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Accounting, Information and the Development of Evidence-Based Resourcing Strategies in Education

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ACCOUNTING, INFORMATION AND THE DEVELOPMENT OF EVIDENCE-BASED RESOURCING STRATEGIES IN EDUCATION*

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ABSTRACT

In this paper we will argue that there has developed a significant gap between the high policy priority given to improving educational performance in the UK and the attention that has effectively been given to generating the information base upon which more effective educational resourcing strategies might be developed. This is despite the fact that ***evidence-based*** policies are intended to be at the heart of the current ***Modernising Government*** initiative.

The high priority given to education by the incoming new Labour Government and by the Prime Minister in 1997 has since been accompanied by substantial ***additional resources*** under the Comprehensive Spending Reviews of 1998 and 2000. The principle of devolving educational budgets and resource management decisions down to individual schools through formula funding, that was at the centre of the previous government's Local Management of School initiative, has also been reinforced. However, there remain important questions of the nature of the links which exist between school resourcing, characteristics of the pupil, and the educational achievements which can be expected from these different pupil and resource inputs. These questions are important for both the design of improved resource allocation formulae to allocate educational resources to individual schools and for resource management decisions within schools, as well as for target setting and performance monitoring. Answering these questions requires the development of a comprehensive national comparative school database, of which improvements in financial reporting would form a key component.

Key words: educational resourcing, educational performance, resource management.

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1. Introduction

The education system is viewed as a primary vehicle for achieving social change and economic growth. As a prime form of investment in ***human capital***, education is central to the achievement of the 'social investment state' desired by writers such as Anthony Giddens (1998),who argues that "investment in education is an imperative of government today, a key basis of the 'redistribution of possibilities'". The high priority which has been given to education, and to the improvement of educational performance, by the incoming new Labour Government and by the Prime Minister in 1997 has since been accompanied by a claimed £19 billion of ***additional resources*** for the education sector over several years from the Government's first Comprehensive Spending Review in 1998 (HM Treasury, 1998a). The most recent Comprehensive Spending Review in July 2000 claims to add over £10 billion to spending on education and training in England by 2003-04 (HM Treasury, 2000a). Accompanying these increases in educational resourcing are Public Service Agreements (HM Treasury, 1998b, 2000b) which specify the target improvements in educational performance indicators which the educational system is expected to achieve in return for such increased funding.

At the same time, the new ***Fair Funding*** regime (DfEE, 1998) has placed renewed emphasis on the delegation of education budgets to individual schools through formula funding, building upon the earlier Local Management of Schools initiative (LMS Initiative, 1990) of the previous Conservative government. Increased ***devolution*** of education budgets and resource management decisions to individual schools has been be combined with an increased emphasis on performance ***target-setting*** for individual schools, on the use of ***specific grants*** rather than general block grants, and on the greater ***monitoring*** of school performance through OFSTED inspections and published school performance tables.

Central to the success of many of these initiatives is an identification of the nature of ***optimal resourcing strategies*** and ***best practice*** in the deployment resources in the education sector towards improved educational outcomes. However, many questions remain as to the role of resources in influencing educational performance, and how one can improve educational resource management and resource allocation to improve educational outcomes. As well of being of central importance to many resource decisions in primary and secondary education, these questions are

also very relevant to the ***monitoring*** of how far individual schools, and the educational system as a whole, are capable of improved performance within existing resources, and what additional levels of performance are feasible with additional resources.

We will argue in this paper that the development of a strong research base to enable these questions to fully answered has been hindered by weaknesses in the ***accounting*** and ***information*** frameworks for primary and secondary education. Improvements in these frameworks are required in order to facilitate the development of adequate ***evidence-based*** policies and resourcing strategies in education. Without such improvements, the objectives of the ***Modernising Government*** initiative in central government (Cabinet Office, 1999; Strategic Policy Making Team,1999) for more effective policy making and improved public services will be made more difficult to achieve in the key education sector.

