram Siraj

Iram Siraj is Professor of Education at the Institute of Education, University of London and is currently seconded to the University of Wollongong, Australia where she is working with the innovative Early Start initiative to strengthen research on the development of children and communities. Iram's recent research projects have included leading on the major Department for Education (DfE) 16-year study on Effective Pre-School, Primary and Secondary Education (EPPSE 3-16, 1997-2013), the influential Researching Effective Pedagogy in the Early Years project (REPEY) and the Effective Primary Pedagogical Strategies in English and Maths (EPPSEM) study. She has worked on longitudinal studies/RCTs as a principal investigator in a number of countries, including the UK, Australia and Ireland. Her most recent publications include Siraj, I. and Mayo, A. (2014) *Social Class and Educational Inequality: The impact of parents and schools*. Cambridge: Cambridge University Press, which "unpacks" the influences on the trajectories of working-class children performing "against the odds". She has always been particularly interested in undertaking research that investigates disadvantage to give children and families from these backgrounds an equal start.

Brenda Taggart

Brenda Taggart's background is in primary education (children age 5 – 11 years) having been a teacher, deputy/acting principal as well as an in-service and initial teacher trainer. She has worked in the field of educational research for over 20 years, a large part of this devoted to investigating the influence of early years education, the family and compulsory schooling on children's development. She has conducted research for both the UK Government and non-governmental bodies exploring the impact of educational initiatives. Her work, within the UK and internationally, focuses on "quality" early experiences, effective pedagogy and the development of policies for young children and their families. She served as a Council member of the British Educational Research Association (2004-2007). She is a Principal Investigator and the Research Co-ordinator for the Effective Pre-school, Primary and Secondary Education project, a longitudinal study funded by the UK's Department for Education (1997-2014).

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Introduction to the Series

The Chief Education Advisor, Sir Michael Barber, on behalf of Pearson, is commissioning a series of independent, open and practical publications containing new ideas and evidence about what works in education. The publications contribute to the global discussion and debate big "unanswered" questions in education by focusing on the following eight themes: Learning Science; Knowledge and Skills; Pedagogy and Educator Effectiveness; Measurement and Assessment; Digital and Adaptive Learning; Institutional Improvement; System Reform and Innovation; and Access for All. We hope the series will be useful for policy makers, educators, and all those interested in learning.

Acknowledgements

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Foreword

As the world gets more and more complex, as more and more jobs are automated or are undertaken in countries with lower labour costs, higher educational achievement is increasingly becoming a necessity rather than an optional extra. Higher achievement for *all* students is the key to every country's future prosperity, and, for individuals, it is becoming essential just to make sense of the world, let alone to finding fulfilling work.

Of course this was realised by some many years ago. In 1975, Jan Tinbergen, winner of the 1969 Nobel Memorial Prize for Economics, spoke of "a race between education and technology" and for at least 40 years, many people have been trying to understand the factors that are associated with successful outcomes for schooling. The first generation of school effectiveness research focused on the characteristics of effective schools, but of course for some schools their success is more to do with the students they recruit than the quality of the education being provided. This was a key argument of the second generation of school effectiveness researchers, who pointed out that demographic factors account for most of the variation in student achievement in most countries. However, in recent years, there has been a growing consensus that successful outcomes for school students depend, more than anything else, on what happens inside classrooms. School leadership is important, but mostly because effective leaders create the circumstances in which teachers continue to learn and develop.

This new third generation of school effectiveness research looks more at the "how" than the "what" of school improvement. How is it that some schools are more effective in educating their students than other schools that are similar in terms of resources, intake and so on? The difficulty with such research is that it is very difficult to do well. Large-scale studies can look at inputs and outputs, and in England the quality of the data available on student achievement means that we can carry out these analyses for the whole national cohort. The problem is that data on the processes of education in schools at the national level is rather thin, and, worse, seems to explain very little.

At the other extreme, we have many high-quality, small-scale, almost "ethnographic" studies, which provide detailed information about a small number of classrooms, and which can suggest factors that might be important, but of course generalising from these small samples is risky.

That is why the *Effective Pre-School, Primary and Secondary Education* (EPPSE) study is so important. It is a large-scale and mainly quantitative study, following a cohort of over 3,000 students from before they enrolled in school through to the end of compulsory education, using measures of student achievement to identify the schools in which students make most progress. However, the study complements the quantitative analysis with hundreds of hours of classroom observation to characterise the most effective practices in classrooms. Moreover, because the study uses well-validated observation methods, we can be sure that the observations are not subjective impressions but robust evidence of what is happening in successful, and not so successful, classrooms. Finally, because the research has been conducted by some of the world's leaders in this area of research, we can trust their findings.

The result is an extraordinary compendium of what works best in helping children learn in classrooms, synthesised into 11 easily understood strategies, and illuminated by copious extracts from the actual fieldwork notes of those involved in the research. Everyone who wants to understand, and improve, primary school classrooms needs to read, and act on, this report.

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Exploring Effective Pedagogy in Primary Schools:
Evidence from Research

Table of acronyms	
EPPE	Effective Provision of Pre-School Education. The first phase of the longitudinal study, which ran from 1997 – 2003 (the pre-school period). This became EPPE 3-11 when the children went into primary school.
EPPE 3-11	Effective Pre-School and Primary Education. The second phase of the longitudinal study, which ran from 2003 – 2011 (the primary school period). This became EPPSE 3-14 when the children went into secondary school.
EPPSE 3-14 and EPPSE 3-16	Effective Pre-School, Primary and Secondary Education. The third (EPPSE 3-14) and fourth (EPPSE 3-16) phases of the longitudinal study, which ran from 2011 – 2014 (the secondary school period).
EPPSEM	Effective Primary Pedagogical Strategies in English and Maths. A sub-study of EPPE 3-11 that focused on practices in Year 5 classrooms.
CVA	Contextual Value Added. A statistical measure of academic effectiveness – the difference between predicted and real attainment of pupils between two time points, for instance progress between age 7 (Key Stage 1) and 11 (Key Stage 2) in primary school.
SER	School Effectiveness Research
IEA	International Association for the Evaluation of Educational Achievement
TIMSS	Trends in International Mathematics and Science Study
PIRLS	Progress in International Reading Literacy Study
PISA	Programme for International Student Assessment
OECD	Organisation for Economic Co-operation and Development
SESI	School Effectiveness and School Improvement
IMD	Index of Multiple Deprivation

Executive Summary

Background

This publication starts by mapping the growth and interest in global comparisons of the impact of education on children's outcomes. It shows how international comparisons of school systems, predicated on variations in outcomes and evidenced through league tables that position countries in relation to one another, provides insights into how effective (or not) their school systems are.

It maps how this interest in "systems" and what schools do led to an acute interest in how schools in successful education systems achieved their results. It details how the school effectiveness and improvement movements grew to investigate what kinds of structures and processes within education lead to value-added educational systems. In particular, it highlights the growing shift in interest from what education systems **do** to **how** they do it. This shift in interest, to educational processes that can create better child outcomes, underlies the importance of understanding how teachers promote successful learning. This report contributes to the debate on what promotes effective schooling and adds to the growing wealth of international literature on this subject.

The main evidence base for the pedagogy part of this publication is a study into primary pedagogy conducted as part of the Effective Pre-School, Primary and Secondary Education (EPPSE 3-16) research study. EPPSE is a large-scale, longitudinal, mixed-method research study (Sammons et al., 2005; Siraj-Blatchford et al., 2006) that has followed the progress of over 3,000 children from the ages of 3 to 16 years (Sylva et al., 2010). The study Effective Primary Pedagogical Strategies in English and Maths (EPPSEM) focused specifically on primary pedagogy in these two core subjects.

Effective Pedagogical Strategies in English and Maths

A continuing question for EPPSE was what influences children's outcomes and reduces inequality. Early phases of the study (Sylva et al., 2008) showed that many background characteristics including parents' socio-economic status, their qualifications and the early Home Learning Environment (Melhuish et al., 2001, 2008; Sammons et al., 2008a) are all positively and significantly related to children's outcomes. Nonetheless, although background factors have powerful effects, education processes linked to pre-school quality and primary school effectiveness also positively shape children's educational

> "education processes linked to pre-school quality and primary school effectiveness also positively shape children's educational outcomes"

outcomes. Since educational influences are mainly exerted through teaching, this suggested that an in-depth evaluation of pedagogical strategies used in the Year 5 classrooms (children age 10) of more and less academically effective schools would be of both policy and practice interest.

The EPPSE study investigated the pedagogy in Year 5 classrooms and produced two reports: *Variations in Teacher and Pupil Behaviours in Year 5 Classrooms* (Sammons et al., 2006) and *The Influence of School and Teaching Quality on Children's Progress in Primary School* (Sammons et al., 2008a). EPPSEM, the subsequent study, builds on these initial findings to provide greater insights into effective primary pedagogical strategies in English and maths.

Pedagogy is a contentious term (Ko & Sammons with Bakkum, 2013). There are numerous definitions and much time has been devoted to debating their subtleties. The perspective adopted here is the definition used in previous EPPE 3-11 research, which states that pedagogy refers to:

> *the instructional techniques and strategies which enable learning to take place.*
> *It refers to the interactive process between teacher/practitioner and learner, and*
> *it is also applied to include the provision of some aspects of the learning environment*
> *(including the concrete learning environment, and the actions of the family and community).*
> (Siraj-Blatchford et al., 2002:10)

Effectiveness is another controversial term. Melhuish argued that:

> *Primary schools where children make significantly greater progress than predicted*
> *on the basis of prior attainment and intake characteristics can be viewed as more*
> *effective (positive outliers in value added terms). Primary schools where children*
> *make less progress than predicted can be viewed as less effective (negative outliers*
> *in value added terms).* (Melhuish et al., 2006a: 4)

The EPPSEM study embraced these two definitions and explored the links between effectiveness and pedagogy.

Exploring classroom practices

In order to investigate practices in "effective" schools, a sample of Year 5 classrooms in 125 primary schools was studied. The schools were selected to include a range with high, medium and low effectiveness scores, as determined by Contextual Value Added (CVA) analyses. CVA statistical models explore children's cognitive/academic attainment and progress in a time frame, having controlled for individual child (e.g., gender), family (e.g., socio-economic status) and other background characteristics (e.g., entitlement to free school meals).

Standardised assessments were used to measure children's academic attainment in reading and maths in Years 1 and 5. Information about classroom practices and processes was collected through two classroom observation instruments: the Classroom Observation System for Fifth Grade or COS-5 (NICHD, 2001) and the Instructional Environment Observation Scale or IEO (Stipek, 1999). Of the original sample, 82 primary schools with full data sets were included in the EPPSEM analyses. It should be noted that no school "dropped out" of the research but in

some there was incomplete data; only schools with full data sets were included in the EPPSEM analyses to ensure comparability. Strict criteria were applied to identify three distinct groups of schools: excellent, good and poor.

In order to develop the analytical framework of pedagogical strategies, professional focus group discussions and a literature review identified the factors that contribute to effective classroom practice. Eleven essential pedagogic strategies were identified and provided the initial analytical framework.
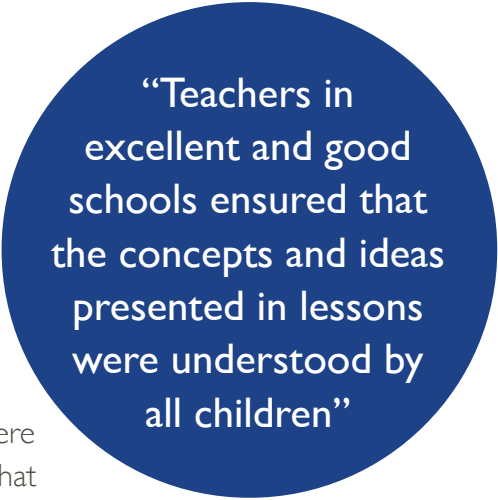
Key findings

Organisation

Teachers in excellent schools were rated particularly highly on their organisational skills. Their resources were prepared ahead of time, well managed during lessons and particularly fit for purpose and tailored to the individual needs of their pupils. They made productive use of instructional time by maintaining good pace and ensuring that every second of their lessons counted. Pupils in these classes had the highest ratings of self-reliance.

Year 5 classrooms in schools identified as poor had significantly lower ratings than the other groups on the organisation and suitability (fit for purpose) of teacher resources, the productiveness of instructional time, the clarity of the teacher's expectations, the management of classroom routines and the extent to which children were independent and self-reliant. Lessons were slow to start, pace was not maintained and time was wasted during transitions. Pupils in these classes received the lowest ratings of self-reliance.

Shared objectives

Teachers in excellent and good schools ensured that the concepts and ideas presented in lessons were understood by all children. They checked that children understood the main ideas of the lesson and intervened when understanding was not clear or complete, even if this required a change part way through the lesson or activity. Although most teachers ensured the learning intention of the lesson/activity was clear (e.g., by writing the "learning objectives" on the board), teachers in excellent schools were especially good at making sure the children understood what this meant. Pupils in these classes were very clear about what they were expected to achieve and how much time they were given to do it.

> "Teachers in excellent and good schools ensured that the concepts and ideas presented in lessons were understood by all children"

In contrast, objectives, learning concepts and ideas were less clear in schools rated as poor. Teachers were slower in checking and correcting pupils' understanding of key concepts and ideas. Although children in these classrooms were aware of their lesson objectives, it was not clear whether they fully understood them or how to achieve them, and they were much less focused and less motivated to meet these goals.

Homework

Teachers in excellent and good schools set homework that was more meaningful and more clearly linked to what the children were learning. They had a more flexible approach to setting homework, which was set to extend and deepen the children's understanding.

In schools rated as poor, teachers set homework simply because they were required to, and the work itself did not appear to be expressly linked to what the children were learning in class. There were no examples of teachers using opportunities that arose during a lesson to set homework other than what was already planned.

