



**Independent evaluation of the uses of Espresso
online digital resources in primary schools**

Final Report – Summary

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Acknowledgements

The author would like to thank most sincerely the head teachers and teachers who have willingly and openly provided evidence that has contributed to this report. Thanks are due also to the Espresso staff, particularly Lewis Bronze, Christine Major and Tony Tintirello, who have in no small measure not only made this study possible, but who have continued to strongly support the evaluation. Individuals and schools in this report have not been named, in order to ensure anonymity, which is an important requirement for those involved and willing to provide evidence for research of this nature - this should in no way be seen as devaluing the huge commitment and contribution played by all involved.

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THE REPORT

In 2010, Espresso commissioned an academically-based and fully independent evaluation study to explore outcomes of uses of its online resources in primary schools. The aims of the study were to explore how Espresso resources are used to support teaching and learning, to assess cost and associated benefits arising, and to explore whether levels or types of use in schools might be associated with measures of pupil achievement and school performance.

The evaluation that was undertaken drew on a range of different forms of evidence, analysed in ways to match the needs of the specific aims being explored. In order to make the full report of the study and its findings more easily accessible, and to enable the reader to focus on selected aspects of specific interest, the entire report has been divided into four sections.

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| Section 1 | Summary – this section contains two main elements, Report Headlines and an Executive Summary. |
| Section 2 | School Uses and Learning Impacts – this includes an introduction and background to the study, details of the structure of the study relating to school uses and learning impacts, descriptions of schools providing evidence, details of how Espresso resources are used in schools and learning outcomes related to these, the pedagogies that teachers adopt when using the resources, and key aspects of learning that are impacted by uses of Espresso resources. |
| Section 3 | Management, Time and Cost Benefits – this includes an introduction and background to the study, details of the structure of the study relating to management, time and cost benefits, details of benefits arising, and how these are calculated at school and wider levels. |
| Section 4 | Attainment and Usage Levels – this includes an introduction and background to the study, details of the structure of the study relating to attainment, performance and usage levels, the forms of data that were gathered and used for this element of the study, and the forms of analysis that were undertaken, together with a range of detailed statistical findings. |

REPORT HEADLINES

This independent evaluation study explores learning impacts of Espresso resources, links to pupil achievement, school performance, and management, time and cost benefits

Evidence was gathered from a range of sources

In total, 45 teacher interviews, surveys generating 338 teacher responses, and analyses of usage and performance involving 337 school sets of data were analysed. Analyses showed that schools involved were representative of schools across widely ranging and different contexts

A very large number of schools subscribe to Espresso

In September 2010, a total of 8,978 primary schools subscribed to Espresso. Most teachers reporting in this study identified strongly with positive qualities they associate with Espresso resources – allowing children to understand things more easily, engaging pupils through a range of sensory routes, positively motivating pupils to learn, and getting wider ideas about topics or subject areas

Teachers reported significant impacts of Espresso resources in a range of important areas of learning

Teachers reported significant impacts on aspects of megacognition (gaining a big picture, involving meaningful learning), cognition (acquisition of ideas and knowledge, generating ideas, gaining understanding, memorisation and retention of ideas and knowledge, encouraging speaking), and social interactions (explanation, illustration, consolidation, initiating exploration)

Schools that fully integrated Espresso resources into their schemes of work positively support teachers in terms of time, which in turn can offer cost benefits

Teachers take on average 6.5 minutes less to find, vet and assess how to use an Espresso resource compared to a general internet-based resource. This saves time for a two-form entry primary school with average use of Espresso resources, equating to at least £7,872 per year. Time savings related to usage levels, applied across all subscriber schools, equates to a total annual cost benefit of £41,756,472

Espresso resources are used widely and independently of many school features

Teachers report that they use Espresso resources in different ways with different groups of pupils to support subject attainment. Correlation analyses of usage levels against attainment results give neutral results, supporting the hypothesis that it is focused use that is important rather than amount of use

Schools with higher attainment results at the end of Key Stage 2 show different patterns of access and use of Espresso resources

Schools that are gaining higher attainment test levels at the end of Key Stage 2 are using more Espresso resources earlier, preparing pupils in the longer term across the entire width of resources, rather than focusing later on a more particular set of subject resources

Teachers use Espresso resources to support teaching and learning across topics and subject areas

Many teachers rely on Espresso resources to support topic work, and to support their teaching of humanities subjects as well as core subjects. Lower levels of use of some resources are associated with subjects with lower numbers of lessons within the curriculum (RE and PSHE, for example), but the value of the resources in these areas is nevertheless commonly reported

Many schools would benefit from enhanced awareness and training

In total, 77% of teachers in one survey indicated being not sufficiently aware of resources to enable them to build them into lesson plans in advance, or use them as and when a learning need might arise. This suggests there is a much greater need for training, in raising awareness, and matching use to pedagogical approach. From the cost benefit analyses reported, schools could gain considerably from these forms of training, if followed by in-house planning support, linking resources to future teaching needs. This could equate to a total time and well-being cost benefit saving in the region of £18,000 per year

EXECUTIVE SUMMARY

INTRODUCTION

The very large number of schools subscribing to Espresso is an indication that many teachers see value in the resources available

Espresso online digital resources were initially created and made available to schools in 1998. The company was able, through a £91,000 grant won in 1997 from the British National Space Centre, to set up its first online distribution trials. Espresso resources have been created continuously since that time; they have a distinctive interface (see Figure 1), and are used widely by teachers and learners in primary and secondary schools. Resources are available in different formats, and are organised by Key Stage, subject, and topic. Dedicated teams within Espresso provide technical support and training to schools and teachers. The bank of resources that a school can access is held on a server system, and Espresso accommodates access through a range of different server facilities. Resources are regularly updated without the need for the school to intervene. In September 2010, a total of 8,978 primary schools subscribed to the resources. In itself, this level of subscription indicates that schools see value in the resources they can access. Subscription to Espresso is based largely on pupil numbers in a school. In early 2011, a 2-year subscription would cost a school £5 per pupil on average, plus 75p per pupil on average for pupil home access, and £75 per school for access to Content Club. A subscription includes teacher home access, as well as an annual training session for each school (which is a popular feature with schools).