2. Educational Performance and Resource Management

It can be argued that issues of resourcing underlie many of the initial pressures for public sector reform in education and elsewhere. Education shares with several other parts of the public sector, such as health care and policing, the key characteristic of being traditionally ***labour intensive*** in nature. The annual pay-bill for teachers, totalling over £12 billion in England in 1999-2000 (STRB, 1999), is by far the largest item of annual expenditure for primary and secondary education. This in turn exposes education, and other labour intensive public services, to the systematic long-term financial pressure of the ***relative price effect*** (Baumol, 1967; Mayston, 1990). As real incomes and wages increase over time with general economic growth, so too does the real cost of the primary input into education, that of teachers' time, relative to the cost of other less labour intensive commodities. The other side of the coin of real income increases, through money wages rising faster than the general price level with economic growth, is a higher relative price of labour intensive public services compared to commodities in general. Governments then find themselves having to run faster to stand still, with labour intensive public services demanding an ever increasing proportion of GDP to pay the increased real wages which public services must pay to compete in the labour market with other parts of the economy in order

simply to maintain the size of the existing public service labour force and level of the public service. Under political reluctance to raise taxes, public sector reform, in search of productivity and efficiency gains in public services, becomes the most attractive escape route for politicians attempting to square the circle of competing demands for maintaining or improving the quality of public services within budgetary constraints on total public expenditure.

If we examine the basis for the relative price effect, one of its prime causes is that of limited ***substitutability*** between labour and capital inputs in public services. In manufacturing industries, increased real wages in the economy at large would stimulate the greater substitution of capital equipment for labour in the production process. Such substitution would also tend to bring with it greater scope for ***embodied technological progress***, through greater investment in capital equipment that embodies the most recent technology that is efficient for the process involved. Such investment also tends to raise the labour productivity of the workers that remain, enabling higher wages to be justified for such remaining workers. In education, capital equipment traditionally appears less easy to substitute for labour than in manufacturing industries. However, a number of considerations arise here which are of some considerable importance in the context of public sector management.

The first is that, despite the national introduction of devolved budgeting in education at the start of the 1990s through the Local Management of Schools initiative (LMS Initiative, 1990), there has been a lack of clear research evidence available to local decision makers on the effectiveness of different resource management policies. Devolved budgeting has given individual school management teams, of the head-teacher and school governors, greater freedom in how to allocate their total allocated budget across different expenditure items. However, for reasons we will discuss in more detail below, a clear body of evidence has not yet been developed on which resourcing strategies are the most educationally effective. As Dennison (1990, p. 58) has confirmed, “recent research activity on resource management in education has been much less than the topic’s importance demands. In particular it has left institutions badly placed to cope with growing requirements upon them resulting from increased financial autonomy”.

The second is a general ***under-capitalisation*** of education, in common with several other public

services. With pressures from the relative price effect on school budgets, the tendency has been to seek to maintain staffing numbers and thereby avoid additional expenditures which put further pressures on these budgets in the short run. Yet, in many parts of the public sector, capital equipment can prove to be very productive in performing many routine tasks which labour resources alone cannot easily accomplish, particularly once the availability of such labour is reduced as its price rises within financially constrained budgets. Keeping track of pupils' attendance, time-tabling and performance records through computer information systems becomes increasingly cost-effective as a means of relieving time pressures on teaching staff. Computerised databases and roadside speed cameras can similarly facilitate many systematic tasks for the police service which otherwise demand levels of labour input which are no longer feasible within existing budgets and wage rates. However, they require a significant initial input of capital. Many existing schools in the UK lack the capital facilities of television-monitor equipped classrooms to discover for themselves whether pupils would learn more from a well-prepared video production that is reproduced in scale at low unit cost for a topic within the standardised ***National Curriculum*** than from a standard labour intensive lesson. Nevertheless, the new ***National Grid for Learning*** in the UK, together with increased levels of computer investment in schools, seeks to introduce into schools greater access to internet-based learning packages, including those that are pupil-interactive.

A third reason for the relatively slow introduction of greater capital into education has been that greater capital investment often does not act as a simple substitute for labour. Instead, if it is to be effectively deployed, capital equipment sets up demands for new labour skills that may be difficult to provide within constrained resources. The greater computer literacy that is required of teachers if they are to make the greatest educational use of the new technology takes time to develop, and may lag behind the computer literacy of some pupils. However, in many instances non-teaching staff, such as classroom assistants or administrative and secretarial staff, can operate relevant capital equipment to relieve more expensive teachers' time. The need to explore optimal ***skill-mix*** combinations has already been recognised in other parts of the public sector, such as health care (Bagust et al, 1992; Carr-Hill et al, 1992; Gibbs et al, 1991; Richardson and Maynard, 1995). The need becomes even greater in the education sector when seen against the background of long-term demographic and labour market trends. Some 40 per cent of the teaching force in

the UK is expected to retire in the next 15 years (Baty, 2000). In addition, there are continuing major difficulties in the recruitment of new entrants into the teaching profession in several key specialisms, such as mathematics and foreign languages (STRB, 1999).