Classroom climate

Classroom climate (the overall feeling in a classroom, evidenced through teacher-pupil and pupil-pupil relationships) was rated highly in excellent and good schools. For example, in classrooms in both excellent and good schools children appeared to be liked and respected by their peers.

The overall classroom climate in poor schools was less favourable and sometimes unpleasant. Teachers were more likely to display negativity (disapproval, reprimands, expression of teacher's dislike, etc.) and children in poor schools were less sociable and less cooperative than their peers in other schools.

Behaviour management

The differences between the three groups of schools were evident when considering the management of behaviour. Children in excellent and good schools were less disruptive and rarely needed to be disciplined. Where teachers did need to correct behaviour, they used humour or a quiet reminder.

Although overall levels of indiscipline throughout the sample were generally low, children in schools rated as poor were more disruptive and teachers disciplined them more frequently. Discipline was often public and sometimes involved threats, personal attacks, shaming or belittling children. Levels of chaos were significantly higher in these classrooms, and teachers practised "over control" – rigid approaches designed to meet the teachers' (rather than children's) needs with teacher-dominated talk.

Collaborative learning

Children in excellent schools spent relatively more time, overall, in collaborative learning situations than those in poor schools, although overall the amount of time children spent in these groups was fairly low.

"Teachers in excellent and good schools set homework that was more meaningful and more clearly linked to what the children were learning"

"Where teachers did need to correct behaviour, they used humour or a quiet reminder"

Personalised teaching and learning
Teachers in excellent and good schools were more likely to personalise their pupils' learning experiences. They did this by being sensitive to the individual needs of the children in their classes and by providing learning materials that were rich and varied. They were rated very low in teacher detachment (e.g., distancing themselves from their pupils by staying at their desks, not offering feedback, not noticing children's behaviour or needs) and high in providing social support for pupil learning, particularly in literacy.

Teachers in excellent schools were exceptionally sensitive to the needs of the children and provided outstanding learning materials specifically chosen and adapted for their pupils. The individual needs of the Year 5 children in these schools were met through their teachers' friendly approach, high expectations and appropriately challenging and differentiated tasks.

Making links explicit
On the whole, there were few instances of teachers making extra and cross-curricular links explicit. Teachers in excellent schools were better able and more consistent in making links with areas outside the specific lesson.
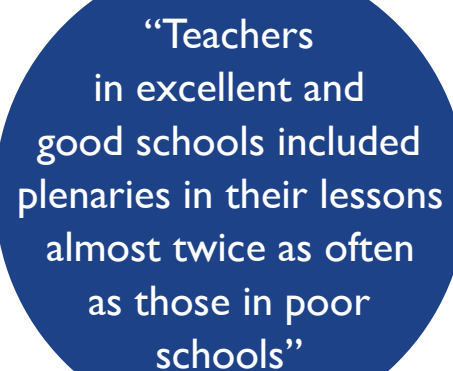
Dialogic teaching and learning
The extent of dialogic teaching[1] showed few differences between the three groups of schools, except in maths where teachers in excellent schools received the highest ratings on using dialogic teaching and learning. Teachers in excellent and good schools were rated significantly higher on dialogic teaching for their use of analysis in maths and in the depth of their pupils' knowledge and understanding. They were also rated more highly on maths discussion and communication, and on sharing the locus of maths authority. In literacy, they were rated higher on instructional conversations.

Assessment for Learning (AfL)
Teachers in excellent and good schools provided more evaluative feedback than those in poor schools. In addition, teachers in excellent schools provided greater opportunities for pupils to reflect on their learning through review than teachers in both good and poor schools, who did not differ in providing these opportunities.

Plenary[2]
Teachers in excellent and good schools included plenaries in their lessons almost twice as often as those in poor schools. In addition, those in excellent schools were more likely to use the plenary to provide opportunities for further discussion, to explore issues in more depth and to extend work and concepts covered in the lesson. In poor schools, a plenary session was often not included at the end of the lesson.

"Teachers in excellent and good schools included plenaries in their lessons almost twice as often as those in poor schools"

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[1] Teachers and pupils participating in an interactive discourse about learning in order to extend pupil thinking and understanding. More than teachers imparting knowledge but a dialogue involving questioning that both parties have a stake in.
[2] The end part of a lesson usually associated with whole-class interactive teaching, which aims to assess the extent to which the objectives of the lesson were met, concepts understood etc. in order to provide assessment information to the teacher for planning the next lesson.

Good teachers did all of the above but teachers in excellent schools excelled in their:

> organisational skills;
> positive classroom climate;
> personalised, highly interactive approaches to teaching and learning;
> use of dialogic teaching and learning and
> more frequent and effective use of the plenary.

It is highly likely that the above factors are all interconnected. For example, dialogic teaching and learning would be impossible in settings with a negative classroom climate. Personalising children's learning requires good organisational skills and helps to create a positive classroom climate and to encourage discussion.

The key findings from EPPSEM are not comprehensive. Other studies, from the UK and elsewhere, have shown different key findings, as referenced in this report. However, there is considerable overlap in findings on pedagogy, suggesting that particular attention should be paid to certain strategies. The EPPSEM findings are innovative and important because they focus on practice and pedagogy associated with better outcomes for children. This has implications for policy and practice, highlighted in the final section of this report, and suggests possible future research directions.

The findings in this report are important for educating teachers and provide possible focal points for continuous professional development. They also highlight where policy makers should focus funding and will help more children from disadvantaged backgrounds to access higher quality provision. This could be achieved by recruiting the best teachers to schools in poorer areas. These are challenging steps and the logistics are not straightforward. For example, the development of a "pupil premium" (additional funding for disadvantaged pupils) is being used in England to raise achievement and "narrow the gaps" between different social groups. The ways in which schools and policy makers localise what has been learnt from this study will depend on their intake and the motivation to use research as part of their plans to improve "systems" as well as schools.
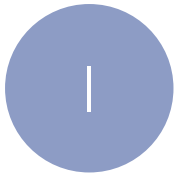
Pedagogy: The International Perspective

This opening section of the report moves from programmes designed to explain international comparisons of student outcomes to the research carried out on schools and, finally, to the fundamental part teachers and their pedagogy plays in making a difference to student learning.

Starting with systems of education
Much has been written describing variations in structures and regulatory frameworks across countries (Döbert et al., 2004; OECD 1994; 2005) that might account for differences in student outcomes. However, structures and regulations provide only limited insights into how well students perform. The School Effectiveness Research (SER) movement pioneered by Mortimore, Sammons and Reynolds (UK), Creemers and Bosker (mainland Europe), Stringfield and Teddlie (US) and Rowe (Australia) in the 1980s/90s provides a wider perspective on what matters when measuring outcomes.

It is outside the scope of this report to cover the vast corpus of research evidence from school effectiveness research. However, the findings taken together with a wide range of studies from many (Sammons, 1999; Reynolds et al., 2002; Townsend, 2007) point to the importance of considering students' background characteristics (e.g., gender) and their social demographics (e.g., parental socio-economic status) as well as school-level variables (e.g., leadership, ethos) when accounting for differences in performance.

SER attempts to measure variation between schools in their impact on students' educational outcomes, taking into account differences in the prior attainments and other characteristics of their student intakes (Sammons, 1996; Scheerens & Bosker, 1997). This research indicates the size and significance of school effects on students' academic, social and affective outcomes by using "value-added" approaches to measuring progress (Teddlie & Reynolds, 2000). A "value-added" approach explores the extent to which students in schools exceed expectations given a defined starting point. It analyses the added value or "boost" that schools give to student attainment/development over and above other influences. In analysing school effects, "value-added" studies also often describe the strength of other individual, family and neighbourhood characteristics, often reported in *Effect Sizes* (Elliot & Schagen, 2004), so that their influences can be compared to the effects of school on a student's learning and development. This is also referred to as Contextual Value Added analyses (CVA).

> "A 'value-added' approach explores the extent to which students in schools exceed expectations given a defined starting point"

SER and international comparisons draw the spotlight away from regulatory frameworks to focus on what happens at the school level in order to explore the notion of an "effective" school.

Whilst it has been relatively easy for educationalists to make international comparisons of the structural aspects of schooling (e.g., age at start of school, adult/child ratios), it is only more recently that comparisons could be made regarding the "outcomes" or "processes" (pedagogy e.g., classroom interactions) of education. The development of systems assessing students' outcomes globally has paved the way for comparisons to be made and for a wider debate on what matters in educating populations around the world.

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In 1995, the International Association for the Evaluation of Educational Achievement (IEA) implemented an ambitious international assessment of student outcomes with the introduction of the Trends in International Mathematics and Science Study (TIMSS). The TIMSS programme tested and compared the academic performance of pupils aged 9/10 and 13/14 in a common set of assessments, allowing for comparisons to be made across the 45 countries that participated in the first "sweep". Every four years, TIMSS collected not only students' raw scores but also information on their background demographic, attitudes and experiences of school. Following TIMSS, the IEA introduced the Progress in International Reading Literacy Study (PIRLS), which monitored the reading achievements and behaviours of children aged 9/10. Launched in 2001, PIRLS initially involved 36 countries with follow-ups conducted every five years.

Perhaps the most well-known outcome study is the Programme for International Student Assessment (PISA) developed in 1997 by the Organisation for Economic Co-operation and Development (OECD). Every three years, it produces international comparisons of education systems worldwide by investigating adolescent performance (age 15) across diverse nations. PISA compares pupils' academic performance in mathematics, science and reading. By 2009, approximately 470,000 students in 65 nations and territories participated in the programme.

These three systems for tracking educational outcomes at an international level are now firmly established. Their results have been used not only to compare "systems" but to inform the development of education policies. Earlier results, which placed many Pacific Rim countries at the top of the "league tables" and some Western countries, notably Germany, further down, have been instrumental in igniting debates concerning how education works at both the macro (national policies and regulation) and the micro (school and classroom) levels, and how these compare across countries. The comprehensive data produced by PISA, PIRLS and TIMSS have drawn attention to the importance of measurable student outcomes. The findings in this report support other reports undertaken by Pearson such as *The Learning Curve* (The Economist Intelligence Unit, 2012; 2014), where the issues of what teachers can actually do to improve practice is explained alongside outcomes and the benefits of certain systems and policies and practices.

The work of SER scholars provided powerful insights into what makes schools successful as places of learning (James et al., 2006) and generated numerous lists of "key characteristics" of effective/good schools (see Table 1).

Table 1: Characteristics of effective/good schools

SER	Main characteristics of effective/good schools
Rutter et al., (1979)	8 characteristics: school ethos, effective classroom management, high teacher expectations, teachers as positive role models, positive feedback and treatment of students, good working conditions for staff and students, students given responsibilities and shared staff-student activities.
Mortimore et al., (1988)	12 key factors: purposeful leadership, deputy head involvement, teacher involvement, consistency amongst teachers, structured sessions, intellectually challenging teaching, work-centred environment, limited focus within sessions, maximum communication between teachers and pupils, record-keeping, parental involvement and positive climate.
Brighthouse and Tomlinson (1991)	7 characteristics: leadership at all levels, management and organisation, collective self-review, staff development, environment/buildings/uplifting ethos, teaching and learning and parental involvement.
Teddlie and Reynolds (2000)	9 criteria: effective leadership, effective teaching, developing and maintaining a pervasive focus on learning, positive school culture, high and appropriate expectations for all, emphasis on student responsibilities and rights, monitoring progress at all levels, developing staff skills at the school site and involving parents in productive and appropriate ways.

Whilst these lists cover similar categories and concepts there are some marked differences, suggesting that there is no single universal list of "school-level variables" that make a school effective. However, in some meta-analyses of studies of school effectiveness, there are school attributes that are consistently attributed to effective schools (Hattie, 2012), but these vary across studies. Indeed, the notion of "effectiveness" is not without controversy, which is reported in Section 2 of this report. However, SER is not confined to just the study of school level variables. The symbiotic relationship between school effectiveness and school improvement (SESI) research indicates that schools are best studied as organisations with nested layers - students within classrooms and departments within schools. The most pervasive view on cross-level influences in nested models of school effectiveness (i.e., multilevel) is that higher-level conditions (e.g., school leadership, policy and organisation) facilitate conditions at lower levels (teaching and learning in classrooms), which, in turn, have a direct impact on pupils' academic outcomes (Goldstein, 1997; Hill & Rowe, 1996; 1998).

Henchley (2001) and Raham (2002) have drawn attention to the characteristics of high performance, low socio-economic status (SES) schools in Canada. The results confirm and extend earlier research and draw attention to the importance of leadership and school culture and how this, in turn, influences classroom culture. This is confirmed by Muijs and colleagues (2004) in a review of research on effective schools in challenging circumstances and the Reynolds (2004) investigation of the impact of improvement programmes associated with "High Reliability Organisations". Hopkins (2001) also identified similar school improvement strategies for schools in challenging circumstances.

School improvement research has turned the attention away from the impact of systems on student outcomes to the impact of the processes within schools and classrooms on these outcomes. This report focuses on "what is taught" and "how it is taught" and the consequential influence on learning.

Focusing on the what of teaching
Harris et al. (2005) emphasise that it is the way in which schools and teachers interpret, understand and respond to lists of characteristics of effective schools or teachers that is key to linking effectiveness and improvement at the teacher, school and departmental level. This shifts the spotlight again from what happens at school level to what happens in classrooms – **what** is taught (the content/curriculum) and **how** it is taught (classroom pedagogy).

What is taught is important and contentious. International reviews (Sargent et al., 2013) demonstrate a wide variation in national approaches to curricula and pedagogy. The spectrum is wide-ranging: France has a very prescribed framework, requiring fidelity across all schools; England has a national curriculum that exempts certain categories of schools; Italy has a national curriculum defined through "national guidelines"; Germany, Switzerland, Canada and the USA have no national framework but Federal/State variations; Finland has "guidelines".