Figure 1: Homepage showing the distinctive Espresso interface



Espresso resources are characterised by certain features that set them apart from other sets of online resources. As can be seen in Figure 1 above, the interface for teachers and pupils is clear, colourful, and uncluttered. A number of recognisable characters appear with the resources, but the resources are largely teacher-based, rather than providing standalone learner-based activities (which is the focus of other online resource sets). Espresso resources are rich not just in visual terms, but also in auditory terms, and in terms of use of short video clips. The material provided is as ‘real’ as possible (rather than being largely cartoon-based), and is kept ‘up-to-date’. By comparison, other online resource sets are less video-based, or provide less ‘real’ material, or offer test exercises rather than focal topics aimed at raising awareness to ideas and knowledge, and at stimulating discussion. The distinctiveness of Espresso resources means that they can be considered by teachers and learners to be complementary to other sets of resources.

Few studies have looked specifically at the impacts of Espresso resources on learning

Although Espresso resources are widely used, few studies have looked either at their specific usage in schools or at outcomes for learners. The author of this report completed two prior studies (Passey, 2005; 2005b) that looked at uses of Espresso resources - one study explored the implementation of resources across one region of England and the training of teachers and lead co-ordinators in local authorities (LAs) and schools, and the other study explored learning uses and impacts in a range of schools. Findings indicated that resources impacted commonly on specific, but important, aspects of learning.

A key outcome from those studies was the identification of the importance of appropriate teacher interventions and the framing of the resources when these were selected and used by teachers in lessons, with pupils. In the study reported here, the approach that has been taken has been to consider and identify where possible the ways that three related and overlapping elements are approached by schools and teachers: features of the resources themselves that are identified as being important (how they are used, and how they are integrated into classroom and school practice); the pedagogic frameworks that are used by teachers with these resources (what their pedagogic aims are, and where they believe value lies in terms of pedagogic use and learning outcomes); and forms of social interaction adopted in classrooms by teachers (the ways that teachers interact with pupils when resources are used, and what social interactions can arise with resources used with pupils).

BACKGROUND TO THIS STUDY***This independent study explores learning impacts of the Espresso resources, and links to pupil achievement, school performance, and management, time and cost benefits***

Espresso has commissioned this academically-based and fully independent evaluation study to explore outcomes of uses of its online resources in primary schools. The aims of the study are to explore how Espresso resources are used to support teaching and learning, to assess cost and associated benefits arising, and to explore whether levels or types of use in schools are associated with measures of pupil achievement and school performance.

The initial element of the study gathered evidence from a selection of schools, then from a wider range of schools, as well as exploring usage statistics and relationships to pupil achievement and school performance

The initial element of the study reviewed experiences reported by a selected group of practitioners. This was followed by a wider collection of evidence from all teachers willing to participate and to respond to a set of online surveys, and finally there was a review of usage data collected by Espresso, analysed to look at how levels and types of use might relate to pupil achievement and school performance.

Evidence base of the study

The different elements of the evidence base comprised:

- An interview schedule, created at the outset of the study, and used to gather details from 45 respondents in schools (43 by email questionnaire responses, and 2 through telephone interviews). Findings from these respondents are included in Section 2 of this report.
- Online questionnaires for the second component of the study were created and based on experiences and findings from the first component of the study. Details about the online survey, and responses gained from 135 teachers on their subject and topic uses of Espresso resources and from 103 teachers about how Espresso resources match their pedagogical needs are included in Section 2 of this report, while details from 100 teachers about time and management benefits are reported in Section 3.
- For the third component of the evaluation, initial usage statistics were provided by Espresso,

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giving details of resource use from a selection of some 100 schools for the period from January to the end of October 2010. Analyses using these usage data (although it should be stressed that these data were not matched in terms of collection dates and dates when pupil attainment data were used for the analyses) were completed and are reported in Section 4.

- Further usage statistics (for 72 schools where there were complete statistics for calendar years 2008 and 2009, which were matched in terms of their collection dates with pupil attainment results) were provided by Espresso, so that the relationship between usage and access to Espresso resources and pupil attainment levels gained could be explored with greater validity. Analyses using these usage data, matched in time terms to data reported on the schools, are reported in Section 4.
- Analyses that looked at selected cohorts of schools from this time-matched group, based on their lower or higher levels of SAT attainment in English in 2007 at the end of Key Stage 2 (and in all other SAT test outcomes also), were completed, and are reported in Section 4.
- Data from a selected group of 124 schools, where Ofsted reports were completed between 2008 and 2010, and where usage statistics were available two months before, one month before, and during the month of the Ofsted inspection itself, were used to explore relationships between levels of usage of the resources and reports of school performance by Ofsted. Analyses undertaken, and findings, are reported in Section 4.

SCHOOL USES AND LEARNING IMPACTS

Schools providing initial evidence are representative of schools in widely ranging contexts

From the initial element of the evaluation, 45 school responses were received. Data about these schools showed that they represented a range of types of school (covering different age ranges and status), that they were located in widely different geographical areas, that their catchment areas ranged widely in socio-economic terms, and that they ranged widely in terms of numbers of pupils on roll, numbers of pupils receiving free school meals, numbers of pupils with statements of special educational need, numbers of pupils from minority ethnic backgrounds, numbers of teachers in the school, pupil to teacher ratios, and numbers of classes in the school. Across the schools different approaches were taken in terms of the mix of abilities in classes, in terms of setting or banding or streaming for core subjects, in terms of levels of their end of Key Stage 2 SAT results in English, mathematics and science over the 3 years prior to 2010. The variety that was identified indicated that responses had been gathered from a representative selection of schools, in widely different contexts, that were widely dispersed, even though it should be recognised that they were all self-selecting and willing to complete the questionnaire or interview.

Schools reported wide uses of Espresso resources, and highlighted a range of positive qualities of the resources that supported teaching and learning

Overall, the schools reported that their technology facilities (desktop and laptop machines in school and at home and interactive whiteboards in school) allowed them to access Espresso resources easily. Schools reported using Espresso resources across their entire age ranges, from nursery to year 6, but in some schools they reported a greater emphasis of use in certain years. Resources were used in the schools at least once a week on average, but most commonly more than once a week. The resources most widely used were news (an example screen of the type used in schools is shown in Figure 2), video, geography, humanities and science resources, but there was also wide use across other subjects and topics. Qualities of the resources that teachers indicated were of great value to them were: the width and coverage across subjects and topics; the ways that resources positively engaged pupils; the ways that resources matched the teachers' curriculum and pedagogical needs; ease of access to the resources; the match of resources to pupils' learning needs and approaches; having access to resources that were continuously up-to-date; the ease with which teachers could handle the resources and integrate them with other technologies such as learning platforms; and the ways that resources

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matched the needs of different groups of pupils including those with specific needs. Resources were reported being used by schools to support both numeracy and literacy, but strengths of resources in supporting cross-curricular themes and topics were particularly highlighted by schools.