At the same time, the spread of new technology into service industries, such as banking and insurance, as well as manufacturing, and the 'delayering' of many managerial jobs in the private sector is likely to mean a continuing substantial pool of experienced and semi-skilled workers facing redundancy or enforced early retirement. If the public sector can tap into such a labour force as administrative or classroom assistants or similar ancillary staff, it may both succeed in providing a cost-effective re-balancing in the skill mix that relieves current pressures on teaching staff in many tasks that are not the most suitable for their skills, and provide beneficial employment for those seeking additional part-time or full time work who might otherwise become unemployed.

In the above context, it is notable that the main focus of ***performance measurement*** techniques, such as Data Envelopment Analysis (DEA) (Mayston and Jesson, 1998; Charnes *et al*, 1994), has been on measuring ***technical efficiency***. This involves assessing the extent to which cost reductions (or conversely output increases) can be obtained whilst holding constant the ***input mix***, i.e. the relative proportions in which inputs are used in the production process. Whether or not the skill and input mix can be cost-effectively changed involves in contrast issues of ***price* or *allocative efficiency*** (Farrell, 1957), related to whether the input mix is the most cost-effective one, given the market prices of the different inputs. Allocative efficiency may be at least as important in securing overall increases in efficiency as increases in technical efficiency. If performance measurement in the public sector is to support improved resource management, it is important that it does take on board issues of the extent to which the input mix, and associated allocative efficiency, can be beneficially improved.

A further important lesson for public sector management, which the labour intensive nature of education underlines, is the importance of paying adequate attention to the impact on the ***labour market*** of its performance management policies. If these policies result in increased stress and lower job satisfaction for teachers, adverse long-term consequences for teacher recruitment and

retention may follow. These may in turn reduce or undermine the net benefit from the improvements in performance that the policies are intended to achieve. Countering such adverse consequences for teacher recruitment and retention through general wage increases for teachers will itself prove to be an expense task, given the large size of the total teaching force. Offering more selective inducements, such as to new student teachers, may be less expensive. However, it may fail in its long term objective if it does not adequately compensate teachers for the loss in ***non-pecuniary benefits*** from increased stress and lower job satisfaction. Performance-related pay increases may succeed in rewarding and retaining more able teachers, but can de-motivate other teachers if the performance related pay system is not well-designed (Mayston, 1992a).

3. Funding and Value for Money in Education

In addition to issues of resource management within schools, the public sector management reforms which have taken place in the education sector raise several other important questions.

a. The first is how the details of the ***funding formulae*** for the allocation of resources from central government down to individual schools should be determined under the current devolved budgetary regime. In the UK, these funding formulae include firstly the formula-driven Standard Spending Assessments (SSAs) for primary and secondary education, by which ***block grants*** are allocated from central government to local authorities. The parameters which are presently taken into account by the SSA formulae include not only pupil numbers for primary and secondary education, and measures of local population sparsity. They also include the socio-economic parameters of the percentages of pupils who are children of lone parents, of Income Support claimants, or of non-UK origin, or who are eligible for free school meals. The formula that each Local Education Authority (LEA) uses to allocate funds to individual schools under the current Fair Funding regime is constrained by central government to be based upon ***age-weighted pupil numbers*** for 80 per cent of the allocation to individual schools. However, each LEA must still decide the relative weights which are to be applied to pupils of different ages, and how socio-economic parameters and other factors are to influence the remaining 20 per cent of the allocation to individual schools. In addition, each LEA must decide how it is to deploy the resources which

it retains for its own functions, such as Strategic Management, and which it does not devolve to its individual schools.

b. In addition to block grants allocated through the above funding formulae, schools in the UK have increasingly received ***specific grants*** from central government, via their LEAs. These specific grants are allocated by central government from specific central funds, such as the Standards Fund, and are for more closely defined purposes than block grants. They have grown in recent years to form a substantial part of total school funding, and are seen by central government as a more targeted way of achieving desired policy outcomes. However, they also raise detailed issues of how much should be allocated to each specific grant and how this total should be allocated between individual schools and LEAs. The information which should be available and used for these funding decisions is again of central importance for the efficacy of the overall system.