Not only is there wide variation in what is taught but content can change markedly over time. The English National Curriculum is an example. Introduced in the 1980s, its numerous reviews and revisions, under different political administrations, are testament to the contentious nature of content. What should be included in, for example, a history curriculum can be influenced by ideology, values, research findings, lobby groups, academics and politicians.

The international comparisons on educational "outcomes" have a very particular approach to the question of what should be taught. The PISA, TIMSS and PIRLS assessments were developed after extensive collaboration with experts in education across the participating countries. These experts drew on their knowledge of assessment frameworks, research instruments and factors that influence learning opportunities. The assessments are not, however, predicated on one specific curriculum but are based on common content from curricula systems around the world. Their tests seek to assess the extent to which students can apply their knowledge to real-life situations in order to equip them for later employment and full participation in society.

The TIMSS study is very clear about its approach to curriculum. It sets out to investigate the curriculum at three levels: the intended curriculum, the implemented curriculum and the achieved curriculum. These are defined as:

a) Intended - what societies intend for students to learn and how education systems are organised to meet these demands

b) Implemented - what is actually taught in classrooms, who teaches it, and how it is taught

c) Achieved - what students have learned

Focusing on the how of teaching
Whilst academics working in SESI are inherently interested in a) and c) as they provide important contexts/outcomes for learning, they have, over many years, consistently drawn attention to b) and in particular the **how** of what is taught. The question of how teachers engage their students in learning is of immense global importance.

> "The question of how teachers engage their students in learning is of immense global importance"

How teachers teach is, like curriculum, important and contentious. It can also have immense implications for national policy. For example, in England after the "New" Labour Party's election to government in 1997, it was determined to make radical changes (West & Pennell, 2002) following surprising PISA and TIMSS/PIRLS results and so commissioned key academics in the field of SESI (Barber, 2007) to report on the distinguishing features of high performing countries and compare these to typical practices in England. The emphasis by Pacific Rim countries on interactive, whole-class teaching, focused group work and clearly defined learning objectives (Barber, 1996; DfEE, 2000a) led to the first English nationwide prescriptive programme for teaching literacy. The Department for Education and Employment's Primary Literacy Strategies (DfEE, 2000b), heavily influenced by the findings from overseas programmes, used a £12.5 million investment (Machin & McNally, 2004a;b) to transform the teaching of reading via regulation, extensive support materials (DfES, 2001a;b) and, most importantly, a comprehensive in-service training programme for practitioners. Alongside this was a similar strategy for teaching mathematics (DfEE, 1998a). These two approaches were eventually reviewed and combined into the Primary National Strategies Framework (DfES, 2008).

The strategies, whilst not completely content free and championing "whole school" approaches to the curriculum, nevertheless consistently emphasised the importance of how students were taught. They reinforced the messages from school improvement researchers (Stoll & Fink, 1996) that what happens in the classroom and the interactions between student and teacher are fundamentally important to a range of outcomes, be they academic, social or attitudinal. They emphasised the importance of pedagogy (the how of teaching).

The SESI research draws attention to the centrality of teaching, learning and classroom processes in determining schools' academic effectiveness (Creemers, 1994; Scheerens & Bosker, 1997; Hill & Rowe, 1998; Teddlie & Reynolds, 2000).

Creemers (1994) and Scheerens (1992) argue that theories of learning and instruction are at the core of educational effectiveness models, with school factors seen as facilitating conditions for classroom factors. Luyten (1996; 2006) provides an overview of the size of school effects compared to teacher effects and challenges the general consensus that teacher effects generally outweigh school effects. The Hay McBer (DfEE, 2000a) report *Research into Teacher Effectiveness* developed a model of teacher effectiveness that links three factors to pupil progress: professional characteristics, teaching skills and classroom climate. The report suggests that over 30 per cent of the variance in pupil progress can be predicted by these three factors, stressing the importance of the teacher's role in creating an "excellent classroom climate". The spotlight moves to the classroom and the teacher's pedagogy.
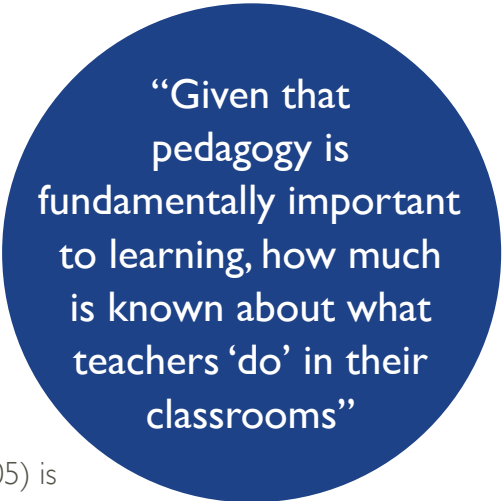
There are numerous definitions of pedagogy and much time has been devoted to debating their subtleties (Ko & Sammons, with Bakkum, 2013). Gage (1985:25) defined pedagogy as "the science of the art of teaching", a science continually developed by innovative teachers and the academic researchers who study their practice. Watkins and Mortimore (1999:3) defined pedagogy as "any conscious activity by one person designed to enhance the learning of another", whilst Alexander (2001; 2008) argued that pedagogy has been defined too narrowly in the past and he specifically criticised Watkins and Mortimore for a definition limited to the "actions" of teachers. Alexander (2000:540) distinguishes pedagogy from teaching; "teaching is an act while pedagogy is both act and discourse. Pedagogy encompasses the performance of teaching together with the theories, beliefs, policies and controversies that inform and shape it".

What continues to make pedagogy controversial is its complexity. Notions of pedagogy have changed over time (Vygotsky, 1963; Bruner, 2006), by context (Moon & Leach, 2008), culture, (Alexander, 2000) and across nations (Reynolds & Farrell, 1996; Watkins & Mortimore, 1999; Simon, 1999; Alexander, 2000).

This report adopts Siraj-Blatchford's perspective on pedagogy as: "the instructional techniques and strategies which enable learning to take place. It refers to the interactive process between teacher/practitioner and learner, and it is also applied to include the provision of some aspects of the learning environment, including the concrete learning environment, and the actions of the family and community" (Siraj-Blatchford et al., 2002:10).

The SESI research previously mentioned enables links to be made between classroom/school pedagogy and outcomes leading to the notion of "effective" teaching. However, "effectiveness" is yet another controversial term, which is explored in the next section of this report.

Given that pedagogy is fundamentally important to learning, how much is known about what teachers "do" in their classrooms that can lead to poor, good or excellent outcomes for their students? The Effective Primary Pedagogical Strategies in English and Maths (EPPSEM) research set out to answer this question using qualitative data that were collected as part of a larger quantitative study on pedagogy. The "mixed methods" approach to the study of effective classroom practices (Siraj-Blatchford et al., 2006; Sammons et al., 2005) is important as it can reveal practices that are useful for both policy makers and practitioners. The EPPSEM study points to the importance of what happens in the classroom and like the work of academics such as Hattie (2012), who has collated the findings of dozens of studies on classroom practices, helps to make learning "visible" to the people who matter – teachers.

"Given that pedagogy is fundamentally important to learning, how much is known about what teachers 'do' in their classrooms"

The findings in this report support other reports undertaken by Pearson such as *The Learning Curve* (The Economist Intelligence Unit, 2012; 2014) report, which explains what teachers can actually do to improve practice, and discusses the outcomes and the benefits of certain systems and policies and practices.

The rest of this report describes the findings on "effective" primary school classroom strategies from a longitudinal study of influences on the academic attainment and progress and social-behavioural development of over 3,000 children in England who were part of the Effective Pre-School, Primary and Secondary Education study (1997-2014).

2 Studying Effective Primary Pedagogy

> Melhuish and colleagues (2006:4) define an effective school:
>
> *Primary schools where children make significantly greater progress than predicted on the basis of prior attainment and intake characteristics can be viewed as more effective (positive outliers in value added terms). Primary schools where children make less progress than predicted can be viewed as less effective (negative outliers in value added terms).*

Section 1 of this report explored, through the SESI literature, the notion of an "effective" school, but the term "effective" is not without controversy. There can be little doubt, given the research evidence (Mortimore et al., 1988), that schools make a difference. What is open to debate is how these differences are measured, what factors are included in the analyses and over what period of time. These are all important considerations when trying to measure "outcomes".

In the UK, the work on Contextual Value Added[3] (CVA) analyses, pioneered by Goldstein (1986, 1995, 1997) and Rasch (1961, 1977, 1980, 1993), led to a move away from comparing schools on raw test scores compiled into league tables to more comparative data (DfES, 2005) that enables the performance of School A to be compared to School B where they have similar intake characteristics (CVA analyses). Many have criticised school league tables and urged cautious use of their findings (Goldstein & Leckie, 2008; Leckie & Goldstein, 2009, 2011), given differences in school intakes and their fluctuations over time. CVA is also not without its critics. Gorard (2008, 2010a,b) questions the reliability of CVA measures and the accuracy of the analyses but his claims have been contested (Muijs et al., 2011b; Reynolds et al., 2012). This said, Sammons and colleagues (2008a, 2011) have shown that there are statistical relationships between the CVA measures and student outcomes and relationships between other measures of aspects of school quality (Ofsted inspection judgements) and student outcomes.

When the longitudinal Effective Pre-School, Primary and Secondary Education (EPPSE) study, funded by the English Department for Education (DfE), wanted to explore classroom pedagogy, what "effective" pedagogy might look like and how it affects a child's learning, the starting point was to identify "good" schools where effective learning might take place in order to provide a framework for drilling down into classroom practices and teacher pedagogy. That is, what teachers do and how they do it.

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[3]CVA controls for prior attainment and background characteristics (e.g., gender, social class) and measures school effects on progress over time.

The methods

The EPPSE study is uniquely placed to investigate children's academic attainment and socio-behavioural development and the factors that influence these, as it has monitored over 3,000 children from when they started pre-school/school (age 3/5) until they left compulsory schooling (age 16). The EPPSE study, as a mixed methods (Sammons et al., 2005; Siraj-Blatchford et al., 2006) programme of research, is concerned with both what children achieve and how they achieve and become engaged learners. The pre-school years of the EPPSE children, including the influence of the quality of their pre-school, their familial characteristics and the richness of their early years Home Learning Environment (HLE), have been well documented (Sylva et al., 2010). The findings, which also demonstrated the importance of early experiences, have had a profound influence on national policy (Taggart et al., 2008), leading to the expansion of pre-school and universal provision for all 3-5 year olds. The case studies of effective practice (Siraj-Blatchford et al., 2002; 2003), which described types of pedagogical practice evident in "highly effective" and "good" pre-school settings, have had a profound influence on practitioners (see Siraj-Blatchford et al., 2008) and how young children are taught (QCA/DfEE, 2000).

A second phase of the research, the Effective Pre-School and Primary Education study (Sylva et al., 2008), began when the EPPSE children moved into primary school. Whilst still exploring any continuing influence of pre-school and the contribution of the family to children's academic and social-behavioural outcomes, the research questions expanded to explore the contribution of the child's primary school to these same outcomes (Sammons et al., 2006; 2007a, b; c; 2008a, b).

This raised some methodological problems. During the pre-school phase, the quality of the 141 individual pre-school settings was measured using two observation rating scales: The Early Childhood Environment Rating Scale-Revised (ECERS-R: Harms et al., 1998) and the Early Childhood Environment Rating Scale-Extension (ECERS-E: Sylva et al., 2003: 2011). The rich information from these ratings (Sylva et al., 1999a, b), coupled with child outcomes data and an effectiveness score for each setting (Siraj-Blatchford et al., 2003), informed the selection of 12 settings for an intense study of pedagogical practices evident in "excellent" and "good" settings.

When EPPE 3-11 sought to investigate the pedagogical practices in primary schools, it could not replicate this approach as the 3,000 children had moved into over 850 schools. The children moved from the targeted six Local Authorities to many regions across the country and, unlike the pre-school where there were concentrated numbers of EPPSE children in a setting, many of the primary schools had a "singleton" or a small number of EPPSE pupils. In order to study primary practices, the research needed to investigate a range of schools to get as full a picture as possible of the types of practice undertaken by teachers in their classrooms, but sending researchers to such a large number of schools to conduct observations of "quality" was both unaffordable and unmanageable.

Therefore, criteria for selecting a subset of primary schools for a focused investigation of pedagogical practices that would differentiate schools are necessary. A key factor in differentiating primary schools is measuring the extent to which they are "effective" or provide good "value added" on measurable child outcomes. Using an "effectiveness" score for this selection was helpful as it provides a common metric that already controls, to some extent, for the background characteristics of a school's intake. Using a value-added measure was considered to be the fairest approach to the selection of a subset of schools for further case study investigations on classroom practice.

> "A key factor in differentiating primary schools is measuring the extent to which they are 'effective' or provide good 'value added' on measurable child outcomes"

The value-added effectiveness measures (or residuals) for each school were calculated using national assessment data for ALL primary schools in England linking Key Stage 1 and Key Stage 2 results, with separate calculation for the core curriculum subjects English, maths and science, across three consecutive years (Melhuish et al., 2006a; 2006b). In these analyses, pupil outcomes in national assessments in Year 6 were predicted while controlling for pupil characteristics from the pupil-level annual school census (PLASC), area characteristics derived from the Indices of Multiple Deprivation (IMD) and the census data, plus pupils' prior attainment measured in national assessments in Year 2 (age 7). The effectiveness measures were derived from the 2002, 2003 and 2004 Key Stage 2 results as these were the years the EPPE children attended primary school. A composite of school-level residuals was calculated over these three years to avoid the known "wobble" in results between individual years (Leckie & Goldstein, 2009).

The school effectiveness measures EPPE 3-11 used were, therefore, independently derived and provide indicators of the academic effectiveness of the school in promoting its pupils' progress. Once the school-level residuals had been calculated for all schools in England the study was able to extract from the national dataset the schools attended by most EPPE 3-11 children and split them into three bands of effectiveness on the basis of academic outcomes: high, medium and low. These analyses showed that the overall academic success of the school is positively correlated to the average academic outcomes for the EPPE 3-11 sample. Children in highly effective schools did better in reading and maths than those from schools who were rated as low for academic effectiveness.