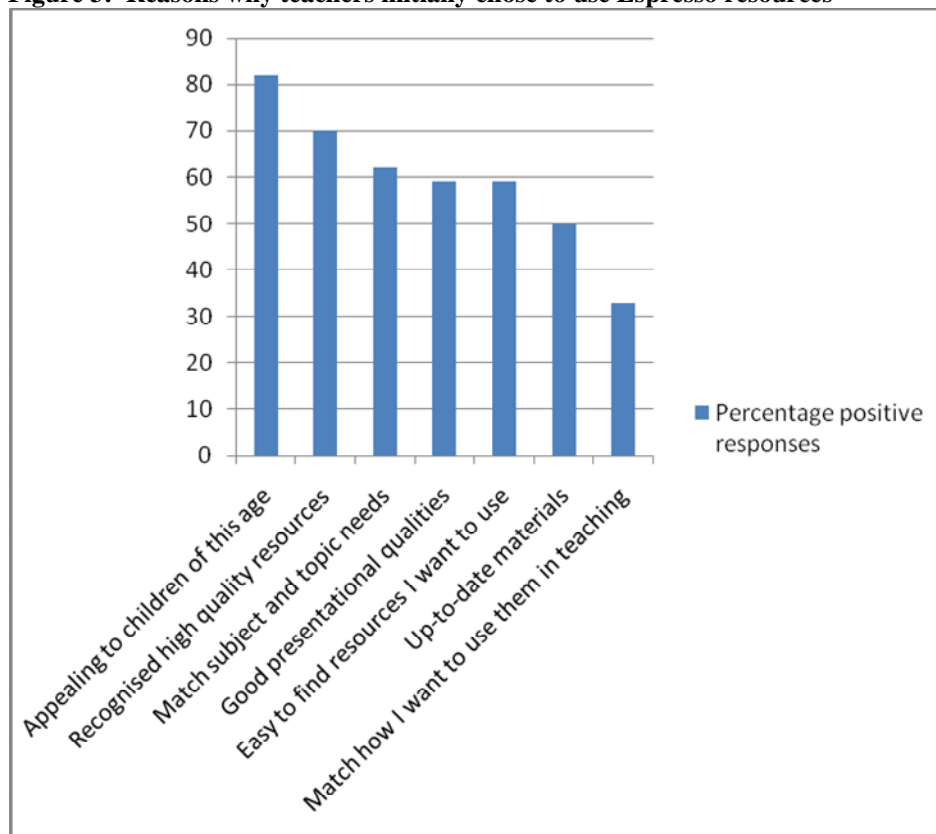
Figure 2: Example screen showing a news page



Many teachers report positively about the qualities they associate with Espresso resources

Teachers reported in survey responses a wide range of qualities that they considered when initially thinking about using Espresso resources (see Figure 3). The quality that they initially considered least commonly was their match to teaching or pedagogical needs. Evidence that will be presented later indicates that there is perhaps a need for schools to consider this more, and that there is at least as much a need for further appropriate training to address this aspect further, as there is a need to shape production of resources in ways to meet their requirements (since producing resources to match all teachers' pedagogic approaches could be very wide-ranging, and may be difficult to entirely meet).

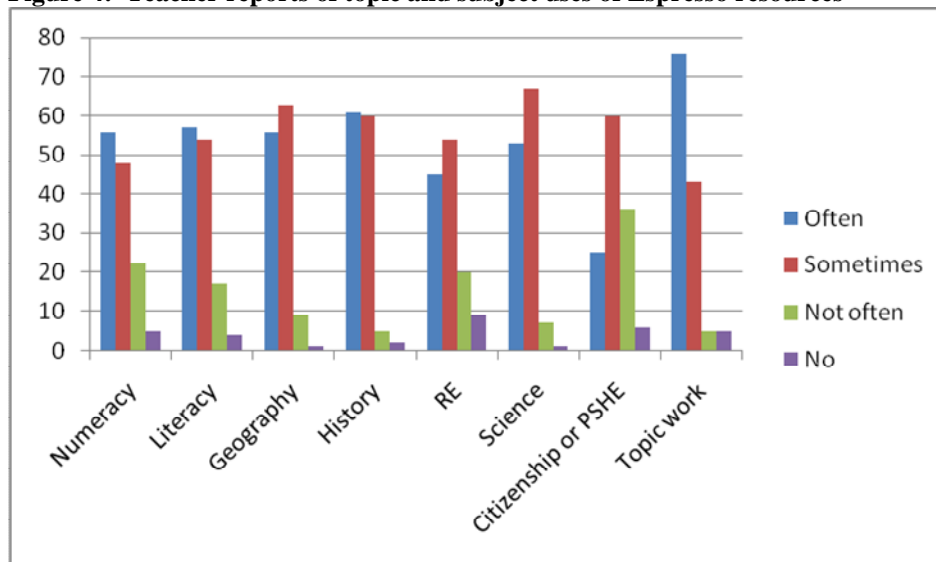
Figure 3: Reasons why teachers initially chose to use Espresso resources



Teachers widely use Espresso resources to support teaching and learning across topics and subject areas

Teachers reported wide use of Espresso resources. It was clear that many teachers relied on Espresso resources to support topic work, and to support their teaching of humanities subjects. Use of resources to support core subjects also featured highly (see Figure 4). Lower levels of use of some resources shown in this figure, however, are likely to be associated with lower numbers of lessons within the curriculum (RE and PSHE, for example).