c. Important questions are also raised as to the extent of the ***value for money*** which individual schools and LEAs achieve in their use of resources under these various devolved budgetary arrangements. Assessing and promoting such value for money forms part of the remit of the monitoring bodies of OFSTED and the Audit Commission in England and Wales. It forms an important part of the processes of ***performance measurement*** and ***performance audit***, with which these bodies are concerned. Yet their ability to carry out this remit depends again on both the availability of all relevant information, and on its effective use. Earlier comparative studies by the Audit Commission (1993 - 1996) in this area were based upon small samples of LEAs, and did not systematically adjust for the different circumstances which different schools and LEAs face in their local educational environment.

d. Such considerations have also limited the ability of the Audit Commission and OFSTED to clearly identify ***best practice*** in the use of resources within the educational system. This in turn has limited their ability to promote best practice, and to offer well-informed advice on how the management of the large sums of public money which are allocated to individual schools and LEAs may be deployed to the greatest educational effect. This is despite the fact that here is now an obligation on local authorities in England and Wales to promote ***best value*** (DETR, 1998) in

the provision of their services, including education. Measuring the extent to which best practice and best value are being attained is also a central part of performance measurement and performance auditing.

e. As well as micro-level decisions on the management and allocation of school and LEA resources, ***macro-level*** decisions must also be made on the total sums of public expenditure that must be allocated to education. Issues of how effective additional resourcing can be in boosting educational attainment are central to the rational carrying out of the Comprehensive Spending Review process. Information is again of prime importance in this process. Recent attempts to make central government policy-making more ***evidence-based*** (Strategic Policy Making Team, 1999) similarly depend crucially upon the ready availability of relevant information, and upon its appropriate analysis.

f. The appropriate ***analysis*** of relevant information, and supporting empirical and theoretical ***research*** to underpin this analysis, is of central importance to investigating the role of resources in education. One analytical concept that merits further investigation in this context is that of an ***'educational production function'***. This maps out the different educational outputs that an efficient school could achieve from a given input of resources and from a given set of characteristics of its pupil intake. Knowledge of the precise nature of such a relationship would be of prime usefulness to the education performance auditing process in seeking to compare the performance of each individual school against a benchmark of best practice. It would also be directly relevant to many of the decisions which need to be made in the above areas. However, many earlier empirical studies claim to find no significant link between educational resources and the educational outcomes achieved from them (Hanushek, 1986). Based upon the apparent absence of this link, Hanushek (1995) has argued that "the research of the past quarter century into educational input-output relationships has indicated clearly that schools around the world pursue very inefficient policies".

Whether or not this conclusion is really valid matters both for the educational performance auditing process and for the overall management of the educational system. The main technique of analysis on which Hanushek and earlier empirical studies rely in attempting to identify the

underlying educational production function is that of ***multivariate regression analysis***. However, other techniques of analysis, such as Data Envelopment Analysis (DEA) (Mayston and Jesson, 1998; Charnes *et al*, 1994) and stochastic frontier analysis (Aigner et al, 1977), would make a distinction between the performance of efficient schools on the educational efficiency frontier, as represented by the underlying educational production function, and those inside the efficiency frontier. The existence of some schools inside the efficiency frontier is consistent with there being a positive relationship along the efficiency frontier between resources and educational outcomes for a given pupil intake. Such frontier techniques of analysis can be used as part of a performance audit to help to identify those schools which appear to be less than fully efficient, and to be capable of achieving more from their given pupil intake and resource intake. At the same time, recognition needs to be given in the educational policy, resource allocation and public expenditure processes to the additional resources which are required by efficient schools to achieve enhanced educational outcomes for different characteristics of the pupil intake.