In order to explore the practices of effective schools, a range of schools needed to be studied. A purposeful sample of 125 schools and classes was drawn from the over 850 schools attended by the EPPE 3-11 sample to include roughly equal numbers of schools in the high, medium and low effectiveness groups and to provide a fair spread of social demographics (rural, inner city, etc.).

> "In order to explore the practices of effective schools, a range of schools needed to be studied"

The case studies of practice were conducted by researchers who were stationed in these schools during the Spring/Summer terms of 2004 and 2005. Classroom observations were conducted by a team of eight researchers with backgrounds in primary education as teachers, headteachers, advisors and/or inspectors.

To make sense of the dynamic place that is the primary classroom, researchers undertook classroom observations using two observation schedules specifically designed to capture the quality of practice in Year 5 classrooms with children aged 10. The choice of measures in any research is extremely important. In educational research, it is crucial that any measures have validity, reliability and credibility with the practitioner community. A number of observation instruments were considered, but few contained measures of the frequency of behaviours alongside global measures in a range of pedagogical domains. Two instruments provided an opportunity to ensure reliability and, in addition, offered the potential for comparisons that would enhance validity. These instruments were the Classroom Observation System for Fifth Grade or COS-5 (NICHD, 2001), often referred to as the "Pianta" after the author, and the Instructional Environment Observation Scale or IEO (Stipek, 1999), similarly referred to as the "Stipek" after the author. These instruments were selected because they were appropriate for the age group, covered a wide range of pupil and teacher behaviours and, additionally, offered the opportunity for comparison with other research studies in similar contexts (Galton et al., 1999: NICHD, 2001).

The COS-5 (NICHD, 2001, referred to as Pianta) observations were conducted across a range of academic subjects, whereas IEO (Stipek, 1999) focused on literacy and numeracy only (Table 2).

Table 2: The sample of classrooms

Year	COS-5 (Pianta) observations	IEO (Stipek) observations
2004 (Spring/Summer)	54	24
2005 (Spring/Summer)	71	69
Total	125	93

The COS-5, developed by Robert Pianta and colleagues (NICHD, 2001), was initially used by the National Institute of Child Health and Human Development (NICHD) Study of Early Child Care and Youth Development in the USA and is divided into two main parts: The Behavioural Coding System, which we refer to as the Frequency of Behaviour Coding System, and the Qualitative Coding System, referred to as the Measures of Quality Coding System. These two parts make up an observation cycle lasting 20 minutes in total. Overall, 1009 observations were conducted in the 125 schools using the COS-5 Pianta instrument.

For each school, the researchers completed a minimum of eight 20-minute observation cycles[4]:

> 1 - Start of the day
> 1 - Start of the afternoon
> 2 - Literacy
> 2 - Numeracy
> 1 - Science or social science
> 1 - Additional academic subject (e.g., literacy, maths, science). High priority was placed on core academic subjects as these are the areas that the EPPSE studies had most child outcome data for

During the first part of the observation, the Frequency of Behaviour Coding System, researchers focused on a "target child" and observed and recorded child and teacher behaviours over a 10-minute period. The schedule noted the child's setting (e.g., large/small group), the content of the activity (e.g., concept development, computation), teacher behaviours (e.g., managerial instructions), the child's academic behaviour (e.g., highly engaged) and the child's social behaviour (e.g., positive engagement with peers).

The second part of the observation, the Measures of Quality Coding System, allowed the researcher to make a global judgement of the "who, what and how" of everything happening at the classroom level. This included the richness of the instruction, classroom management, positive/negative climate, the use of evaluative feedback and teacher sensitivity.
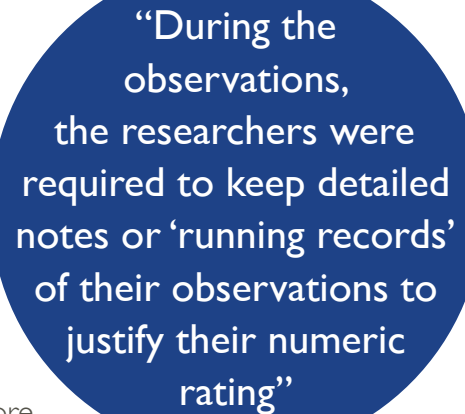
Having completed the COS-5, the researchers also observed using the IEO, designed by Deborah Stipek in 1995 for the Centre on Organisation and Restructuring of Schools (Stipek, 1999). It, like the COS-5, was used to obtain information about variation in school processes, including teachers' and pupils' classroom behaviour and experiences. The purpose of the IEO is to gather high-inference numerical indicators of pupils' instructional environments by combining researcher judgements about the teacher's teaching and pupils' learning behaviours. In the EPPE 3-11 study, the IEO was used specifically to observe both literacy and numeracy in each of the Year 5 classrooms in 93 focal schools, given the importance of these aspects of the curriculum to later academic success.

The IEO has four main areas – General Classroom Management and Climate, General Instruction Scales, Mathematical Instruction Scales, and Writing Instruction Scales – with a total of 16 sub-scales that include depth of knowledge and student understanding, student engagement, etc. These observations provided numeric scores that could then be used in statistical analyses, which linked the variation of the practices observed to the EPPSE's measures of child outcomes.

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[4]This has been adapted from the NICHD (2001).

The full findings of this associated quantitative tier of the EPPE 3-11 research were reported in three publications: *Variations in Teacher and Pupil Behaviours in Year 5 Classes* (Sammons et al., 2006), *The Influence of School and Teaching Quality on Children's Progress in Primary School* (Sammons et al., 2007c) and *Final Report from the Primary Phase: Pre-school, School and Family Influences on Children's Development during Key Stage 2* (Sylva et al., 2008). Together these two observation schedules provided the research with a measure of the "quality of pedagogy" within primary schools across a range of effectiveness.

During the observations, the researchers were required to keep detailed notes or "running records" of their observations to justify their numeric rating, thus collecting both quantitative and qualitative data. However, the researchers' field notes were not included in the original analyses. The richness of the qualitative information collected by the field team became apparent after the quantitative analyses were published and these notes provided a valuable insight into life inside Year 5 classrooms, beyond what could be collected by a summative numeric score.

> "During the observations, the researchers were required to keep detailed notes or 'running records' of their observations to justify their numeric rating"

Armed with three sources of data – 1) a school-level academic effectiveness measure (from the value-added, residual score from national assessment data), 2) quality measures (from the COS-5 and IOE observations – see Appendix 1 for full details of the instruments) and 3) the qualitative notes – EPPSE was in a position to triangulate these sources of evidence and explore the pedagogical practices common across 82 (with full data sets) of the 125 schools and classrooms with different levels of academic effectiveness and quality of pedagogy.

This report details the analyses and describes how effective pedagogy is evident in these schools. Within the sample, three distinct groups of "typical" schools were identified.

Group A: Excellent Schools: Academically effective schools with good quality pedagogy

Table 3: Criteria for inclusion in Group A: Excellent schools
(academically effective, good quality pedagogy)*

Source	Possible scores range from (low to high)	Minimum scores required to be included in the academically effective, good quality pedagogy group
National Assessment Residual Scores (RS) (a measure of school effectiveness)	1 to 5	RS ≥ 3 in both English and maths AND at least one RS ≥ 4
Instructional Environment Observation (IEO)	1 to 3	IEO ≥ 2 if COS-5 = 5 OR IEO = 3 if COS-5 = 3 or 4**
Classroom Observation System (COS-5)	1 to 5	COS-5 ≥ 3 if IEO = 3 OR COS-5 = 5 if IEO = 2**

* Percentage of pupils eligible for free school meals (FSM) was available for each school and was checked to ensure that schools with both higher and lower proportions of pupils eligible for FSM were included in each category.

** Schools where quality of pedagogy on both scales was medium (IOE=2; COS-5=3) but both residual scores were high (RS≥4) would also have been included in this group; however, none of the schools fell into this category.

The only other schools included in Group A were those with medium ratings on both pedagogical quality scales, where both the English and maths residual scores were rated as high (RS≥4). The criteria were stringent and only 10 of the 82 schools (12%) fell into the "academically effective, good quality pedagogy" category.

Group B: Good Schools: Medium academic effectiveness and medium quality pedagogy

Table 4: Criteria for inclusion in Group B: Good schools
(medium academic effectiveness, medium quality pedagogy)*

Source	Possible scores range from (low to high)	Minimum scores required to be included in the medium academic effectiveness, medium quality pedagogy group
National Assessment Residual Scores (RS) (a measure of school effectiveness)	1 to 5	RS = 3 in both English and maths
Instructional Environment Observation (IEO)	1 to 3	IEO = 2
Classroom Observation System (COS-5)	1 to 5	COS-5 = 3

* Percentage of pupils eligible for free school meals (FSM) was available for each school and was checked to ensure that schools with both higher and lower proportions of pupils eligible for FSM were included in each category.

Group C: Poor Schools: Low academic effectiveness and poor quality pedagogy

Table 5: Criteria for inclusion in Group C: Poor schools
(low academic effectiveness, poor quality pedagogy)*

Source	Possible scores range from (low to high)	Minimum scores required to be included in the low academic effectiveness, poor quality pedagogy group
National Assessment Residual Scores (RS) (a measure of school effectiveness)	1 to 5	RS ≤ 3 in both English and maths AND at least one RS ≤ 2
Instructional Environment Observation (IEO)	1 to 3	IEO ≤ 2 if COS-5 = 1 OR IEO = 1 if COS-5 = 2 or 3**
Classroom Observation System (COS-5)	1 to 5	COS-5 ≤ 3 if the IEO = 1 COS-5 = 1 if the IEO = 2**

*   Percentage of pupils eligible for free school meals (FSM) was available for each school and was checked to ensure that schools with both higher and lower proportions of pupils eligible for FSM were included in each category.

**   Schools where quality of pedagogy on both scales was medium (IOE=2; COS-5=3) but both residual scores were low (RS≤ 2) were included in this group. Three schools fell into this category.

The remainder of the schools fell in between or around these categories, apart from a small number (eight schools) that did not fit clearly into any category and so were redundant to the aim of selecting schools that could clearly expose, for both policy makers and practitioners, the practices associated with excellent, good and poor pedagogy. Each "typical" effectiveness and quality of pedagogy group contained schools from a variety of settings (inner city, shire and rural) and had a range of levels of advantage of pupil intake (i.e., higher and lower percentages of pupils eligible for free school meals). A complete list of schools and their characteristics in relation to school national assessments, and quality ratings, can be found in Appendix 2.

Having established a robust sample of 82 schools and rigorous methods for collecting data, the EPPSE research scrutinised the observations to see if there were some practices that differentiated school and teachers across a range of effectiveness. The findings are reported in the next section of this report. For the full findings from this phase of the research, see Siraj-Blatchford et al., 2011.

3 Effective Primary Practices

The analyses of the sample described in Section 2 of this report showed that, despite an initial expectation that three quite distinct groups would emerge, the whole sample actually divided into two primary groups: schools with "medium" to "good" academic effectiveness and quality of pedagogy (the larger) and schools with extremely poor ratings. A third "excellent" group is nearly identical to the medium/good group but with some distinct pedagogical practices, as illustrated in Figure 1 below. Given the strict criteria referred to in Tables 3 – 5 the focus for reporting is on 10 schools in the excellent group, 9 in the good group and 10 in the poor group.

Figure 1: Division of school across categories

Schools with extremely poor ratings

Schools with medium to good academic effectiveness and quality of pedagogy
(the vast majority)

Schools with excellent ratings
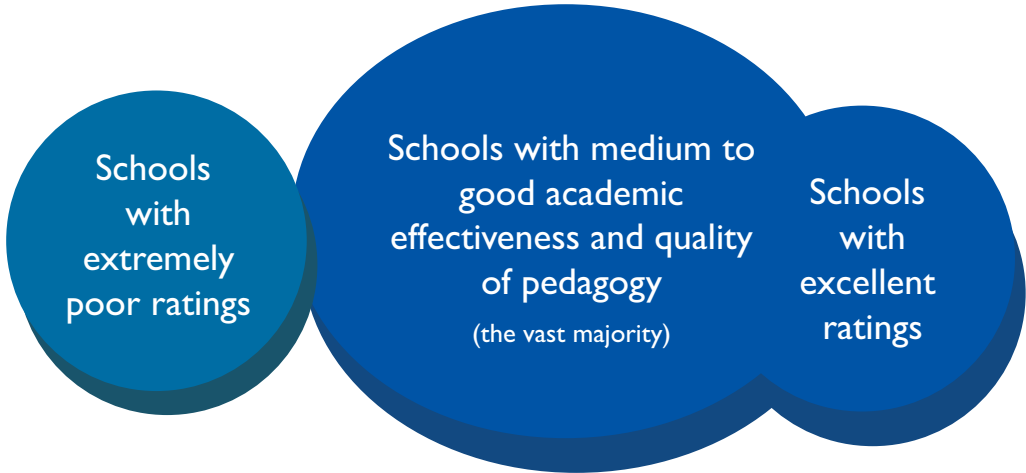
The research sought to distinguish the practices in these three groups. The first phase, developing the analytical framework of pedagogical strategies, involved combining a number of professional focus group discussions with the results of a literature search to ensure breadth and diversity in the identified factors that contribute to effective classroom practice.

The initial analyses of the observed data showed practices that were grouped into more than 40 strategies and factors, many with similar features. As this list comprised many overlaps and duplicates, it was collapsed into 11 main strategies with some subheadings. These established pedagogic strategies provided the initial analytical framework that continued to be elaborated through the process of reviewing the literature. The qualitative data were systematically interrogated until a saturation point was reached (no new strategies emerged) to determine which cases confirmed or confounded the theoretical themes that were emerging. The analytical process was therefore partially "grounded" and involved inductive processes and constant iteration between the qualitative data, theory and empirical evidence following progressive stages of deduction and verification. The final list of strategies has been summarised in Table 6.