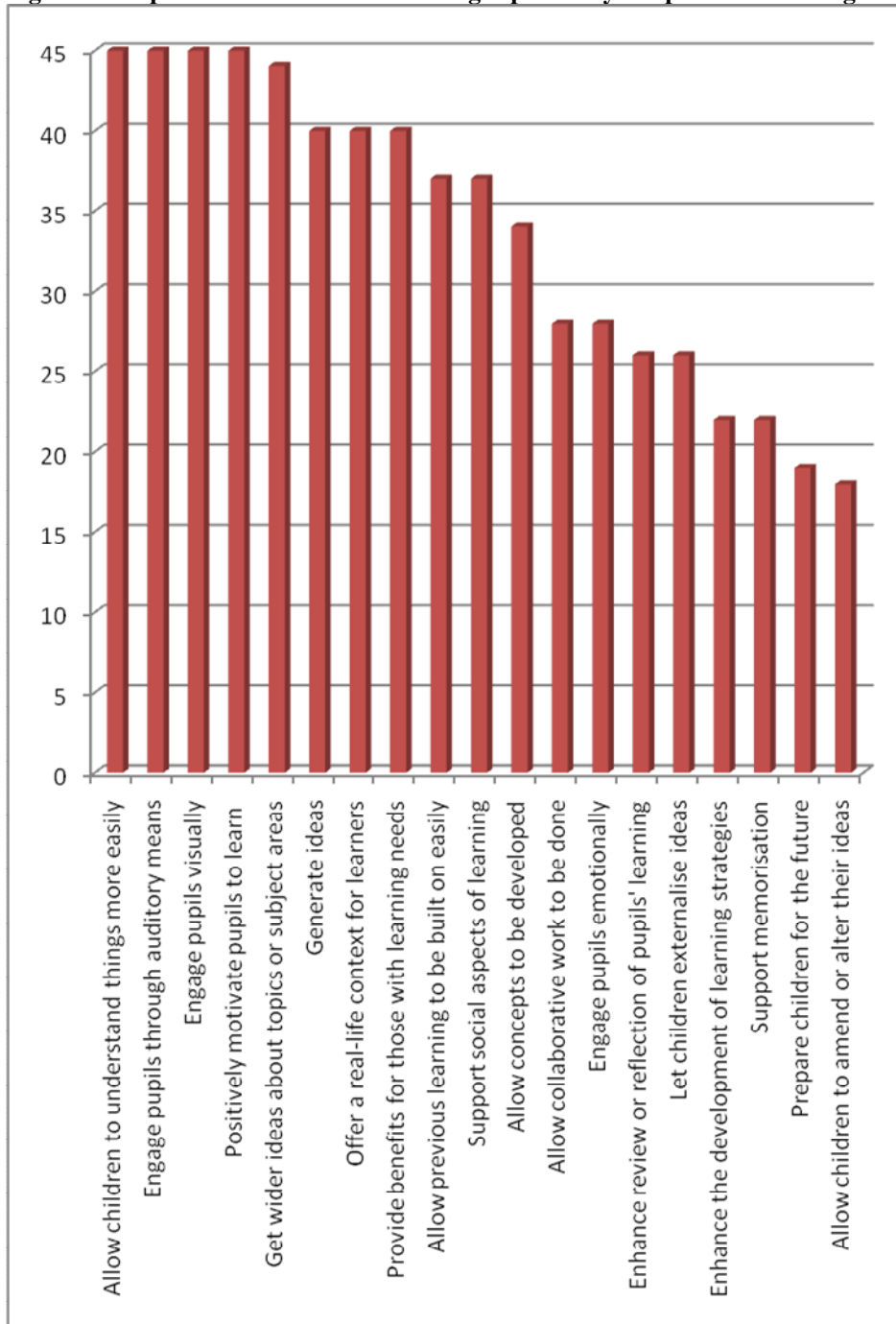
Figure 4: Teacher reports of topic and subject uses of Espresso resources



Teachers report significant impacts of Espresso resources on a range of areas of learning

Across all reports, there were many areas of learning where teachers noted impacts. These are highlighted in Section 2 of the report, but are shown in summary here in Figure 5, and later in this section in Figure 6.

Figure 5: Impacts on learners and learning reported by a representative range of teachers (n=45)



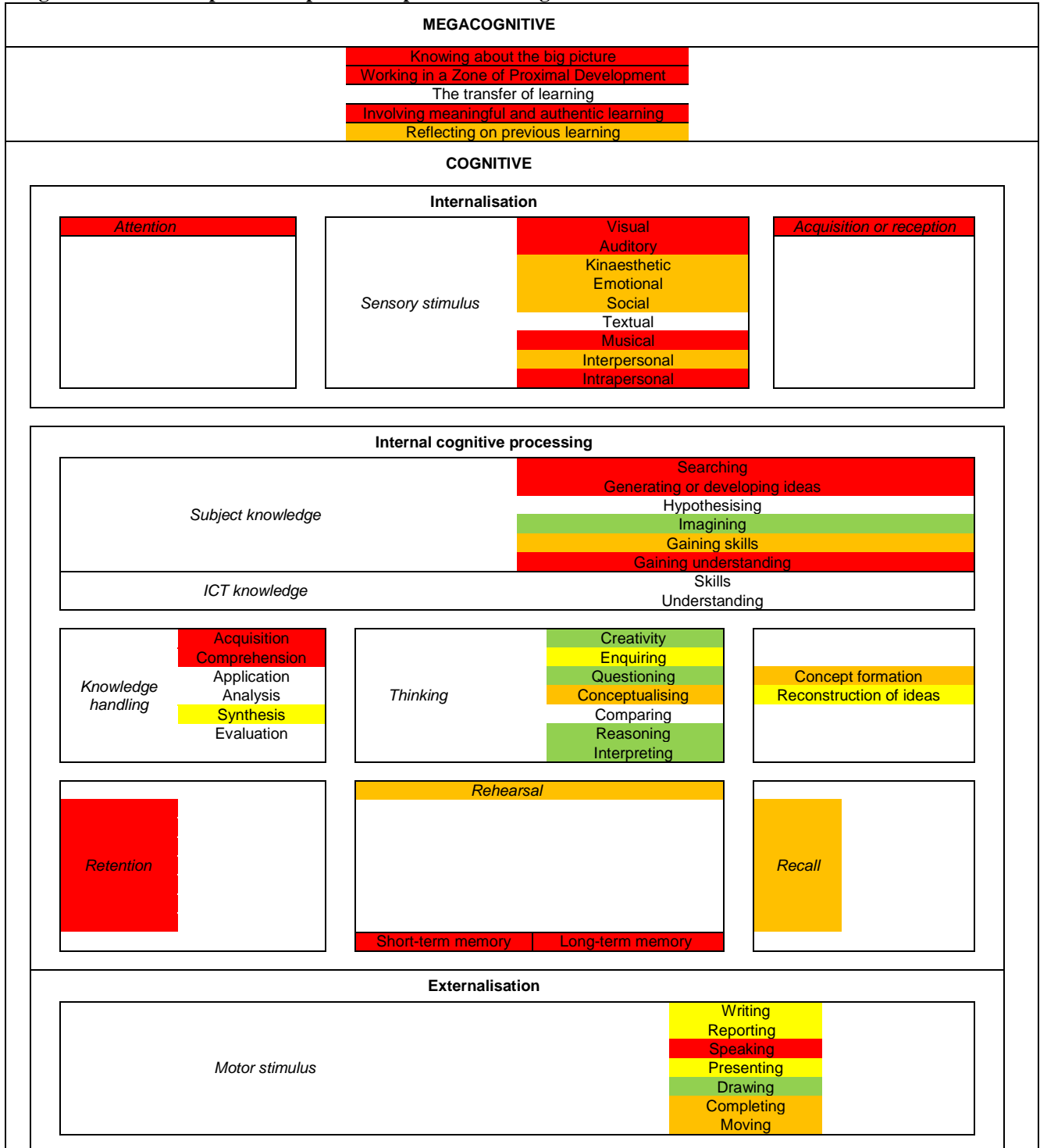
Many areas of learning are reported by teachers to be impacted when they use Espresso resources