A further weakness of reliance upon multivariate regression analysis to identify the underlying educational production function is that it ignores the likely existence between important interactions between the ***supply-side*** concept of the educational production function, and ***demand-side*** considerations (Mayston, 1996). These demand-side considerations may arise because middle-class parents seek out schools with strong examination results and with favourable resourcing, and have a stronger economic ability to buy houses in the catchment areas of such schools, in contrast to parents in less favourable socio-economic circumstances. In addition, the demand-side relationships may arise because schools, LEAs and central government specific grants have a concern for greater equality of outcomes that means that greater resources per pupil are allocated to those pupils who are relatively under-performing compared to their expectation. These existence of these demand relationships can bias downwards the estimated coefficient between resources and educational outcomes, for a given pupil intake, in the above multivariate regression studies away from its true underlying value (Mayston, 2000). Correctly identifying the true underlying educational production function requires instead adequate recognition of the ***simultaneous-equations*** nature of the inter-relationships between the different variables (Mayston and Jesson, 1999).

If all of these different demand and supply relationships are to be correctly identified, adequate micro-economic ***modelling*** of their interactions is required. Such modelling represents a further step along the path of developing greater sophistication into the process of performance measurement and auditing than that involved in the simpler techniques of performance league tables and ratio analysis (Mayston and Jesson, 1990). Given the dependency of educational outcomes on the characteristics of the pupil intake, and the additional demand inter-relationships involved, such the use of such overly-simple techniques in performance measurement may well fail to do justice to the schools involved. The need for adequate modelling in the education sector reflects a wider need for adequate micro-economic modelling in other parts of government and the public sector (PIU, 2000) to support policy and resourcing decisions. The labour intensive nature of education makes the adequate modelling of the supply and demand for teachers particularly important in the education sector. The UK Department for Education and Employment (DfEE, 1998a) has taken some initial steps in this direction. However, it is notable that in the DfEE's own model neither the supply of, nor the demand for teachers, is assumed to depend upon teachers' salaries, or upon other factors, such as house prices, which might be expected to have an influence on teacher retention and recruitment. This is also despite the importance of teachers' salaries for the finances of schools, LEAs and central government. Further research work to improve the ***micro-economic modelling*** of the teacher labour market is clearly desirable.

4. Accounting, Information and User Need in Education

The resource management issues discussed in Section 2 above, together with the areas **a. - f.** in Section 3 above, each represent an important area of ***user need*** for relevant information. That meeting user need should be the primary goal of financial reporting is one of the main tenets of the Statement of Principles of the UK's Accounting Standards Board (ASB,1999) and of the conceptual frameworks developed by the US Financial Accounting Standards Board and other authorities (Mayston, 1992b). Questions then arise as to how far currently available financial accounting information does meet these user needs in the education sector, and how far there is scope for progress in ensuring that financial accounting information plays a more positive role in

meeting user need. Ensuring that there are strong links between user need and the accounting information that is required to be reported each year, can, moreover, help to overcome the tendency, which some have observed (Jones, 1992; Rutherford, 1992), for accounting information in the public sector to be put to little use. This is despite the fact well-designed accounting information in the public sector might be potentially very relevant to many user needs. This is particularly the case if it is properly processed and appraised by ***information intermediaries***, such as the Audit Commission, who can adequately interpret it in comparison with other relevant data (Mayston, 1992c).

When we examine each of the areas of user need highlighted above, we can first note that there is a ***substantial overlap*** in the information required by each different area. Improving resource management within schools requires information on the extent of the current shortfall in the educational performance of each school, given its total budget and pupil intake, compared to best practice, and the ways in which this shortfall can be reduced. A performance audit on the extent of the value for money achieved by each individual school, and how this might be improved, requires very similar information. The evaluation of the effectiveness of different specific grants requires information on the extent of the difference these grants make to the performance of different schools, both efficient and less than fully efficient schools, given their existing budgets and pupil intakes. Similar information is required for the evaluation of the educational effectiveness of increases in block grant funding. This information could in turn form the basis for an ***evidence-based*** determination of the details of funding formulae, and specific grant awards process, aimed at directing the total available resources to where there are likely to have maximum educational effectiveness.

A second main feature of these areas of user need is that accounting information needs to be considered ***alongside*** other information, such as information on the characteristics of the pupil intake. The educational performance that can be expected for a given input of resources into a school depends critically upon the characteristics of its pupil intake. These characteristics therefore need to be adequately taken into account in value for money performance audits and in performance target-setting for schools or in formulating benchmarks for performance measurement. Moreover, assessing what the precise relationship is between the maximum

educational performance that can be expected from a school and its input of resources and pupil intake requires more sophisticated ***modelling*** and research than conventional forms of accounting ratio analysis.

