Espresso Education

Evidence of impacts of digital resources on learning

Don Passey

Senior Research Fellow
Department of Educational Research, Lancaster University

28th August 2012

Acknowledgements
My particular thanks to Richard McGrath for creating the invaluable MS Excel spreadsheet of national data, drawing together key details from a range of sources, and to Lewis Bronze for his continued support with this area of research. My thanks also to all the head teachers, teachers and teaching assistants in schools and to the local authority personnel and Espresso Education personnel who provided invaluable evidence for the background studies referred to in this report.

In brief

Across the range of studies reported in and drawn together for this review, the evidence shows that:

- Espresso Education resources have distinctive and strong features and affordances that are used by many teachers to support pedagogical approaches across topic and subject areas.
- Teachers use Espresso Education resources (often regularly) to support teaching and learning in the core subjects of literacy and numeracy (English and mathematics).
- Teachers recognise outcomes from these uses in widening and deepening aspects of learning, engaging learners, enhancing understanding, providing opportunities to generate ideas and discuss points and issues, and supporting memorisation and recall.
- While some schools focus their uses of Espresso Education resources in particular year groups, others integrate uses across the entire age range of their pupils.
- Longer-term uses of Espresso Education resources, embedded in practices across those schools' entire age ranges, are associated with higher levels of standard attainment test (SATs) results.
- Many schools that have subscribed to Espresso Education resources for 11 years or more have intakes of pupils who are more disadvantaged and vulnerable in terms of learning.
- The focus of those schools in recent years has been on school and learning improvement, care and well-being, and partnerships with families and others.
- Many schools within this population are known to have focused uses of Espresso Education resource in early years as well as across later Key Stages, and have targeted uses to support more vulnerable pupils.
- Espresso Education resources have been used in those schools as part of a range of strategies and practices (including effective ways to identify and address learner weaknesses on a regular basis) to ensure that individual needs of pupils or groups of pupils are met.
- Impacts arising from these strategies, measured through attainment results (SATs), show that the results on average match or go beyond national averages of attainment progress or expectations.
- Schools subscribing to Espresso Education resources for longer periods of time have been able to build their uses across the school, integrate them into school-wide planning documents, and while a range of these schools have supported pupils generally, many have supported more specifically those who have been disadvantaged or more vulnerable in terms of learning, so that consequently they have gained at expected or above expected levels in terms of attainment (SATs) results.
- A similar pattern of association between intakes of pupils and expected or enhanced progress and attainment levels at Level 4 or above holds true for special schools that subscribe to Espresso Education resources when they are compared to non-subscribers.

Assumptions and limitations

In reading the contents of this report, and particularly regarding analyses and findings that are reported using the national data set, the following points should be considered:

- In looking at school features such as pupil intake characteristics, proportions of pupils on free school meals, and school effectiveness measures reported by Ofsted, it is assumed that the data taken from the reports in those years are consistent with data for all other years, particularly those in which progress and attainment results were reported and used.
- Patterns of uses associated with years that schools have subscribed to Espresso Education resources and their relationship to associated outcomes such as expected progress and levels of attainment have not been explored in previous years (before 2011) in any depth and are not reported here.

This report

The purpose of this report is to provide an overview of the evidence base for Espresso Education digital resources impacting on the learning of pupils in primary schools. The report will use findings from previous studies conducted by the author; one study explored uses and outcomes for teachers and pupils across a national sample, while another study explored these features across all schools within a single local authority (LA). The first study explored uses and outcomes in a maximum of 337 schools; in the study 45 teacher interviews, 338 teacher survey responses, and 337 school sets of data were gathered and used. The second study explored uses and outcomes across all 92 school centres in the LA (nursery, infant, primary, junior, special, and short-stay schools). The findings of these reports provide important contexts and background on which to overlay a new set of analyses that use data at a national level. The new data set allows uses and outcomes to be explored across the entire range of 19,983 schools in England with primary age pupil cohorts (across the 5 to 11 year age range), and with 16,739 of those having cohorts that provide attainment results for pupils at the end of Key Stage 1 (at 7 years of age) or Key Stage 2 (at 11 years of age). All of these findings, together with findings from other related and relevant studies, are integrated into a picture within this report, to consider impacts on learning at a wide level. The relationship of the studies reported here are shown in Figure 1 following.