Using a learning framework to record levels of responses about learning impacts, it is clear that a wide range of learning aspects are supported and impacted by uses of Espresso resources. The particular hotspots reported (where impacts are reported very commonly) are: megacognitive (gaining a wider perspective and a bigger picture, enabling pupils to work from their existing knowledge and to meet further challenges to learning, and involvement with meaningful and authentic learning); cognitive (gaining attention, focusing acquisition and reception of ideas, enhancing engagement through visual, auditory, kinaesthetic, musical and intrapersonal sensory routes, offering opportunities for pupils to search, generate and develop ideas, gaining understanding, acquiring and comprehending topic knowledge, memorising and retaining ideas and knowledge, and externalising through speaking);

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social interaction (instruction, explanation and illustration, demonstration, questioning, consolidation, and initiating and guiding exploration); and societal (providing opportunities concerned with citizenship). Reports of impacts shown in Figure 6 are graded, from red at highest levels, through orange and yellow, to green where levels are less certain, and white where no details are available.

Figure 6: Teacher reports of impacts on aspects of learning



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METACOGNITIVE	
<i>Monitoring task performance</i>	Keeping place, sequence Detecting and correcting errors
	Pacing of work
<i>Selecting and understanding appropriate strategy</i>	Focusing attention on what is needed Relating what is known to material to be learned
	Testing the correctness of a strategy
SOCIAL	
<i>Learner interaction</i>	Instruction
	Explanation and illustration
	Direction
	Demonstration
	Discussion
	Scaffolding
	Questioning
	Speculation
	Consolidation
	Summarising
Initiating and guiding exploration	
Evaluating pupils' responses	
SOCIETAL	
<i>Caring thinking</i>	Appreciative
	Normative
	Empathetic
<i>Contextual thinking</i>	Education
	Citizenship

In looking at the areas of the figure where lower levels of impact are shown, it should be noted that teachers find it much harder to judge impact that is concerned with transfers of learning or with outcomes that arise at later times, since they cannot be so certain that outcomes are definitely associated with specific earlier interventions or uses of specific resources. This uncertainty explains their reports of lower levels or uncertainty with regard to impacts of resources on certain aspects of thinking generation, which are always difficult to associate with specific causes or events.

MANAGEMENT, TIME AND COST BENEFITS

Schools that fully integrate Espresso resources into their schemes of work positively support teachers in terms of time, which in turn can offer cost benefits

From the interviews with teachers, schools reported that Espresso resources helped them in a range of ways:

- Teachers relied heavily upon the resources, in terms of quality of material, how they were presented, and how they matched the ways they wished to use them to support learning.
- Espresso resources saved them time. If teachers searched the internet for similar materials, the quality of those materials and their match to learning needs was not known to the same extent. In looking for those similar resources, they needed to invest time in vetting, as well as selecting, them.

Evidence provided by schools about their patterns of use of digital resources, and amounts of time involved in preparation activities prior to their using them in a classroom, allows a comparison of time and related cost benefits to be made. Comparing a two-form entry primary school that integrates Espresso resources fully, with a school using Espresso and internet-based resources equally, there is a difference in terms of time use that equates to a cost benefit of £6,240 to the school that fully integrates the Espresso resources (using average levels of reported usage for these calculations).

Important additional points to note in this respect (which are explored and detailed further through the evidence gathered from the online questionnaires) are:

- Teachers rate the presentational and support qualities of Espresso resources higher than those of other internet-based resources.

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- Time and cost benefits reported and calculated in this study are likely to include elements of the personal time of some teachers, as searching for resources is likely to be done at home rather than in school (so time benefits in these circumstances would contribute positively to overall teacher well-being).
- The costs of subscription and training have not been included in this figure (as both of the schools used in this cost analysis were identified as subscribers to Espresso).
- Cost benefit savings associated with qualities of experience for the pupil, time savings associated with reductions in the need to transfer or copy files from one place to another, with the recognition that copyright and usage does not need to be considered, and that printing or copying of materials is not needed, have not been included in this figure. However, it might be argued that schools could expect these facilities and outcomes to be met from subscription costs.

A wider cost benefit analysis was used to identify potential cost benefits at a national level. Looking at patterns and levels of access to Espresso resources of a randomised sample of 90 schools, three broad categories of usage levels were identified. These categories related by inference to – fully integrated uses of Espresso resources, equal levels of use of Espresso resources and internet-based resources, and low levels of use of Espresso resources compared to internet-based resources. Applying average time and cost benefit savings on the basis of these three categories, and on the basis of numbers of teachers in the schools, and assuming that all other digitally-based resources used are internet-based, then the average annual school cost benefit saving for 87 schools (where there were full data sets accessible) was some £4,651. Applying this as an average figure across all subscriber schools, this equates to a total annual cost benefit saving of £41,756,472.

Teacher uses of Espresso and non-Espresso resources

Teachers are clearly often and regularly using online resources to support teaching and learning. On average, teachers are using Espresso resources, according to survey responses analysed, between 9.25 and 7.76 days out of 20 (about once every two or three days). On average, teachers are using non-Espresso resources between 14.08 and 13.33 days out of 20 (above two to nearly three out of every four days). In the case of using non-Espresso resources, in 152 cases out of 206 (74% of all occasions), teachers are likely to spend more time when accessing these non-Espresso resources, as 74% are general internet-based resources, that take more time to find, vet and assess how to use them.

Time savings and equivalent cost benefit savings

Overall, on average, teachers take some 6.85 minutes to find, vet and assess how to use an Espresso resource, but some 13.35 minutes to find, vet and assess how to use an internet-based resource (nearly twice as long). So, some 6.5 minutes less is taken to find, vet and assess how to use an Espresso resource. On this basis, a time saving analysis related to cost benefits shows that, for a two-form entry primary school with 16 teachers, the time saved per year when using Espresso resources would be between 131.20 and 156.16 hours. At an average hourly rate of £60 per teacher, the equivalent cost saving per year is between £7,872 and £9,370.