Table 6: Effective pedagogical strategies

Pedagogical strategy	Indicator for the pedagogical strategy
1. Organisation	Well-organised teaching time, no time wasted, good pace, good classroom routines, children are self-reliant
2. Shared goals	Clear, shared objectives with specific guidance on how to achieve them
3. Homework	Use of homework
4. Classroom climate	Positive classroom climate, teacher-child and child-child interactions, teacher has in-depth knowledge of, enthusiasm for and confidence in teaching subject
5. Behaviour management	Effective behaviour management
6. Collaborative learning	Use of groups for a specific, collaborative purpose, peer tutoring
7. Personalised learning	Appropriate and considered differentiation, scaffolded learning, varied and rich teaching resources
8. Making links explicit	Building on prior pupil knowledge and looking forward to the next steps in the curriculum, cross and extra-curricular links made explicit, practical teaching activities to teach testing and application of knowledge and problem solving
9. Dialogic teaching and learning	Sustained shared thinking, open-ended questions used to develop deeper understanding rather than for summative evaluation, teaching and encouraging analytical thought, children's talk encouraged and moderated
10. Assessment for Learning	Ongoing formative assessment
11. Plenary	Use of plenary (discussion at the end of a lesson bringing together the main concepts and rehearsing the key learning points)

The rest of this section reports on the main pedagogical strategies and describes examples of practice recorded by the researchers that illustrates these.

The above strategies were identified from the literature on pedagogy in schools and applied to the EPPSEM schools, and were found in all of our "good" and "excellent" primary schools. At the end of this section the main differences between the good and excellent practices are identified. The analyses included qualitative field notes as well as the ratings from the structured observation (see Appendix 2). A top-down analysis, using the strategies identified from the research literature, and a bottom-up analysis from the qualitative data, which complemented the structured observations, were used.

Findings for each of the pedagogical strategies

1. Organisation

Teachers in excellent and good schools were rated highly on their organisational skills and wasted little time. The classroom routines were efficient and smooth. Children were responsible for their own time and resources: they knew what to do and they did it.

Teachers in excellent schools gave a great deal of thought to the resources they used. These were prepared ahead of time, well managed during lessons, were particularly fit for purpose and tailored to the individual needs of their pupils. These teachers also made productive use of instructional time by maintaining good pace and by ensuring that every second of their lessons counted. Pupils in these classes had the highest ratings of self-reliance.

> "Children were responsible for their own time and resources: they knew what to do and they did it"

Excerpts from the researcher notes bring these strategies to life:

- Transitions are routine for almost all the children. The teacher packs a lot into the lesson. Everyone knows what is expected of them (S26, Literacy IEO)

- No time was wasted in moving from set literacy table places to the carpet at the start and the end of the lesson. The teacher was very well prepared with an OHP of the poem and interactive board sentences and the worksheets. The teacher's expectations are very clear as to what to do and what time they have to complete the task. The TA (teaching assistant) role is with a group of eight children - less able; this is clearly defined, and they (the teacher and the TA) have planned prior to lesson. Equipment all available (S28, Literacy IEO)

- From the very beginning a quick pace. No time lost whatsoever (S01, Literacy IEO:3)

- Difficult to see how any more could have been squeezed in (S01, Numeracy IEO:3)

- Children immediately sit on carpet as arrive in room. Routine to brainstorm in pairs (S02, Literacy IEO:3)

- No time lost. Very quick start to literacy. Finally all cleared up quickly. They know what to do and they do it (S04, Literacy IEO:3)

- Routines are very efficient – have monitors for everything to help the teacher. No disruption (S05, COS-5 (7):5)

- Well-established routine (S06, COS-5 (1):5)

- Children familiar with routines – they know what to do when they return from assembly (S06, Numeracy IEO:3)

This compares with Year 5 classrooms in poor schools, which were rated significantly lower than the other groups on the organisation of the teacher's resources and whether they were fit for purpose, the productivity of instructional time, the clarity of the teacher's expectations, including classroom routines, and the children's independence and self-reliance. Lessons were slow to start, pace was not maintained and time was wasted during transitions. Pupils in these classes received the lowest ratings of self-reliance. The field notes report:

- Time is not well managed. Lessons run over leaving no time for the next lesson… children take a long time to respond and are often late arriving for sets. Teacher does not seem to mind this (S76, Numeracy IEO)

- He can get involved with individuals and the SEN group but then becomes completely detached. He shouts for control then ignores the behaviour for long periods. His presentations are very hurried as though "This is what I said I'd do and I'm going to do it" but once he's done that, he doesn't really seem to care about the children's work. He doesn't monitor children's work in any depth nor is there feedback (S79, Literacy IEO)

Year 5 teachers in excellent schools excel at:

- Providing high-quality teaching and learning resources: Teachers provided high-quality teaching resources thoughtfully adapted to meet the needs of their pupils

- Making effective use of time: Every second counts. No time was wasted

- Encouraging self-reliance: Children were responsible for their own time and resources. They knew what to do and they did it independently

2. Shared, clear objectives

Good teaching and learning are facilitated by teachers and pupils working towards common, shared goals that are agreed on and understood by all concerned. Children need to know what they are supposed to be learning and how much they should aim to achieve over a defined period of time and they need to internalise these goals as their own. Teachers in excellent and good schools ensured that the concepts and ideas presented in lessons were understood by all children. They checked that children understood the main ideas of the lesson and intervened when understanding was not clear or incomplete, even when it meant changing the lesson or activity part way through.

Although most teachers were good at making sure the learning intentions of each lesson and activity were clear to the children (e.g., by writing lesson objectives on the board), teachers in excellent schools were especially good at this. Pupils in these classes were very clear about what they were expected to achieve and how much time they had to do it in.

> "Pupils in these classes were very clear about what they were expected to achieve and how much time they had to do it in"

One particular observation summed this up:

- The teacher changed her lesson when she realised her pupils had not grasped one of the main principles needed to complete a symmetry activity. After an introduction to symmetry (the children had been working on this topic in Art as well as in Maths), the children were asked to work in pairs and create patterns for each other to repeat. The patterns had to contain two lines of symmetry and a perpendicular line. Despite a careful introduction to the task and the teacher modelling how to approach it, the children were still not sure what to do (there was much confusion over how to draw a perpendicular line). When the teacher realised that the confusion was widespread, she stopped the lesson, re-explained the task and then asked the children to have another go (S02, Numeracy IEO)

In contrast, objectives and learning concepts and ideas were less clear in poor schools. Teachers were slower to check and correct their pupils' understanding of key concepts and ideas. Although children in these classrooms were aware of their lesson objectives, it was not clear whether they fully understood them or how to achieve them, and they were much less focused and less motivated to meet these goals.
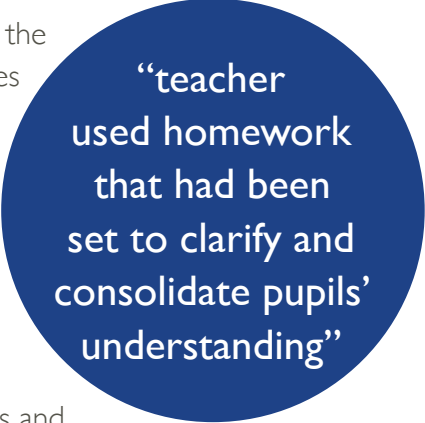
> Year 5 teachers in excellent schools excel at:
>
> - Providing clear learning objectives: Teachers ensured that each child knew what he or she was expected to learn during each lesson and activity

3. Homework

The EPPSE 3-14 study showed that in secondary school, after controlling for SES, children who spent two or more hours per night on homework, compared to children who spent no time on homework, showed better progress for maths and, to a slightly lesser extent, better progress for English. This level of homework was also associated with a positive effect on socio-behavioural outcomes and on positive changes in these outcomes from age 11 to 14 (Sylva et al., 2012).

Although the use of homework was not systematically recorded in the primary schools when classes were observed, there were references made in the researchers' notes to instances when homework was set. Teachers in excellent and good schools appeared to set homework that was more meaningful and more directly linked to what the children were learning. They had a more flexible approach to assigning homework and this was sometimes in addition to the timetabled requirements. For example, in one school (S27), the homework was used to clarify some teaching points. The children were learning how to measure irregular shapes and the teacher used homework that had been set to clarify and consolidate pupils' understanding.

> "teacher used homework that had been set to clarify and consolidate pupils' understanding"

In two other schools, although there was no direct mention of homework, pupils were set some optional work to be done outside class time. In S30, a bottom set literacy group had been working on the "true" story of The Three Little Pigs. The children were asked to think about whether they believed the wolf's or the pigs' side of the story before the next lesson. Children in S31 had really enjoyed a poetry lesson that centred on alliteration and on a combination of collaborative and individual work that was brought together during the plenary. The teacher offered a house point to anyone who could write another verse of the class poem during their break time. Although the homework in the last two cases was very informal, it was highly likely that at least some of the children would take up these opportunities to extend the work done during the lesson.

In the first case, the task was an interesting extension to the class activity and was easily achievable by this group of pupils who struggled with literacy. Children in the poetry lesson were highly engaged and really enjoyed writing their poems, so the opportunity to continue with the activity, combined with the incentive of a house point, meant they were very likely to take on the challenge.

This informal approach also meant the confrontation that may arise over incomplete homework was avoided. Children who completed the tasks would be rewarded (by praise, by being better prepared for a class discussion and by being awarded a house point), but those who didn't would not be singled out for punishment. While it could be argued that these tasks weren't really homework and the informality of them was due more to the teachers' laziness (no marking, no consequences to follow through on) or were simply the result of an unplanned moment of opportunity seized by the teacher, setting work to be done outside of class time

in this way meant that all children had an equal opportunity to take advantage of it, and the situation where some children may be reprimanded for not doing their homework was completely avoided.

In poor schools, teachers set homework simply because they were required to set it and the work itself did not appear to be expressly linked to what the children were learning in class. There were no examples of teachers using opportunities that arose during a lesson to set different/more homework than what was already planned.

Although the observation data from the IEO and COS-5 could not provide evidence of the teachers' intentions regarding the homework they set, the teacher survey of the 125 schools from which these schools were selected did find that where there was more emphasis on homework (according to teachers) pupils made more progress (Sammons et al., 2007c).

4. Classroom climate

The classroom climate (the overall feeling in the classroom characterised by teacher-pupil and pupil-pupil relationships) was rated highly in excellent and good schools. Classrooms in excellent schools were rated exceptionally highly on positive classroom climate. Children were well liked and respected by their peers. As well as good teacher-pupil relations, teachers supported their pupils' learning, they showed sensitivity and provided a safe environment.

"Children were well liked and respected by their peers"

The quality of the relationships between teachers and their pupils was very important. Respect between teachers and children was a significant part of the classroom ethos and was evident in the observations of all the highly-rated classrooms. In these classrooms, children's opinions and feelings were valued and they were expected to respect the opinions and feelings of everyone in the classroom. Instances of disciplinary problems were rare and, when they did occur, were sensitively handled by the teacher without belittling the child.

This was brought to life in the researchers' notes:

- A feeling that children were enjoying their learning and confident. A feeling of respect between children and teacher … Very aware of children. A very warm supportive attitude, which reflects a child-centred approach. No need to discipline (S0l 1, COS-5 (1):5)

- An experienced teacher, firm, friendly with high expectations (S01, Literacy IEO:3)

- Classroom climate … a strong feeling of respect for each other. A mature attitude (S01, Literacy IEO:5)

- The teacher was supportive and encouraging, smiled a lot (S01, Literacy IEO, field notes:4)

- Firm but friendly and supportive teaching approach… The children feel very secure in terms of both learning and socially (S01, Numeracy IEO:3)

- Supportive approach with high expectations (S01, Numeracy IEO, field notes:3)

- (The teacher) is happy and jokey with the rest of the class. Lots of smiles are shared. Mentors different groups – praise-encouragement. Obvious affection seen (S02, COS-5 (6):6)

- Warm supportive feeling. Children very content (S03, COS-5 (8):5)

- The classroom seemed totally safe. The children were confident and comfortable and enjoying each other's company; also respectful towards the teacher who they obviously liked (S03, Literacy IEO:3)

- The teacher established firm, friendly control and the children responded. They clearly enjoyed their learning and all were respectful. Lots of praise, encouragement for the children (S03, Numeracy IEO:3)

- Teacher is very involved and aware of children. Lots of praise, e.g., "fantastic" (S04, COS-5 (3):5)

- A very safe classroom, the children are secure and confident. The teacher maintains firm, friendly and supportive control. All respect each other – adults, children. The children are enjoying their learning. (S04, Literacy IEO:3)

- A lot of support for the children from the class teacher, the special needs teacher and the learning support assistant. Children were also supportive to each other (S04, Literacy IEO:3)

- All (classroom climate) characterised by mutual respect (S04, Numeracy IEO:3)

- Teacher praises the way they are all getting on with each other (S05, COS-5 (3):4)

- Demeanour of teacher: relaxed, does not raise her voice, lots of smiles . . . laughed with children ...Very proud of children's achievements (S05, Literacy IEO:3)

- Never raised voice. Lots of smiles and pats on back to children (S05, Numeracy IEO:3)

- Good evidence of mutual support between children. Class teacher and teaching assistant are both encouraging and listen respectfully to children's suggestions (S06, Literacy IEO:3)

- This classroom is a safe place to take risks (S07, COS-5 (7):5)

- Such mutual respect allows children to confidently share their writing with the class. Everyone listens intently as others read. Class teacher makes positive comments – but also some fair criticisms well received (S07, Literacy IEO:3)

- Respect obvious. Work well in groups – negotiate roles, share work and help others (S08, Literacy IEO:5)

- A safe place to make mistakes (S07, Numeracy IEO:3)

The overall classroom climate in poor schools was often rated as unpleasant. Teachers were more likely to display negativity (disapproval, reprimands, expression of teacher's dislike, etc.) and children in poor schools were less sociable and less cooperative than those in other schools.