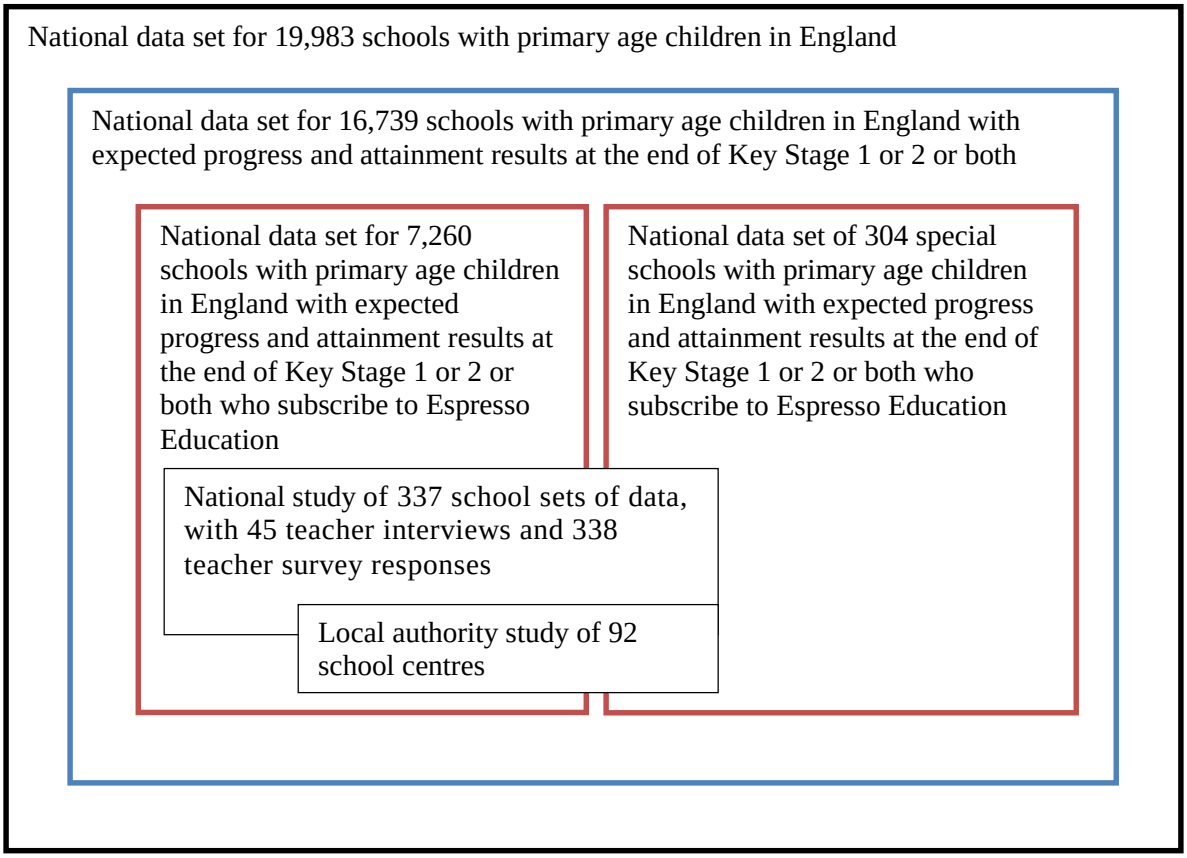

Figure 1: Relationship of studies and evidence base

Considering some background studies

The search for evidence that links uses of digital technologies to enhanced subject attainment has been on-going for many years. An early range of sudies by Becta (2001a; 2001b; 2003a; 2003b), showed an association between levels of information and communication technologies (ICT) in schools and levels of attainment results (SATs). However, it has been more difficult to always identify clearly whether there is a cause and effect relationship in terms of levels of equipment or resources and enhanced attainment levels. Nevetheless, a range of research and evaluation studies have shown that ICT can

have an impact upon learning when that learning is measured by subject attainments (SATs). For example, Harrison et al. (2002), found that:

> *"A statistically significant positive association between ICT and National Tests for English was found at Key Stage 2. Positive associations were also found for mathematics at Key Stage 2, although they were not as striking and not statistically significant. … A statistically significant positive association between ICT and National Tests for science was found at Key Stage 3, but there were no other clear-cut associations at Key Stage 3. … At Key Stage 4, there was a statistically significant positive association between ICT and GCSE science and in GCSE design and technology." (p.2)*

The extent to which ICT itself has led to impact, and the extent to which other factors have contributed, has not always been clearly identified, although the role of other factors is certainly well recognised. Studies where pupils have used ICT on its own (that is, without teacher intervention or support), have rarely identified an enhancement of attainment beyond an initial and fairly limited period of time (teachers and observers have reported a matter of a few months with some forms of integrated learning system (ILS), for example). In terms of contributory factors and enhanced attainment arising from uses of ICT, Becta (2001b) reported that:

> *"Analysis of the Ofsted data on quality of ICT use reveals that attainment is even higher when high levels of ICT resource are combined with 'Good' ICT teaching. On average 69% of pupils in schools with 'Very good' ICT resources attained at least five GCSEs. When 'Very good' resources are combined with 'Good' ICT teaching, this proportion rises to 72%." (p.8)*

Passey (2011d) found that there were no identifiable associations between levels of use of Espresso Education resources (measured by levels of logons and numbers of pages visited) and attainment results. Indeed, he argued that a concern with this relationship is based upon a false premise: more use is not the same as effective and focused use. As Cox et al. (2003a) stated, the selected use of resources by teachers is a vitally important factor:

> *"There is a strong relationship between the ways in which ICT has been used and pupils' attainment. This suggests that the crucial component in the appropriate selection and use of ICT within education is the teacher and his or her pedagogical approaches. Specific uses of ICT have a positive effect on pupils' learning where the use is closely related to learning objectives." (p.3)*

Cox et al. (2003b) went on to say that:

> *"Studies show that the most effective uses of ICT are those in which the teacher and the software can challenge pupils' understanding and thinking, either through whole-class discussions using an interactive whiteboard or through individual or paired work on a computer. If the teacher has the skills to organise and stimulate the ICT-based activity, then both whole-class and individual work can be equally effective." (p.3)*

Passey (2011a) identified discussion and challenge that could arise and was commonly reported when teachers use Espresso Education resources, and indeed many teachers reported that Espresso Education resources supported their pedagogical needs in activities with intentions to enhance discussion and challenge. Certainly in cases where pupils experience appropriate ICT use, the critical actions of the teacher in supporting learning have been identified in a range of studies. Ofsted (2004) stated, for example, that:

> *"Evidence also shows a clear place for pupils' use of ICT across subjects where the learner is using ICT purely as the medium for learning and where prior learning in ICT capability is not utilised. The gains in such experiences include being able to control the pace and order of learning and the clarity of exposition through animated graphics or video clips. The role of*

the teacher in this activity paradoxically becomes more significant; the mix of human and computer interactions is the telling factor." (p.8)

Some researchers have argued that impact should be measured through outcome measures of controlled studies. In the case of Espresso Education resources, a recent study in the United States (Espresso Education, 2012) has shown that these resources can impact directly on learning, measured through a controlled test study. The results of an 18-month, mixed methods study in 10 classrooms, conducted by MIDA Learning Technologies, showed that:

- *"The pupils in the experimental group significantly outperformed the control group on the standards-based post-test.*
- *"The pupils in the experimental group also significantly performed better on the standards-based post-test than the standards-based pre-test.*
- *"The statistical data suggests that the use of Espresso as part of the everyday curriculum, even when used for little more than one hour per week, helped pupils to achieve at higher levels than their counterparts who were taught without Espresso."*

There is, therefore, background evidence that digital technologies and resources can impact on learning, and that Espresso Education resources can, through a controlled test study, enhance learning results. A key question for this report is, therefore, whether evidence is available that can show that learning impacts arise in the case of Espresso Education resources that are demonstrable across and within a wide population of schools.

Methodologies adopted and building a picture of impact

Particular methodologies and demographic filters were applied in an earlier study that looked at patterns of Espresso Education usage in schools over time (Passey, 2011d). Schools explored in that evaluation study were selected on the basis of access to logfile data made available by Espresso Education. The analytic methods and approaches used, as well as the findings themselves, are layered onto a national picture in this report, detailing impacts through attainment results at school levels at Key Stages 1 and 2. This report will provide an overview of the picture across all three studies (Passey, 2011a; 2012b; and the study of the national data set reported here). This report will identify the methods used and findings arising from the national data set study to greater extents, since these are detailed here for the first time.

What does impact mean, and how can it be measured and identified?