Greater use of Espresso resources could benefit teachers and schools even more, if the reliance on internet-based resources could be reduced. Teachers report that they use non-Espresso resources between 13.33 and 14.08 days in a 20 day period. On average, 74% of this usage is access to general internet-based resources, equating to between 9.86 and 10.41 days of use in a 20 day period, or 2.47 to 2.6 days in a week. Over a 39 week school year this would involve teachers in using general internet-based resource for between 96.33 and 101.40 days. If teachers use one resource each day, then the time that could be saved if they accessed resources through Espresso would be between 626.15 and 659.10 minutes per year (between 10.44 and 10.99 hours per year). In a two-form entry primary school with 16 teachers, this additional time saved per year would be between 167.04 and 175.84 hours. At an average hourly rate of £60 per teacher, the equivalent additional cost saving per year would then be between £10,022 and £10,550.

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If both current and additional cost savings were gained, then this would equate to a total of between £17,894 and £19,425 per year. If schools could move towards online resource bases where their time to find, vet and assess usage was low, then considerable cost savings through teacher time would be possible.

The fact that some of this time and related cost saving is happening out of school should also be considered in terms of the overall cost benefit analysis. Cost savings will be higher if they are associated with more supportive and positive well-being. Head teachers have reported that teacher stress, and non-accommodation of well-being, can incur costs that amount to twice the hourly rate associated with teacher time (Passey, 2010). Using teacher reports of when they access resources (outside or inside school or both), it is possible to calculate an average out-of-school access ratio; the calculated ratio is 1.60. Taking account of well-being and the ability of teachers to choose when to search for resources, an average two-form entry primary school could then gain, when considering the equivalent of teacher time as well as well-being gains, which would relate to cost savings per year of between £12,595 and £14,992 (calculated on the basis of average uses of Espresso resources, together with general internet-based resources), or between £28,630 and £31,080 (calculated on the basis of use of Espresso resources entirely, without use of any general internet-based resources).

A summary of time and cost benefit savings

The time and cost benefit analyses can be summarised as follows:

- Teachers take on average some 6.5 minutes less to find, vet and assess how to use an Espresso resource than a general internet-based resource.
- Taking reported average usage levels of Espresso resources and general internet-based resources in a two-form entry primary school into account, Espresso resource use saves time (when compared to access alone being to internet-based resources) that equates to an annual cost benefit of some £8,000.
- As many teachers report that they access resources at home, and they feel more comfortable and less stressed in doing this, then there are well-being gains involved, which in cost benefit terms equate to a value in the region of £13,000 (which also includes the £8,000 benefit above).
- Comparing a two-form entry primary school that fully integrates use of Espresso into short and long-term planning with a two-form entry primary school that uses Espresso and general internet-based resources equally, there is a time and cost benefit saving of some £6,240 for the former school.
- Reports indicate that teachers are using general internet-based resources on average more than Espresso resources, so, using these reported data, if an average two-form entry primary school were to move to entire use of Espresso resources, integrated into short and long-term planning, then it would save time that would equate to a value in the region of some £10,000 per annum.
- Taking three different levels of subscribers' usage into account, and applying time savings based on the likely different levels of use of internet-based resources in these three groups, the cost benefit that equates to the time saved across all Espresso subscriber schools totals some £41,750,000 annually.

ATTAINMENT AND USAGE LEVELS

Some academic studies suggest that resources supporting wider and deeper aspects of learning have strong impacts on achievement

It is clear that many schools use Espresso resources to support learning, and often the uses by schools focus on quite specific aspects of learning. As these aspects of learning are concerned in many instances with wider and deeper aspects of learning, rather than more shallow or focused concerns on just the memorisation of specific facts, exploring possible relationships between levels and types of usage of Espresso resources and achievement outcomes (such as those shown by nationally reported

SATs results) are worthy of more specific study. With usage data provided by Espresso, and achievement data from publicly available reports, these data sets were integrated into a single spreadsheet file; the data were subsequently transferred into a statistical analysis package (*SPSS*) to generate descriptive statistics of the data fields, crosstab analysis to show ways that data fields might relate, and correlation analyses to identify levels of relationship between these factors. (More complete details of methods are given in Section 4.)

Expectations and issues concerning analyses with usage statistics

It is clear from evidence gained from the initial set of interviews with teachers that Espresso resources are being used in a range of ways, and are being seen to support learning in a range of ways. However, although many of the strong and fundamental outcomes of uses that are being recognised fall within areas of megacognition, cognition and social aspects of learning, there is also evidence that indicates teacher-reported impact on memorisation and recall. It is these latter elements that are often fundamental to success in tests and examinations, but Espresso resources have not in the past strongly focused on these aspects of pedagogic need (although resources currently being deployed do focus in this area much more strongly). Coupled with this, there could be an assumption made that usage level is an indicator that can lead to positive impact in itself. This may be misleading or indeed false; from the evidence shown in Figure 5 it is clear that teacher support is a vital element in bringing about positive outcomes when resources are used. So, high levels of usage could actually be an indicator of non-teacher-supported or less-teacher-supported uses (pupils are given free rein to use resources, without a great deal of teacher support). In this case, usage levels might well correlate negatively with attainment. Alternatively, of course, teachers could be using Espresso resources at different levels with different groups to support aspects of learning concerned with tests, but that the resultant attainment levels are not different but are similar. In other words, where teachers recognise a class or group that need more support, they are given that support through higher levels of usage of Espresso resources; but then the results of that class or group would be at similar levels to those that are not recognised as needing the same levels of support. In this case, usage would be correlated negatively to any needs for additional support (as those using resources more would start at lower attainment levels), but resultant attainment levels would show no strong correlation to usage levels. Additionally, it is also difficult to know exactly when usage might lead to positive attainment gain; it could be for some pupils that revision in December is important, while for others it is more important in March. Not knowing how usage times relate to attainment, therefore, does not allow a focused analysis to be undertaken (especially at a pupil level, where ultimately the gains are identified). Taking these factors into account (lack of full match of resources to revision and memorisation needs, lack of knowledge of how usage levels relate to important aspects of teacher support, and lack of knowledge of when usage would best support revisions needs of pupils) it would be false to expect that this form of correlation analysis would result in any strong positive correlation outcomes. Indeed, if teachers match support to the needs of pupils, and as a consequence, similar amounts of attainment are raised above the starting baseline level, then a neutral correlation should be expected.