A third main feature of user need aimed at improving the performance of schools is the need for ***dis-aggregated*** income and expenditure data. The income data for each school should include income from different main sources, including different forms of specific grants. Assessing the effectiveness of different patterns of resource management within schools requires accounting information on how different schools spend their available budgets across different expenditure categories. These expenditure categories should include expenditure on teaching staff, administrative staff, supply teachers, classroom assistants, and other education support staff, as well as expenditure on premises, catering, cleaning, and other facilities. Given that the total income and expenditure of some secondary schools can exceed £4 million a year and that large sums of public money are at stake across the education system as a whole, an accounting requirement that there be annual financial reporting of the total amount spent in these main categories is arguably a reasonable requirement, particularly as the head-teachers and governors of individual schools should themselves be in possession of this information for their own management and financial control purposes.

One body which did require such information to be published by each individual school under its control was the UK's Funding Agency for Schools, through its Rainbow Pack of accounting and financial management requirements (FAS, 1998a). Moreover, these requirements imposed a framework for ***consistent and comparable*** financial reporting of dis-aggregated expenditure and income items. This in turn helped to facilitate comparisons of the cost-effectiveness of different individual schools (e.g. FAS, 1996, 1998b, 1999a), and of their resource management practices on dis-aggregated expenditure items, such as energy and water (FAS, 1999b). However, the FAS has now been abolished, with the Grant Maintained (GM) schools which were under its control now transferred to their diverse local authorities. These local authorities have different accounting practices and individual requirements for recording and reporting expenditure and income items for their schools. The consistency and comparability of accounting and financial reporting by individual (former GM) schools that the FAS achieved will now be lost.

The DfEE (1995)'s earlier Financial Benchmarking Project sought to identify a common useful set of dis-aggregated expenditure items for individual schools from its sample of 37 primary schools from 5 London LEAs. However, despite its recent renewed interest in Financial Benchmarking (DfEE, 2000), the DfEE has yet to specify any standardised requirement for reporting dis-aggregated expenditure items or for reporting individual specific grant income by individual schools, or consistent methods for comparing the unit costs of schools in different circumstances. Similarly, the UK's main public sector professional accountancy body, the Chartered Institute of Public Finance and Accountancy (CIPFA), has yet to take a lead in these directions. This is despite the central importance of primary and secondary education in the functions of many local authorities, from which CIPFA draws a large part of its membership. The Local Management of Schools devolved budgetary process has, nevertheless, generated Outturn Statements on the total income and expenditure of individual schools, although these will not be available in electronic form for some time. The new Section 52 Outturn Statement, which each LEA must produce, will contain some information on expenditure on teaching staff and some other dis-aggregated expenditure across the LEA as a whole. However, it will fail to provide information on dis-aggregated expenditure patterns of its individual schools, even though the LEA typically holds in its own records much of this information on individual schools.

The labour intensive nature of education, and the dominance of labour costs in school budgets, also make desirable more detailed information on how the main resource of ***teachers' time*** is deployed across different subjects and across different pupil groups within schools. The availability of such information is desirable not only to identify best practice in school resource management and the scope for improving the deployment of resources within schools in the most educationally effective, and cost-effective, ways. It is also required if there is to develop a body of evidence which can help to inform local authorities on how best to be determine the age weights on individual pupil numbers that are required to make up at least 80 per cent of their resource allocations to their individual schools. Without data on how schools actually spend the block grants they receive from their LEAs on resourcing different pupil age groups, and without an accompanying analysis of the educational effectiveness of different patterns of such resourcing, decisions by LEAs on these main parameters of school resourcing formulae will continue to be uninformed by any substantial body of evidence.

The identification of user need itself stimulates a search for sources of existing data which might be better deployed to achieve greater effectiveness in meeting user need. One such source is the existing Head-teachers' Forms HP and HS. Primary and secondary head-teachers, respectively, are required to complete these forms in advance of periodic OFSTED inspections. The forms contain *inter alia* details of the allocation of teaching time across different subjects and age groups within the school, teacher qualifications, and class sizes. However, these forms are typically completed and stored as manual records, in a form which does not facilitate easy access, statistical comparison or analysis. At the same time, electronic school time-tabling software packages are now available with the potential for generating summary information on teaching time devoted to different subjects and pupil groups within the school from their database, as a ***low cost by-product*** of the routine school management process of time-tabling. There is then likely to be considerable scope for progress in future in meeting both the needs of OFSTED inspections and other user needs at a lower cost that the present arrangements by more closely aligning the potential of new technology with that of user need.