> Year 5 teachers in excellent schools excel at:
>
> - Providing an extremely positive classroom climate
>
> - Sensitively responding to the needs of their pupils
>
> - Creating an environment where children are well liked and respected by their peers

5. Behaviour management

The differences between the three school groups were most evident when considering the management of behaviour. Children in excellent and good schools were less disruptive and rarely needed to be disciplined. Where teachers did need to correct behaviour, they used humour or a quiet reminder. The observations considered teachers, disciplinary tactics, levels of disruption, over-control and chaos.

The following notes describe the pedagogy displayed by teachers with good behaviour management strategies:

- The whole class and all children are on task, but control is established by involving children in their learning (S01, COS-5 (1):5)

- The teacher was very aware of all that was happening in the class. No need for any overt action to exert discipline (S01, COS-5 (2):5)

- The teacher uses his name several times – compliments him on his eagerness to volunteer and participate. Praises for correct answers. He smiles back at her several times. Eye contact (S02, COS-5 (1):5)

- Teacher has to discipline him once... does so in jokey manner (S02, COS-5 (5):5)

- Calm, quiet and firm discipline – mainly by expectation (S03, COS-5 (6):5)

- No disciplinary incidents, clear expectations. Children on task (S04, COS-5 (3):5)

- Occasional quiet reminder of rules. All well organised (S04, COS-5 (8):5)

- You can hear a pin drop in this class as children work (S07, COS-5 (7):5)

- The teacher has a "strong" presence and maintains a high profile throughout … Feeling of teacher and children jointly seeking progress. Control by expectation, involvement in learning. Teacher is firm and friendly (S01, Literacy IEO:3)

- Only one very minor disagreement by three boys, which they settled amicably (S03, Literacy IEO:3)

- The teacher established firm, friendly control and the children responded (S03, Numeracy IEO:4)

- The teacher maintains firm, friendly and supportive control (S04, Literacy IEO:3)

- Teacher experienced and in control. Talks at normal volume, children listen attentively. She allows lots of quiet on task discussion in pairs and with whole class – children were on task (S05, Numeracy IEO:3)

- High expectations, challenging work, appropriate and qualified praise – and no chance to slack (S07, Literacy IEO:3)

Although levels of indiscipline were also generally low in poor schools, children in these schools were more disruptive and teachers disciplined them more frequently. Children "shouting out" inappropriately was a distinctive feature of these classrooms. Discipline was often public and sometimes involved threats, personal attacks, shaming or belittling children. Levels of chaos and teacher over-control (rigid approaches designed to meet teacher's rather than children's needs) were significantly higher in poor schools.

The following observations were recorded:

- Teacher strives for control and to make himself heard. Shouts, lengthy lectures, public castigation. "I'm not interested! I'm not in the mood for you!" (S79, Numeracy IEO)

- Teachers response to a restless child: "Right, I'm getting sick of you. Really, really sick. You haven't stopped talking since you came in the class." Another child was sent out of the class for being restless (S82 Numeracy IEO.)

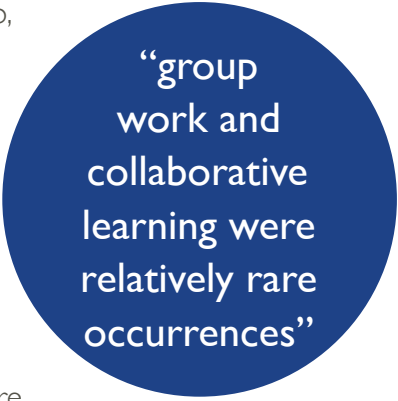**Year 5 teachers in excellent schools excel at:**

- Managing behaviour by setting high expectations and involving the children in their learning

- Handling discipline issues privately and sensitively

6. Collaborative learning

In all the schools, the amount of time spent on collaborative learning was low. Furthermore, while the children in excellent schools spent the most time overall in collaborative learning situations, the differences between the three groups were not significant.

Collaborative learning covered a range of pedagogical strategies including the use of group work for specific purposes such as differentiation and peer tutoring.

Of the three main types of setting seen in schools (individual, group, whole class), the impact that group work has on children's learning has been the focus of much discussion. Group work implies much more than sitting children near to each other and asking them to work together; real group work requires children to work collaboratively and this includes sharing roles, ideas and information. The classroom observation instruments provided information about how often children worked in groups but less detail about the specific purpose of the group work. Findings from the COS-5 showed that group work and collaborative learning were relatively rare occurrences.

"group work and collaborative learning were relatively rare occurrences"

Teachers in excellent schools engaged their pupils in collaborative group work a little more frequently than Year 5 teachers in schools with medium or low academic effectiveness and medium or poor quality pedagogy. Although the use of groups was inconsistent and relatively infrequent compared to whole-class and individual work, instances of some collaborative group work were found for many of these Year 5 classrooms. When children in excellent schools spent time working collaboratively, they were often asked to act as "sounding boards" for each other or to comment on each other's work. There were also times when they worked in groups in order to solve a problem. A good illustration of groups of children working collaboratively on a task came from S03 (Numeracy IEO). The children were given the hypothetical task of ordering desks for everyone at their school. The children had to work together in groups to share their understanding of measurement, develop their skill in measuring, agree a common understanding of "middle number" and plan their work. The lesson began with sharing the objectives of the task. This was followed by group work to solve the problem and concluded with the groups sharing their findings with the entire class. The result was a lesson filled with questioning and discussion amongst the children in each group. The IEO gave a sense of busy, communicative children working together to solve a complicated problem that required every child's effort and skill.

Teachers sometimes made use of differentiated groupings to provide further teaching or extra support for a particular group of pupils. In one classroom, the teacher had been explaining how to work out subtraction sums by partitioning to the whole class. Once the rest of the class began working on the differentiated worksheets she had provided, the teacher sat with the lowest ability group to provide extra teaching and support (S08, COS-5).

Children in highly effective schools were used to helping each other and they often had "response partners" with whom they worked regularly. For example, in one lesson, the teacher checked to make sure each child's response partner was there before setting them a task to do together: "You're going to work with response partners … Anyone have a problem because their response partner is not here?" The children were obviously used to working in this way because they set straight to work without any confusion or chaos about what they needed to do (S01, Literacy IEO).

Other incidents elicited these notes:

- Worked closely with peers, discussing work and approach to the problem (S01, COS-5 (1):4)

- Took a leading role when working with peers (S01, COS-5 (2):4)

- Children were working collaboratively. The classroom was a buzz of activity (S01, COS-5 (2):5)

- Collaborative work, children involved (S01, COS-5 (3):5)

- Talking, working with peers. At times … (the child) takes the lead in discussion (S01, COS-5 (4):4)

- Cooperates well in group reading – take turns in group, no arguments. Listens well to peers read (S02, COS-5 (8):4)

- Clear evidence of good positive relationship with peers with "response" partner and others on the table (S01, COS-5 (3):4)

- Children worked with response partners (S01, COS-5 (3):5)

- During the collaborative part, discusses well with partner (S05, COS-5:4)

- Children participate … read and discuss their work (S05, COS-5 (3):6)

- Children made excellent progress in using and applying their knowledge of place value in this whole-class activity. Good teaching – and opportunities to learn from contributions of others (S07, COS-5 (2):5)

- Children are encouraged to discuss with their partner during the mental introduction to the lesson to decide on the two-step process needed to multiply by 20 (S02, Numeracy IEO:3)

Year 5 teachers in excellent schools excel at:

- Providing some opportunities for collaborative work

- Encouraging children to work as "response partners" in peer tutoring situations

- Providing opportunities for group work that required true collaboration

- Using group work as a way of devoting more time to one particular group of children

7. Personalised teaching and learning

Personalised teaching and learning requires a teacher to adapt all aspects of his or her teaching to the needs of the specific individuals within a classroom group. In order to personalise the learning of the individuals within his or her class, a teacher must be sensitive to the individual needs of each of their pupils and be actively involved with their learning. Teachers need to recognise the individual needs of their pupils by having a good understanding of the individual children within a class, providing teaching and learning materials suitable for a range of children, scaffolding[5] and differentiating the work set and outcomes expected. This strategy captured teacher sensitivity/detachment, the variety and richness of their teaching resources, how they differentiated work and their use of scaffolding to aid learning.

Teachers in excellent and good schools were more likely to personalise their pupils' learning experiences. They did this by being sensitive to the individual needs of the children in their classes and by providing learning materials that were rich and varied. These teachers used friendly approaches, high expectations and appropriately challenging and differentiated tasks.

They were rated as very low in teacher detachment (e.g., distancing themselves from their pupils by staying and working at their desks, not offering feedback, not noticing children's behaviour or needs) and rated highly for providing social support for student learning in literacy. The following gives examples of good practices in this area:

- Children were involved in their learning and enjoying the experience. Indicating teacher sensitivity and understanding of children's needs (S01, COS-5 (3):5)

- Clearly knows children well. Gives sensitive support and realistic feedback as she moves round the room (S06, COS-5 (1):5)

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[5] "Scaffolding" as a pedagogy strategy - the teacher, through providing the support that is needed for the child to achieve a successful outcome (or understanding), firstly identifies (assess) what the child's current (unaided) capability/understanding is and then, in the process, and as a result of their provision of the appropriate support, ensures the child has a good grasp of what a successful outcome actually is (i.e., what it is that they will later be aiming to achieve on their own). The adult then gradually withdraws or reduces the support and allows the child to develop confidence in their independent performance. Scaffolding derives from Vygotsky's notion of the "zone of proximal development", a zone that includes everything that is achievable with assistance, that would otherwise lay beyond individual capability.

- Teacher is very aware of children's strengths and weaknesses and gives appropriate support and asks questions to suit those she chooses to answer, often naming them rather than choosing volunteers (S07, COS-5 (2):5)

- Knows children well. Directs some questions – and frames some for particular children (S07, COS-5 (7):5)

- Sure of her understanding of the children, their levels and needs. Also in her ability to extend appropriately (S01, Literacy IEO:3)

- Teacher encourages all to contribute ideas throughout. Children listen well to each other. Teacher uses children's names to get them to contribute (S02, Literacy IEO:3)

- Teacher says to all about boy at front "Very good boy spending his time reading whilst he's waiting." This is one of the very shy boys, less confident. She boosts his confidence here (S05, Literacy IEO)

Teachers in poor schools provided teaching and learning resources that were less varied, less engaging and less likely to be appropriately differentiated. The teachers themselves were less sensitive to their pupils' individual needs and more detached from their learning experiences.

Year 5 teachers in excellent schools excel at:

- Providing a good variety of high-quality teaching resources

- Understanding and responding sensitively to the needs of their pupils

8. Making links explicit

On the whole, there were few instances of teachers making extra and cross-curricular links explicit. Teachers in excellent schools were better able to and more consistent at making links with areas outside the specific lesson. In classrooms in excellent schools, teachers made cross-subject and extracurricular links explicit for their pupils. They specifically pointed out the links between what children were doing in a particular lesson and what they were learning in other subjects. They also helped their pupils to see the connections between what they learn in school and their lives and the world outside of school. Teachers in these schools made links between academic subjects, and between academic subjects and life outside the classroom, clear by pointing them out as part of their teaching (e.g., suggesting the children might enjoy rereading the stories they are writing now later on in their lives) or by using practical activities that linked a lesson objective to the outside world.

One lesson in particular, recorded using the IEO, exemplified a way of connecting a large number of subjects together (English, geography, science and personal/social/health education) and then connecting these subjects with the children's lives, both in and outside the school (all within an hour and a half). At the start of the lesson, the children were given two tasks: to write a poem using ideas from a previous geography lesson and to look at how people affect their environment. On a previous day in geography class, children had begun looking at the school environment and the area around it, even going up to the school roof to look at their city. To make the link between English and geography even stronger, the teacher asked the children to use their geography books to write their poems. The children began the lesson sitting in debating groups on the carpet brainstorming words for "environment". The teacher then wrote the keywords for the lesson up on the board and the children had a whole-class session discussing the previous work they had done on the topic. At the end of this session, the children moved into a lively class debate, full of questions and astute arguments. The researcher was very impressed with the quality of the debate and how well the children were able to follow the rules. From this activity, the children watched a short film and then moved back to their tables to begin writing their poems about the school environment and the effect people have on it.

The observations of this lesson gave a sense of children experiencing an enormous number of activities (especially given the short time), designed to demonstrate the links between the different subjects and the environment around their school. In pedagogical terms, it also illustrated how teachers need to consider and plan for (and be responsive to) the importance of pace and variety in learning and teaching episodes.

Another example in literacy (S01) offered an interesting adaptation of a teacher using children's prior knowledge not only to build and extend their understanding of one topic but also to link a second topic so understanding of that topic was strengthened as well. The teacher had been working on haiku poems with her mixed Year 5/6 class and she began the lesson by praising the children for their work on haikus the previous day. She then explained that she was going to set them a bigger challenge: not only did they have to write another haiku but they had to show a chronological change (e.g., growing up, months of the year). By the end of the lesson, the children had not only worked through the difficulties of incorporating sequential events into the restrictive format of the haiku but had also presented their work to the rest of the class. The researcher's notes indicated that the children were highly engaged throughout the lesson and that the teacher spent a great deal of time supporting individual children.

Sometimes, as above, the teacher used previous work the children had done as a relevant reminder to help them with a task that was the same or very similar. For example, in S02 (Literacy IEO, lesson plan) the teacher reminded the children of a character profile they had written about Dickens' Scrooge to help them write a character profile of J. R. R. Tolkien's "hobbits".