Espresso resources are used widely and independently of many school features

Descriptive statistics showed that a random sample of over 100 schools selected for statistical analysis included a representative sample, covering the range of the major different features that apply across primary schools. Correlation analyses explored whether features of these schools in any way related to usage and access patterns, and attainment levels of SATs at the end of Key Stage 2. Using initial data available (from which only limited conclusions could be drawn about relationships to attainment outcomes, as usage and access data were collected at time periods that were different from those for the attainment data results), it was clear that numbers of sessions to which pupils were exposed to Espresso resources, numbers of pages accessed by pupils, and the types of files accessed by pupils were all largely independent of locality, starting and leaving age, numbers of pupils on roll, numbers or pupils receiving free school meals, numbers of pupils with special educational needs (either with or without statements), numbers of pupils from ethnic minority backgrounds, numbers of teachers in the school, and the pupil to teacher ratio. Access was also largely independent of attainment outcome;

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pupils were generally experiencing and gaining access to the resources whether they gained more highly as a year group or not. There was a very slim indication (from the number of negative correlations rather than the strength of correlations) that pupils in higher attaining groups tended to gain less frequent exposure to Espresso resources.

Results from analyses with time-matched statistics

A time-matched school sample (for usage statistics and SATs results) allowed a more robust set of analyses to be conducted. For these analyses 72 schools were selected. For this sample, there were strong correlations between numbers of pupils on roll and all measures of usage (numbers of visits, numbers of pages, and bandwidth). These correlations arose in the months where there were no major holiday periods (implying that the relationship was school or teacher related). These correlations were all strongly negative, indicating that as numbers of pupils on roll increased, so the usage levels decreased. These results might be explained by larger numbers of pupils having lower levels of access to technology, or larger numbers of pupils across larger numbers of classes not being supported by teachers in the same ways. There were no strong correlations between numbers of pupils on roll and attainment levels. So, whilst numbers of pupils on roll were related to usage levels, these were not related to attainment results.

From this sample of schools, a further selection was made. This further sample selected out those schools that attained 85% or above at levels 4 and above in their SAT results in English in 2007 (and this group also gained a much higher average percentage score for numbers of pupils achieving level 4 and above in mathematics and science, and level 5 and above in English, mathematics and science). The remaining sample of 41 schools was used to run similar analyses. The correlation scores indicated two important outcomes: that during the first half of the school year, increasingly rural (or less urban) schools in the sample showed higher levels of usage of resources by pupils; and that again, pupil numbers on roll were related to levels of usage. In the latter case, the correlation values were strongly negative, indicating again that higher levels of usage were associated with lower numbers of pupils on roll. But, it is important to note that from a parallel analysis it was found that numbers of pupils on roll and attainment results were not correlated at statistically significant or high score levels.

Indeed, it is of note, perhaps, that no strong correlations between usage levels and attainment levels were shown (except in one case). Many of the correlation values gained for attainment at levels 4 and above were very largely around the neutral position; the exception was in mathematics. In all subjects for levels 5 and above, negative tendencies were noted. If these results are compared to the tendency shown when all attainment level groups were included, then the comparison suggests that selecting out the higher attaining groups has indeed removed some of the greater tendency for a negative correlation (for attainment level outcomes 4 and above in English and science). This being the case, and the fact that at levels 5 and above there was the same tendency towards negative correlation shown (increased in values in some cases), then this still suggests (without firm evidence of statistical significance) that higher attaining groups are not using Espresso resources as much (or are not encouraged to do so by their teachers).

These results do not contradict teacher interview responses, or hypotheses put forward about likely correlation outcomes and how these would be explained. Teachers in their responses indicated that they chose uses of Espresso resources to match pupil needs. While they found that all pupils were supported by uses of Espresso resources, many examples given described situations where pupils needed additional support or where they gained enhanced levels of awareness. This indicated that teachers were selecting the use of resources to support specific needs of specific pupils or groups of pupils. If as a consequence all of these pupils gained from these different but relevant exposure to and uses of resources, then correlation analyses of levels of usage against attainment results would be neutral; a neutral set of results was largely what was found.

Schools with higher attainment results at the end of Key Stage 2 show different patterns of access and use of Espresso resources

The correlation analyses that were run did indicate, however, differences in terms of usage levels when schools were grouped according to levels of attainment gained. Usage statistics showed the ‘top pages’ accessed by each school. For the 72 schools in the time-matched sample, the ‘top pages’ accessed by the 42 schools with lower attainment results (less than 85% at Level 4 or above in English at the end of Key Stage 2 in 2009), and the 30 schools with higher attainment results (85% or above at Level 4 or above in English in 2009), were compared. Using the ‘top 10’ pages as indicators of resources most commonly accessed across these two groups of schools, it was found in both cases that Key Stage 2 resources were accessed more than Key Stage 1 resources, which in turn were accessed more than Early Years resources, that mathematics was the subject accessed most commonly, and that shared sound activities, search facilities and the route creator were the forms of activity most commonly accessed.

By comparing the ratios of ‘top 10’ pages accessed across these two school groups, it was clear that those with higher attainments at the end of Key Stage 2 accessed Early Years and Key Stage 1 resources more, and Key Stage 2 resources less, and that they used mathematics resources less but other topic resources more. These data (and the differences between levels of access at the different Key Stages is statistically significant, $\chi^2=6.446$ and $p=.04$) suggest that the schools that are attaining at higher levels at the end of Key Stage 2 are using more Espresso resources earlier, preparing pupils in the longer term across the width of resources, rather than focusing later on a more particular set of subject resources.

When other features of these two school sets are considered, higher attainment or lower attainment persists across all subjects and test levels; the average scores for SAT levels, in English at level 5 and above, in mathematics at both level 4 and above and at level 5 and above, and in science at both level 4 and above and at level 5 and above, all show wide differences. The same wide difference is not shown when contextual value added (CVA) scores are considered, but some academics (Gorard, 2010, for example) consider these scores to be invalid for the purposes of this type of comparison.