The Head-teachers' Forms HS and HP are completed only in advance of OFSTED inspections, which take place only once every few years. In contrast, the DfEE's Form 7 is required to be completed by each school every year. This provides data on class sizes by age group, though not by subject. The DfEE's Form 7 embodies its annual Schools' Census that enables the DfEE *inter alia* to carry out its traditional task of responding to Parliamentary Questions on political issues such as the maximum size of primary school classes. However, it is less clear that it has been designed to help provide a valuable database of ***management information*** to assist in meeting the types of user need identified above. The incorporation of Form 7 into the electronic Common Basic Dataset (DfEE, 1998) that will in future be required to be provided by schools similarly omits useful resourcing information, such as class size by subject, that might be linked to educational performance.

Financial accounting information on how schools spend their available budgets needs to be accompanied not only by management information on the use of key resources, such as teachers' time across different subjects and pupil groups. It also needs to be accompanied by ***performance data*** on the educational achievements of these different pupil groups by subject. Much of this data

is already available in electronic form from the extensive Key Stage testing and examination framework that is already in place in schools. However, there is need for more extensive publication of ***value added*** data that indicates the progress of pupils within the school at each Key Stage, by comparing their performance which that which would have been predicted on the basis of their ***prior attainment*** at an earlier stage of the educational process (Jesson, 1997).

The DfEE's proposed Common Basic Dataset (DfEE, 1998) involves an ambitious framework of collecting educational performance data as electronic individual ***pupil records*** of achievement. If successful, this will enable researchers, analysts, monitoring bodies and school managers to look behind school-level averages to more detailed data on the dispersion and inequalities in performance across different pupil groups that these averages may conceal. If there is to be greater understanding of the educational effectiveness of different patterns of resourcing within schools, then this valuable pupil level performance data needs to be accompanied by the type of dis-aggregated data on resourcing and the use of teaching time discussed above. Well-organised databases and computer software associated with the routine management activity of school time-tabling for individual classes, teachers and pupils should be capable of generating not only summary data on such resourcing, but also ***pupil-level*** information on teaching resource inputs.

The third set of variables which are relevant here are those relating to ***pupil background*** and the socio-economic context of the school and its pupils. Again school averages can conceal significant variations across pupils within its catchment area. The use of the percentage of pupils in receipt of free school meals, as a proxy for socio-economic disadvantage, is similarly not ideal. Some disadvantaged pupils may fail to register for free school meals for fear of embarrasment. Detailed information on the background of the majority of pupils who are typically not receiving free school meals is also absent from this measure. Well-organised pupil databases for routine internal school management can, however, generate profiles of pupil post codes. These can in turn be linked to detailed socio-economic data for the Census Enumeration District, enabling a ***relational database*** to be established between pupil-level data on educational performance and resourcing, and wider socio-economic background data. Census data can still, nevertheless, become somewhat out of date during the ten years between Census dates, particularly if new housing developments have taken place in the intervening years, or there have been other substantial changes in the

character of the local area. Fortunately, new census data will become available in the next few years from the 2001 Census.

We have noted above the ***overlap*** which exists between the user information needs in several different areas that are relevant to improving the educational effectiveness of resource management and resource allocation in primary and secondary education. Moreover, these different areas involve the overlapping interests of several different categories of users, including school managers, parents, LEAs, monitoring bodies, such as OFSTED and the Audit Commission, researchers and central government. At the same time, the value of the data on any individual school is substantially enhanced by its being analysed in relation to ***comparative*** data on a large number of other schools in similar circumstances. Given that data is itself expensive to collect and assemble, these considerations mean that the most cost-effective way of organising the data is through a ***national comparative database*** to which these different users have access, and which brings together school performance, resourcing and context data in a consistent and comparable way. Confidentiality protocols and anonymisation may be required in the case of pupil-level data, though much other detailed data on school performance is already in the public domain. Some initial moves in assembling different data sources on a consistent basis have been made by the DfEE through its new LEA and School Information Service. However, this is only to be available to members of the DfEE itself through its own internal intranet. This involves a lost opportunity to maximise the benefit of comparative data for improving the management of the education system as a whole, through making the database available to schools, LEAs, monitoring bodies, researchers and other users. The ready availability of internet facilities to LEAs, schools, researchers, monitoring bodies, researchers and indeed parents means that a national comparative database could be made widely accessible to a wide range of potential users.