"the children moved into a lively class debate, full of questions and astute arguments"

Another example demonstrates clear links being made across domains of learning. In S05, the teacher linked both a numeracy lesson and a literacy lesson with some work the children were doing on an opera (*The Elixir of Love* or *L'elisir d'amore*). The maths lesson was especially interesting because, although it was linked to the opera (a work of fiction), it was also based on "real-life problems". The lesson began with the teacher questioning the children about why real-life problems are important and explaining the meaning of "cross-curricular". The children then had to come up with money problems for their classmates that were related to the opera they were studying. Children created problems about the price of "Elixir" and food, drinks and flowers for the wedding. The researcher commented that the children were engaged and very enthusiastic throughout the lesson (S05, Numeracy IEO).

> **Year 5 teachers in excellent schools excel at:**
>
> - Making links to areas outside the specific lesson more consistently
>
> - Being better able to make the connections for cross-disciplinary links as well for links to life beyond the classroom

Teachers in poor schools rarely connected their lessons and activities with other subjects or with areas outside the classroom or school.

9. Dialogic teaching and learning

Dialogic teaching and learning refers to teachers and their pupils participating in an interactive discourse about learning in order to extend pupil thinking and understanding. This is about much more than teachers imparting knowledge; it involves the dialogue and questioning in which both teachers and their pupils take part. Dialogic teaching often includes "higher order" thinking skills that challenge the learner. Compared to many of the other strategies, there were fewer examples of dialogical teaching in the classroom observations and, possibly because of this, there were few differences between the three groups. The exception was in numeracy, where teachers in excellent and good schools were rated significantly higher on dialogic teaching (Alexander, 2006) for their use of analysis in maths and in the depth of their pupils' knowledge and understanding. In literacy, they were rated higher on instructional conversations.

Two examples, taken from the field notes, show this in a real-life situation. In preparing her pupils to work on some money problems (real-life application of maths), the Year 5 teacher told the children not to worry about the answers. She explained she was more concerned with them being able to identify the operations and, by implication, the strategies required to solve the problems than calculating the correct answers. She asked the children to write down the operations required to solve a problem and told the children they were not allowed to write down the answer. Some found this hard and the teacher reassured one child by saying "You look quite hesitant. Don't worry about the answers; you are very good at maths. Write down the operations only."

This teacher offered the children in her class opportunities to focus on strategies rather than answers by insisting that they did not work out the answers. The children were encouraged to discuss their solutions with each other and to share their ideas and strategies with each other. (S05, Numeracy IEO).

The teacher in S08 also spent a great deal of time during both the maths and literacy IEO observations questioning children. In a data-handling lesson, she frequently asked the children to explain concepts (What is the mode? Explain what the data mean. How will we deal with all these data?) and then used their answers to further clarify their meaning (S08, Numeracy IEO). During the literacy lesson about a poem, she stopped often to question pupils about the inferences that could be drawn from the poem and whether or not they could justify their interpretation of one of the characters in the poem from what was actually written.

Children in poor schools spent less time learning and carrying out analysis. Their teachers were less likely to encourage discussion, analysis and depth of understanding of mathematical concepts, to share the responsibility for learning with the children or to support and promote discussion for deeper understanding in literacy.

Year 5 teachers in excellent schools excel at:

- Providing opportunities for children to learn and practise analysis

- Encouraging discussion, analysis and depth of understanding in maths

- Sharing the locus of maths authority with their pupils

- Supporting and promoting discussion for deeper understanding in literacy

Children in excellent classes spent significantly more time learning and performing analysis and using inference skills than children in good schools. Differences in communication were found between the three groups of Year 5 classrooms; in excellent classrooms, children were engaged in instructional conversations significantly more. In addition, in good and excellent classrooms, more time was spent on maths discourse and communication. Communication, concept development, problem solving and analysis are all important for dialogic teaching and learning, and link closely with our next section on assessment and feedback during lessons.

10. Assessment for Learning (AfL)

Assessment for Learning not only gives a child an indication of how well he or she is currently performing but also provides detailed guidance on how to improve. This can be done by the teacher providing feedback to the entire class (for example as part of the plenary), to groups of children or to individual children. This type of assessment can be delivered immediately by the teacher or the child's peers or later on as part of marking the child's work. It can be done during or after the activity. Teachers in excellent and good schools provided more evaluative feedback than those in poor schools and they provided more opportunities for the children in their classes to reflect on their learning. In addition, teachers in excellent schools provided greater opportunities for their pupils to reflect on their learning through review than teachers in both good and poor schools, who did not differ in this area.

The following comments were noted by the researchers:

- Feedback at the individual level and also at class level; there was depth

- The teacher was involved with children throughout – as a whole class or with groups or individuals. Responded accordingly . . . every indication of good quality feedback

- Uses children's writing to model and feedback. Uses children's paragraph structures as basis for work

- The teacher uses children's answers to model correct answers

- Gives individual feedback to most children as she moves round

- Children are encouraged to evaluate their own handwriting. The class teacher also gives feedback as she goes round the class discussing handwriting

> **Year 5 teachers in excellent schools excel at:**
>
> - Ensuring that Assessment for Learning was part of lessons
>
> - Providing sufficient opportunities for children to reflect on their learning

11. Plenary
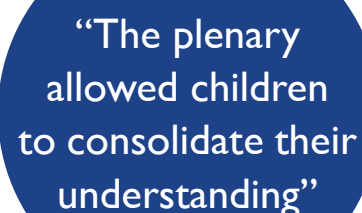
The plenary involves the teacher in gathering children together to review lessons and consolidate their learning, and it first became a common feature in primary classrooms with the introduction of the National Literacy Strategies (DfES, 2008). The plenary is an opportunity to explore how far the objectives of a lesson had been met and to identify the next stage of learning to be addressed. Although data on the use of plenaries had not been collected for all schools in the sample, teachers in excellent and good schools were found to have included plenaries in their lessons almost twice as often as those in poor schools.

In addition, those in excellent schools were more likely to use the plenary to provide opportunities for further discussion, to explore issues in more depth and to extend work and concepts covered in the lesson. This finding extends that reported by Sammons and colleagues (2007c), which revealed a statistically significant link between the use of the plenary and independent measures of observed quality based on both the COS-5 and IEO instruments.

For Year 5 classrooms in excellent schools, three quarters of the IEO lesson observations contained plenaries. The main uses of the plenary in these schools were to (i) informally assess children's understanding of basic concepts and skills, (ii) provide an opportunity for children to share their work and receive feedback and (iii) resolve issues arising from the lesson and provide a forum for collaborative problem solving.

In good schools, just over half of the lessons observed using the IEO included plenaries but many of these were rushed and the material was not covered in depth. Opportunities for sharing work and deepening understanding were rare. It is possible that the teachers included a plenary because they knew they should, but didn't leave enough time either to plan or deliver the plenary properly. Most plenaries were under five minutes long and the longest plenary (about 15 minutes) was really just a continuation of the main lesson with children solving slightly more difficult problems. In most classrooms, the teacher checked answers with the children or questioned the children about their work - but not in depth and not with the purpose of sharing strategies or providing an opportunity for higher order thinking or insightful questions.

There were many examples of a good plenary. In S31, a teacher carefully managed an excellent plenary session (about 10 minutes) with children working collaboratively to improve their work. The lesson was about poetry and the children were working on rhyme, alliteration and onomatopoeia. During the plenary, the teacher asked the whole class to write the chorus of a class poem together. The poem had to include alliteration and the children also had to find a way to include the sound of a lorry trundling along a road. By letting the children lead, and improve on each other's suggestions, the whole class contributed to the writing. The teacher then asked individual children to add in the verses they had written to create a whole-class poem. The session was so effective that the children were disappointed when the session ended for break time. The plenary allowed children to consolidate their understanding of poetry techniques, to work collaboratively by helping each other to improve and by contributing their own work and to extend their knowledge and skills.

"The plenary allowed children to consolidate their understanding"

The plenary was often used as a forum for children to share their work and this usually included some feedback from the teacher. In S02, for example, the teacher used a short (five minutes) plenary session to provide feedback to the whole class by asking three of the children to read out the character profiles of J. R. R. Tolkien's "hobbits" they had written.

She was able to offer a little feedback to the individual children about their work but, more importantly, she used the plenary to address some issues arising from the level of difficulty of the task. Many of the children were finding the task very hard and so the teacher was able to reassure the children, encourage them to keep trying and to offer specific suggestions about things they could try (e.g., using more semi-colons in their writing) (S02, Literacy IEO).

A similar technique was employed by the S04 teacher at the end of her literacy lesson. The children had written poems about their school environment and although most of the children would be sharing their work with the rest of the class the following day, the teacher was able to provide some immediate, general feedback by reading out some of the children's work at the end of the lesson (S04, Literacy IEO).

A particularly striking example of using the plenary as a forum for sharing work with the specific aim of providing constructive feedback came from S01, where children were working on writing haiku poems containing a chronological sequence. The teacher spent the final 10 minutes of the lesson asking children to read their haikus out to the class, and offered very specific suggestions for improvement. The quality of the feedback was different in this lesson because the focus was much more on finding ways to improve the work rather than just providing praise and encouragement. This gave all of the children in the class an opportunity to reflect critically on their own and each other's work and to consider what worked well and how the haikus could be improved. This teacher exemplifies how a classroom "community of learners" culture engages learning (S01, Literacy IEO).

The plenary session was also used for resolving issues arising from the lesson and providing a forum for collaborative problem solving. The S03 teacher asked children to sort out an imaginary desk order for their class (also cited as an example of collaborative learning). The children had to consider a number of factors - especially the dimensions of the desks. The children's measuring yielded a variety of results and the teacher used the plenary session to help resolve this difficulty by turning to a discussion on "averages" and "middle numbers". The children shared their results with each other and then discussed the various options for finding the most representative measurements (median, mode, mean). They were encouraged to "argue for their point of view." (S03, Numeracy IEO).

In Year 5 classrooms in poor schools, plenaries were recorded for only a quarter of lessons. When a plenary was used, it was generally short and the main purpose was often to check answers from work completed during the lesson. Opportunities for in-depth discussion, extension or reflection did not occur as part of the plenary session in these classrooms.

What differentiates excellent practice from good practice?

Year 5 teachers in excellent schools (defined as those that are academically effective with good quality pedagogy):

- Have excellent organisational skills. They share clear learning objectives with the children in their classes and ensure that all pupils understand these objectives and their associated concepts. Their resources are extremely well organised and fit for purpose and their classroom routines are well established, smooth and adhered to by all. Children in these classrooms know what they have to do, know what to do if they need help and have more responsibility for managing their time and resources.

- Establish a positive classroom climate. In these classrooms, relationships between children and between adults and children are characterised by a true sense of liking and mutual respect. These classrooms are often described as happy places with a "buzz" of productive learning activity. Children in these classrooms are less disruptive, behaviour management is handled sensitively and often through expectation, and teachers rarely have to discipline children. Teacher sensitivity is high and teacher detachment low.

- Personalise their teaching. These teachers are sensitive to the needs and interests of their pupils and provide a variety of resources to suit the different needs of the individual children in their classes. Learning objectives are communicated clearly and these teachers are more likely to make explicit links between learning and activities in the classroom, other subjects and the world outside the classroom. These teachers link their homework directly to what children are learning in their lessons and are more likely to take advantage of opportunities that arise during lessons to suggest learning activities that can take place out of class time.

- Use dialogic teaching and learning, especially for numeracy. Children in their classrooms are more likely to work collaboratively, to take part in instructional conversations in literacy, to have opportunities to receive evaluative feedback (from the teacher or from their peers) and they spend more time learning and performing analysis. In maths, these teachers outperformed others in their use of maths analysis, the depth of their pupils' knowledge and understanding, maths discourse and communication and their willingness to allow the children to also be the maths "authority" in the classroom. The dialogue in these classrooms was two-way; teachers were open to pupils' suggestions and corrections and used these in their teaching.

- Made more frequent and better use of the plenary. Not only were these teachers about twice as likely to use a plenary in their lessons, they used the plenary to allow further discussion, exploration and extension, to provide opportunities for useful feedback and to consolidate and deepen understanding.

It is highly likely that good organisational skills, a positive classroom climate, personalised and highly interactive approaches to teaching and learning, dialogic teaching and learning and the use of a plenary session are all interconnected. For example, dialogic teaching and learning would be impossible in settings with a negative classroom climate. Personalising children's learning requires good organisational skills and helps both to create a positive classroom climate and to encourage discussion.

4 Summary and Implications

Much has been written about pedagogy and effectiveness and messages (for both policy makers and practitioners) can be powerful when the two are studied together (Muijs & Reynolds 2011; Sylva et al., 2010; Ko & Sammons with Bakkum, 2013).

The EPPSEM research set out to explore the differences between poor, good and excellent teachers, with reference to child outcomes (attainment), our structured observations (Appendix 1) and Ofsted ratings. This was possible because of the unique opportunity to link qualitative information (observation notes/lesson plans) to the effectiveness ratings of schools.

EPPSEM attempted to provide:

- a description of the strategy and where supporting evidence was expected to be found in the data

- an explanation of the main differences and similarities across the three academic effectiveness and quality of pedagogy groups in primary schools

- an exploration of the themes arising from the analysis

- a series of excerpts from the field notes to illustrate good practice for user groups

- a summary of the key findings for policy makers and practitioners

- a list of pedagogical strategies that distinguish Year 5 classrooms in academically effective schools with excellent quality pedagogy and outcomes from the two other academic effectiveness and quality of pedagogy groups

Every study has limitations and no study is entirely conclusive. While EPPSEM refers to primary classrooms, the observations were made in Year 5 classrooms and therefore results may not always apply across all the primary age groups.

Given the focus on classroom strategies, and other school and pupil-level factors that are known to influence school effectiveness such as leadership, monitoring pupil progress, the extent of improvement since the previous Ofsted inspection, parental support, attendance and rates of exclusion were not included, although they are addressed elsewhere in the EPPE/EPPSE literature (Sammons et al., 2006; 2008a,b).