Results from an analysis using Ofsted performance measures

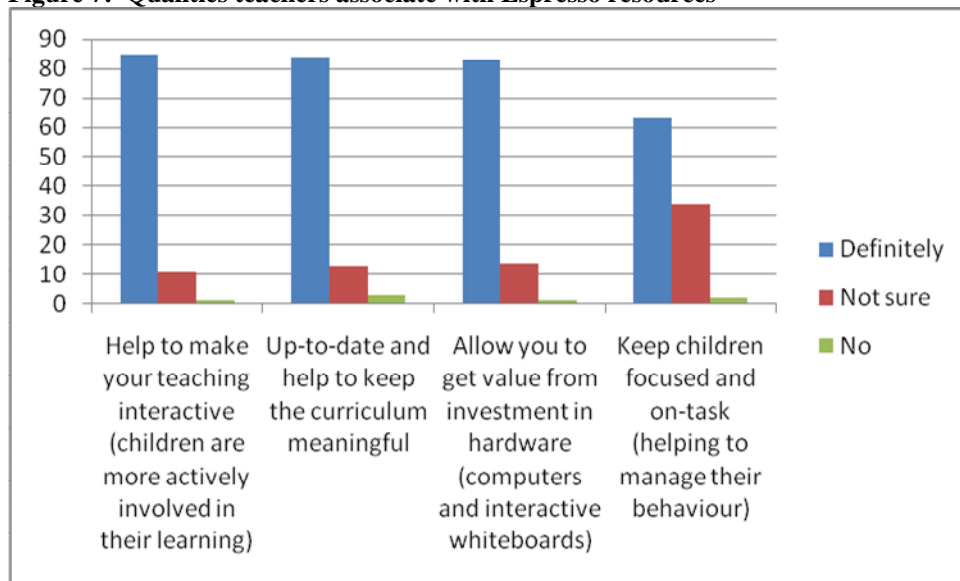
A further analysis was run to explore whether there were possible correlations or relationships between usage and access levels of Espresso resources and performance indicators of schools (those publicly accessible from Ofsted reports). The analysis yielded no indicators of correlation between usage statistics (numbers of visits per pupil two months before, one month before, and during the month of the Ofsted report) and performance measures within the Ofsted reports. When explored further, it was found that this result was to be expected; although it was feasible to undertake the analysis, unfortunately the range of schools involved, even though there were 124 in total, did not include an equal or reasonably balanced number across the entire spectrum of performance indicators. The schools were imbalanced towards those with high performance outcomes. In itself, this is a potentially interesting finding; it could be that schools gaining high Ofsted performance measures (focusing on effective management and wide curriculum diversity) choose to use Espresso resources. The evidence in itself is not entirely conclusive, but could be an avenue worthy of further exploration.

MOVING FORWARD***Awareness and training***

It is clear that many teachers recognise Espresso resources as having useful and positive qualities (see Figure 7). Espresso resources supporting interactive aspects of teaching and learning is highlighted particularly, and although highlighted at a lower level, the fact that many teachers feel that Espresso resources help with behaviour management also offers an important contribution for teachers working in classrooms where behaviour can be challenging.

Espresso online digital resource evaluation

Figure 7: Qualities teachers associate with Espresso resources



It is clear that few teachers reporting in this study are not satisfied with the resources from Espresso. However, some responses do show that there is a need for either additional training to enable teachers to see how resource use can match their teaching approaches more, or a greater consideration of teaching approaches when resources are produced, or both. Certainly the need for more training in terms of uses of resources is indicated by responses from teachers about their awareness of the resources. In total, 77% of teachers responding in one survey indicated that they were not sufficiently aware of the resources to enable them to be either built into lesson plans in advance, or used as and when a learning need might arise. These responses suggest a much greater need for training in raising awareness, and exploring how resources match to pedagogical approaches. From the cost benefit analyses reported above and in Section 3 of this report, it is clear that schools could gain considerably from an up-front investment in time in training, followed by appropriate in-house planning support, so that teachers are able to link resources to their future lessons and teaching needs as thoroughly as possible.

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About the author

Dr Don Passey is a Senior Research Fellow in the Department of Educational Research at Lancaster University. He has wide experience with developing and using evaluation and research methods to look at technological innovation, and has studied and reported on outcomes of implementation and uses of leading edge technologies and their impacts on learning for over 20 years. His work has focused particularly in areas exploring implementation, management and uses of leading edge technologies for primary and secondary age pupils and teachers, in informal as well as formal learning settings, but he has undertaken studies in further education settings also. Increasingly, his focus has been on how technologies support groups of young people who find it hard to learn. His research is based strongly in grounded theory approaches, adopting integration and sequencing of appropriate ranges of qualitative and quantitative (covering wide ranges of size sampling) methods, and he has developed new analytical techniques to explore impacts of technologies on learning, which include the use of learning frameworks and gap analysis.

He has led and undertaken more than 50 research and evaluation studies over the past 10 years, the vast majority independently commissioned to support aspects of policy or practice. He has recently completed a study for Wolverhampton Local Authority (LA) on the implementation of the LP+ learning platform, is undertaking a range of studies on home access and uses of technologies to support young people's learning, has undertaken an evaluation study for the BBC looking at outcomes of the BBC News School Report project, and a number of studies for Becta looking at potential uses of technologies with young people who are not in employment, education or training (NEET). He has over the past few years undertaken a series of evaluation studies on how schools in Aston Pride have supported the development of community and home access to ICT, as well as a review of the ICT development practices and outcomes arising in Wolverhampton LA. He was commissioned by the BBC to look at learning uses and outcomes of the BBC jam resources at an early stage of their development. He previously completed studies on the role and learning benefits of IT Academies for the DfES, the use of broadcast video clips in schools and uses of multimedia support for at risk young people for the BBC, the uses of specific online learning resources for regional broadband consortia (RBCs), the ways in which ICT is linked to pupil motivation for the DfES, the role of ICT in supporting learning practices for disadvantaged communities for a NDFC project, the outcomes of uses of interactive whiteboards, and the development of e-learning practices across RBCs and local authorities (LAs). Earlier studies reported on the outcomes and implementation of Pathfinder LEAs for the DfES, the development of Year 7 online course materials for mathematics for RM, the use of a number of integrated learning systems in schools, he led a team that investigated the outcomes of laptop use in schools and homes as part of the Microsoft UK Supported Anytime, Anywhere Learning Project, and led a study for the Qualifications and Curriculum Authority (QCA) looking at the implications of uses of ICT for coursework in examination assessment.

He has worked with EU and government agencies, commercial and non-commercial groups, educational institutions and schools, in undertaking research to inform both policy and practice. He was a consultant to a previous department for education on a number of projects, which included work on the development of innovative approaches to data management systems in schools and LAs. He has worked with commercial companies in the UK, Switzerland and Germany, with state pedagogical research institutions in France, Spain and Germany, with educational groups in Hong Kong, Bermuda, and Peru, with LAs across England and Scotland, with RBCs, and with individual schools. He established, in collaboration with SSAT, a Masters in Research course in Innovation in School Practice for teacher practitioners, focusing on researching the uses of data and technologies within schools and in homes.

He is vice-chair of the International Federation for Information Processing Working Group on Information Technology in Educational Management, a member of an international Working Group on Elementary Education and ICT, and a member of the BCS Schools Expert Panel. He has written widely on aspects of leading edge ICT uses in primary and secondary education.

24th April 2011

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