In contrast to the DfEE's current policy, there needs instead to be much greater emphasis on the ***sharing and exchange*** of information on schools throughout the education system. Given that the production of much of the data imposes costs on individual schools and LEAs, there is a need to ensure that they also share in the benefits of the comparative information which can be made available. Without access to a national comparative database by schools, LEAs, monitoring bodies, and researchers, much of the information's potential benefits in improving resource

management and informing areas **a. - f.** above will be lost.

One disadvantage of the DfEE's specification of a Common Basic Data Set of data which all schools must provide is the possible resistance this produces to making available school-level data outside this prescribed set. As noted above, this prescribed dataset fails to include some useful data on dis-aggregated school expenditure items and on the use of teaching time by subject. There is indeed a danger of the DfEE's Common Basic Data Set failing to be sufficiently responsive to ***best practice*** and to ***innovation*** in the production of relevant information. It is important also to recognise that there will be a ***spectrum of good practice*** in the extent to which individual schools and LEAs are themselves well-organised to produce relevant data. Establishing what best practice is, and how useful it is, is likely to depend on the voluntary activity of more innovative LEAs and schools. One such innovative LEA is that of Surrey County Council (1996), which has its own Strategic Information Service for Schools that includes *inter alia* detailed comparative information on the use of teaching time for different subjects within its schools.

A mechanism which could promote the use of best practice and the sharing and exchange of additional useful comparative information is that of a ***National Educational Information Exchange*** (Mayston and Jesson, 1999) to operate alongside the national comparative database. This would make available comparative data on the same basis as it was supplied. LEAs and schools who were willing to provide additional data would then be rewarded by the availability to them of similar data from other LEAs and schools. The process here is one of ***voluntary exchange*** to secure mutual benefits in addition to those available from the Common Basic Data Set. Over time, the specification of the Common Basic Data Set could be strengthened in the light of the benefits which were demonstrated by the voluntary production of the additional information. Both the National Educational Information Exchange and the national comparative database would represent substantial examples of ***'joined-up' government*** (Cabinet Office, 1999) and would contribute to the steady development of ***'evidence-based' policies*** (Strategic Policy Making Team, 1999), and resource management strategies at both local and national level.
Some progress has recently been made by the Audit Commission in the UK at establishing a ***Schools Financial Comparisons Website.*** This currently makes use of a sample of dis-aggregated expenditure data for the financial year 1997-98 from 1,500 schools. It is intended to enable a

school to compare their own expenditure patterns across a number of standard headings with those of the schools in the sample that are similar to the school in question under a number of criteria, whilst maintaining confidentiality and anonymity of the comparative schools. However, it is desirable that the Audit Commission updates and expands its coverage to a significantly larger sample, given the several different criteria on which schools can differ. It is also desirable that it be linked to data on school performance and school context, so that a national comparative database could steadily emerge. If this database is to be of maximum benefit, it is also desirable that it be linked to suitable analytical techniques which can assess the scope for improved performance and resource use which any given school can be expected to achieve.

5. Conclusion

There exists considerable scope for progress in the UK on improving the availability of school-level financial accounting information, as part of a new national comparative database on school performance, resourcing and the pupil intake. This comparative database would be a valuable source of information for meeting the information needs of a wide range of potential users, in the directions of improved resource management, performance measurement and performance auditing in primary and secondary education. The large sums of public money which are at stake in these areas underline the importance of the promotion of best practice and value for money in the allocation and use of these resources to their greatest educational effectiveness. The success of structural public sector reforms, such as the Local Management of Schools and devolved budgeting, depends upon the availability of relevant and reliable management information that can help to direct resources to where they are most effective.

Similar information is required by monitoring bodies to ensure accountability for the effective use of these resources. Routine school-level management activities can themselves generate valuable data that can feed into the national comparative database alongside other relevant data sources, if the accounting qualities of consistency and comparability are imposed upon them. There is currently a golden opportunity to remedy current deficiencies in the information base in order to support the development of more evidence-based policies and resourcing strategies in the primary and secondary education sector.

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