Also, although the large amounts of quantitative data available provided additional support for the frequency of use of pedagogical strategies, the main focus of the EPPSEM sub-study was on the qualitative descriptions the researchers included in their observations, specifically designed to support practitioners, practice and policy makers with illuminative evidence. Again, the quantitative data is reported elsewhere (Sammons et al., 2006; 2008b).

Finally, one other constraint of the EPPSEM approach was that the observations focused on the pedagogical strategies described and measured in the research instruments. This meant that there was sometimes less or more data to support or refute some of the strategies identified through the evidence-based literature search and professional focal discussions.

It is clear that further research would be helpful, especially if conducted in whole-school contexts where excellent, good and poor outcomes are known, so that comparisons can be made across ages and stages. However, what clearly emerges is a "bundle" of behaviours that, taken together, can make a difference to children's development and progress and therefore their later life chances. This is especially true for those children who come from disadvantaged backgrounds, where previous EPPSE research (Sylva et al., 2010) has shown that what happens at classroom level in pre-schools and schools makes a difference to outcomes. It could be argued that good leadership is essential. There is much for leaders of education to ponder from this research in enhancing their knowledge. In order to advance effective practice, they could take some of the key messages from this research and the international literature and apply them to their schools and situations.

The EPPSEM research is not alone in identifying pedagogical strategies requiring special attention; the international literature complements these. In terms of organisation, there is good literature on the productive use of instructional time (Evertson, 1995; Muijs & Reynolds, 2003; Alexander et al., 2006), which emphasises the importance of good organisational skills and the development of whole-school policies on maximising lesson times, whole-class interaction and time on tasks. Maximising learning time with consideration to pace, variety and resources has been well documented. Classroom routines, well-organised resources that are fit for purpose and higher levels of self-reliance and responsibility for pupils have all been shown to enhance learning experiences for children (Claxton & Carr, 2004; Gipps et al., 2000; Watson et al., 2007). Sharing objectives, and making the teacher's intentions clear to pupils in relation to the concepts and ideas presented in lessons, is vital (Borich 2000; Gipps et al., 2000).

Another aspect related to a positive classroom climate is relationships between children and between teachers and children. This was a major feature of excellent classroom teachers in an OECD review of 11 countries and the Hay McBer review (DfEE, 2000a) conducted for the UK's Department for Education. It is also a key feature of a number of rating scales that measure quality of pedagogy (Creemers & Reezigt, 1999; NICHD, 2001). Many socio-cultural researchers have emphasised the importance of creating "communities of learners" (Shulman, 2004). Research on climate also emphasises teacher sensitivity (Anderson et al., 2004) and good peer relations (Kutnick & Kington 2005). Effective discipline and sound behaviour management are also key to excellent practice (Rogers, 2007; Woodcock & Reupert, 2012) and the effective running of classroom practice to enhance learning. However, over-control is not effective.

Collaborative and group learning has been studied for some time, but collaboration requires purpose and good content. Small-group work has been related to higher achievement (Veenam et al., 2005) but it has to be carefully managed. Effective teachers often allow children to work in groups to think through their ideas and to present and make explicit their thinking. This includes to each other and peer tutoring (Whitebread et al., 2007). They assign roles within group work and see interaction as an integral part of learning (Gipps et al., 2000; Fosnot, 1996; Barron, 2003; Tolmie et al., 2010).

Personalising and differentiating learning is equally important for groups and individuals. Classrooms with considered, purposeful differentiation ensure that learning can be scaffolded (Rojas-Drummond & Mercer, 2003) and has the variety and richness required to retain children's interests and the right level of challenge. This requires teachers to have prior knowledge of their children's learning levels, to plan for the next steps in learning and to make links explicit within and across concepts (Bruner, 2006). This supports the case for shifting towards a more integrated approach to the curriculum (such as topic work) rather than a purely subject-specific approach (West & Muijs, 2009).

Although direct teaching has an important place in the classroom, other strategies can promote better provocations to children's thinking and these often depend on the quality of the interaction between the teacher and the learner. Referred to as dialogic teaching and learning (Wells, 1999), it is a key feature of effective classrooms and is characterised by the use of open-ended questions to develop deeper level learning. It has been seen to be important in the early years, where sustained, shared thinking has been found in effective practice (Siraj-Blatchford, 2002), and for older children (Muijs & Reynolds, 2011). These approaches encourage more analytical thought as children reflect, explain and argue through their thinking and learning and problem solving, it also enhances children's meta-cognitive skills (De Jager et al., 2005). This requires good content knowledge, instructional conversations (Andrews, 2011) and the willingness by teachers to share the locus of control and authority (Alexander, 2006).

In the last decade, Assessment for Learning has achieved great popularity (Black et al., 2003). It has an emphasis on feedback strategies that are formative and strong on delving into children's understandings and extending their learning (Black & Wiliam, 1998; Arter & Stiggins, 2005). Evaluative feedback of this kind, examples of which are given in this report, helps children to reflect on their learning through reviewing their work (Rittle-Johnson, 2006). It offers encouragement and promotes effort, especially when coupled with suggestions and strategies to assist the learner to move forward in their learning (Dweck, 2000).

The research on homework is mixed in the findings. However, there is a great deal of evidence that suggests that if homework is meaningful (Trautwein, 2007), flexible to what arises in lessons (Cooper, 2006) and extends and deepens understanding of concepts and links with children's learning experiences, it will enhance learning (Durden, 2008).

All of the above could be researched further but this report testifies that a great deal is already known about what promotes good outcomes for children. The challenge is to put this knowledge into practice and embed it in policies and classrooms. The report has identified a number of strategies which, if given a higher profile in initial teacher training and the continuous professional development of teachers, would improve practice and therefore provide better educational experiences that enhance children's learning and improve academic and social-behavioural outcomes. These findings are of particular relevance to policy makers at both national and local level who have responsibility for investing in, and designing programmes for, the development of educational leaders and teachers. Good programmes that genuinely improve practice and pedagogy ultimately increase children's life chances. As Michael Fullan (1991:17) stated:

Educational change depends on what teachers do and think. It's as simple and complex as that.

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Appendices

Appendix 1: Classroom observation instruments

Classroom Observation System for Fifth Grade (COS-5) (Pianta)

This instrument is divided into two main parts: The Frequency of Behaviour Coding System, and the Measures of Quality Coding System.

The Frequency of Behaviour Coding System

The Frequency of Behaviour Coding System is used in the first of the two 10-minute observation segments. This part includes the coding of child and teacher behaviours across a range of classroom and curriculum settings. For the duration of this part of the observation, a target child (TC) is observed and recorded during a sequence of 10 60-second intervals (30 seconds observing, 30 seconds recording) during which focus is placed on capturing information in five general areas of the target child's classroom behaviour and experience.

The categories are:

Child level setting - The classroom setting in which the target child is working:

1. Whole class
2. Large group >6
3. Small group - 6 or fewer
4. Individual

Content of target child's activity - The nature of the activity in which the target child is engaged including:

1. Subject areas (e.g., literacy, numeracy)
2. Sub categories within a sub area (e.g., word-level and comprehension in literacy)
3. Part of literacy and numeracy hour as described by the NLS or NNS (specifically adapted for use in the UK)
4. Non-curricular activities such as enrichment and free time

Teacher behaviour - Interaction with the target child:

1. Attending to target child (directly)
2. Teaching basic skills
3. Teaching analysis
4. Managerial instructions
5. Monitoring and checking work
6. Displaying positive or negative effect and discipline

Child academic behaviour:

Type of behaviour

1. Learning/performing basic skills
2. Learning/performing analysis
3. Collaborative work
4. Requesting attention/help/information
5. Volunteers

Degree of involvement

1. Engaged
2. Highly engaged
3. Unproductive
4. Off-task or alternative academic behaviour

Child social behaviour - Social interactions with peers and adults in the classroom:

1. Positive/neutral engagement with peers
2. Negative/aggressive engagement with peers
3. Positive affect towards teacher
4. Negative affect towards teacher
5. General disruptive behaviour

The Measures of Quality Coding System

This part of the observation instrument is dedicated to 10 minutes continuous observation of behaviours and characteristics of the target child and the teacher in the classroom at a more global level. This section contains two broad categories: Child Codes and Classroom Codes. Under these main headings there are a number of sub-headings or constructs (behaviours, characteristics) that must be rated.

Child codes

1. Positive affect
2. Self-reliance
3. Sociable/cooperative with peers
4. Attention
5. Disruptive
6. Activity level
7. Child-teacher relationship

Classroom codes

1. Richness of instructional methods
2. Over-control
3. Chaos
4. Teacher detachment
5. Positive classroom climate
6. Negative classroom climate
7. Productive use of instructional time
8. Evaluative feedback
9. Teacher sensitivity (Main teacher only)

Items are rated on a seven-point scale (1 very uncharacteristic to 7 very characteristic).

The IEO (Stipek)

Instructional Environment Observations Scale (IEO) (Stipek)

Researchers using the IEO observed one complete literacy and numeracy lesson. There are four main areas of this instrument: General Classroom Management and Climate Scales for both subjects, General Instruction Scales for both subjects and Mathematical Instruction Scales for Numeracy, and Reading / Writing Instruction Scales for Literacy.

Literacy

1. Classroom climate
2. Classroom routines
3. Cross-disciplinary connections
4. Linkage to life beyond the classroom
5. Social support for student learning
6. Student engagement
7. Reading as meaning making
8. Basic skills development in the context of reading
9. Higher order thinking in writing

10. Purposeful development of writing skills
11. Instructional conversations

Numeracy

1. Classroom climate
2. Classroom routines
3. Cross-disciplinary connections
4. Linkage to life beyond the classroom
5. Social support for student learning
6. Student engagement
7. Use of maths analysis
8. Depth of knowledge and student understanding
9. Basic skill development in the context of problem solving
10. Maths discourse and communication
11. Locus of maths authority

Appendix 2: Complete List of Schools

School	IEO	COS-5	Maths Residual Score	English Residual Score	% Pupils Eligible for FSM
High Academic Effectiveness, Good Quality Pedagogy					
S01	3	5	3	4	0.00
S02	3	3	5	4	21.62
S03	2	5	4	4	31.51
S04	3	4	3	4	30.80
S05	3	4	3	5	15.94
S06	3	3	5	3	2.94
S07	3	4	3	4	18.30
S08	3	4	4	4	11.84
S12	3	3	3	4	30.66
S13	3	4	4	3	49.13
Medium Academic Effectiveness, Medium Quality Pedagogy					
S25	2	3	3	3	7.19
S26	2	3	3	3	11.41
S27	2	3	3	3	5.19
S28	2	3	3	3	2.53
S29	2	3	3	3	18.50
S30	2	3	3	3	35.19
S31	2	3	3	3	15.00
S32	2	3	3	3	9.01
S36	2	3	3	3	13.74
Low Academic Effectiveness, Poor Quality Pedagogy					
S73	1	3	2	3	7.63
S74	2	3	2	2	10.39
S75	2	3	2	2	39.13
S76	1	1	1	2	53.11
S77	2	1	2	2	12.31
S78	2	1	3	2	12.63
S79	2	3	2	2	59.61
S80	1	2	2	1	40.38
S81	1	1	2	3	15.04
S82	1	1	3	2	15.68

Continued on next page

School	IEO	COS-5	Maths Residual Score	English Residual Score	% Pupils Eligible for FSM
High/Medium Academic Effectiveness, Good/Medium Quality Pedagogy					
S09	2	4	4	3	21.13
S10	2	4	4	3	7.01
S11	2	3	3	4	41.52
S14	3	4	3	3	11.04
S15	3	4	3	3	9.01
S16	3	4	3	3	4.15
S17	3	4	3	3	9.83
S18	2	5	3	3	39.46
S19	3	4	3	3	10.63
S20	2	5	3	3	50.48
S21	2	5	3	3	46.23
S22	3	5	3	3	8.19
S23	3	5	3	3	8.80
S24	3	4	3	3	35.31
Low/Medium Academic Effectiveness, Poor/Medium Quality Pedagogy					
S38	2	4	2	1	6.93
S39	1	2	4	3	63.38
S40	2	1	3	3	9.53
S41	1	2	3	3	55.05
S42	1	4	2	2	29.61
S43	1	2	3	3	4.16
S44	1	3	3	3	4.80
S45	2	1	3	3	43.05
S46	1	2	3	3	42.57
S47	2	1	3	3	5.97
S48	1	2	3	3	30.70
S49	2	4	1	2	9.20

School	IEO	COS-5	Maths Residual Score	English Residual Score	% Pupils Eligible for FSM
Around Medium Academic Effectiveness, Medium Quality Pedagogy					
S34	2	2	3	3	7.07
S35	2	2	3	3	41.87
S33	2	4	3	3	35.44
S37	2	4	3	3	8.41
S50	3	2	3	3	25.08
S51	2	2	3	5	29.74
S52	1	4	3	3	17.53
S53	1	4	2	3	10.19
S54	2	4	2	3	17.74
S55	3	3	3	3	36.31
S56	3	2	2	3	3.33
S57	3	2	4	3	35.45
S58	3	3	3	3	25.55
S59	1	4	3	3	7.89
S60	3	3	3	3	14.86
S61	1	4	3	3	12.35
S62	2	2	4	4	29.41
S63	2	4	2	3	11.14
S64	1	4	4	3	43.05
No Category					
S65	1	3	4	4	52.82
S66	1	5	3	2	11.19
S67	1	5	3	3	48.37
S68	1	3	5	3	15.27
S69	3	4	2	2	1.34
S70	1	5	2	4	27.61
S71	3	4	1	2	59.55
S72	1	5	3	3	23.01

What clearly emerges is a "bundle" of behaviours that, taken together, can make a difference to children's development and progress and therefore their later life chances. This is especially true for those children who come from disadvantaged backgrounds.