Before findings are presented, some discussion of what impact means, how it might be measured, and the pre-requisites to ensure that the measures are as valid and robust as possible, will be considered and presented here. It is important to distinguish initially between four key terms and elements when investigating digital technologies and their effects on learning: affordances; uses; outcomes; and impacts. Affordances describe the features that a digital technology provides (such as video of real-life situations, or online amendable text, and the use of these in learning must clearly be legitimately linked to the next three elements if there is to be a cause and effect relationship established between the digital technological and impacts). Uses describe how a technology is applied by teachers and learners (such as use of a video about an author's approach to writing to support pupils' creative writing approaches in classrooms), and uses are clearly dependent on technological affordances and features of digital resources (and these must be considered and identified in any analysis of uses). Outcomes describe what actually results from use (such as the ability to remember certain time tables more effectively), and are dependent on individual pupil characteristics and attributes, as well as being dependent on teaching and environmental context (so these also need to be considered in an analysis of outcomes). Impacts describe measurable outcomes arising (such as test results, which might be teacher-devised tests, or national SATs), and are dependent on the match of measures used and criteria selected with the affordances, uses and outcomes that are determined by teachers in terms of learning goals (so these must be clarified and considered within any subsequent analysis). In support of these links, what is clear in schools is that teachers are usually and widely focusing on those elements that are important to them as teachers, to their schools and to their parents – that is, they are focusing the

use of resources on attainment results (particularly SATs results in English and mathematics). Indeed, it can be seen from the evidence presented in previous study reports (Passey, 2011b; 2012b) and in this report that teachers are using Espresso Education resources to focus on the learning of pupils in preparation for tests that will be reported nationally (at the end of Key Stages 1 and 2).

Existing evidence of impact of digital technologies and how they relate to Espresso Education resources

There is evidence from a range of sources that digital technologies impact on learning. Some studies have concluded this from a focus on specific digital technologies, using controlled studies (where some pupils or classes or schools have access to and use the technologies, while other pupils or classes or schools do not have the same access and use). Differences between the two groups, matched for all other contexts, are then statistically analysed to derive significance and effect size outcomes. By contrast, other studies have taken a broader approach, which have looked across a wide range of studies to draw conclusions from across a range of contexts. A recent example of the latter form of study (Tamin et al., 2011), concludes that there is impact from uses of digital technologies that support teachers in their pedagogical approaches for learning more than they support learning practices accessed directly by learners:

> *"The current **second-order meta-analysis** summarized evidence regarding the **impact of technology on student achievement** in formal academic contexts based on an extensive body of literature. The synthesis of the extracted **effect sizes**, with the support of the validation process, revealed a **significant positive small to moderate effect size favoring the utilization of technology** in the experimental condition over more traditional instruction (i.e., technology free) in the control group. The analysis of two substantive moderator variables revealed that **computer technology that supports instruction has a marginally but significantly higher average effect size compared to technology applications that provide direct instruction**. Also, it was found that the **average effect size for K–12 applications of computer technology was higher** than computer applications introduced in postsecondary classrooms." (Tamin et al., 2011, p.16)*

Studies that have explored more specific digital technologies have also shown levels of impacts arising on learning. In the context of Espresso Education resources, the medium used by most schools and teachers to provide access to learners is interactive whiteboards. Underwood (2009) identified impacts of learning arising in a study conducted in England:

> *"The evidence tells us that integrated use of technology enables **a range of positive outcomes** for children and young people. **Impact on attainment at Key Stage 2**: **An average gain** from ICT use was equivalent to: a term's additional progress in English; 2.5 months of progress in writing for low attaining boys; 2.5 – 5 months' progress for some groups in maths through effective use of whiteboards; 7.5 months' progress for some groups in science through effective use whiteboards." (Underwood, 2009, p.3)*

Having said that studies do identify positive impact measures, some researchers believe that impacts on learning arising from specific uses of digital technologies are either very hard to measure, or, actually, impossible to measure. The reasons for this are based on the difficulty of associating the impact measure used with the affordances and uses of the digital technologies. As a recent research group stated (ALT, 2012):

> *"Some of the attendees questioned **whether it was possible to evaluate the outcomes** of successful technology enhanced learning. The **outcomes of education extend beyond examination results** and timescales extend beyond the period at school. Learning was also context dependent and there was an issue of the currency of the results of any research." (ALT, 2012, p.6)*

Other reasons for concern about impact measures are based on the difficulties of ensuring that matched sets of control and test groups are contextually the same in all other respects. As the ALT group (2012) went on to say:

> *"It was also argued that **one cannot hold variables constant** in the same way as one can in science and health. It was not clear what a control group would do in a large scale education experiment and whether this were indeed possible as teachers would find it hard to stand dispassionately back from that group and teacher attitudes affect results." (ALT, 2012, p.6)*

Sampling and generalisability

Whether conclusions can be drawn from data gathered in research studies with regard to identifying outcomes and impacts has often been argued from the standpoint of sampling. Some have said that appropriate sampling procedures must surely address concerns about generalisability (and it is generalisability that is actually the issue here – the question of whether results from one population can be generalised to other populations). Sampling and generalisability rely, of course, on measures concerned with representativeness of the total population. So, what sort of percentage would be needed to be anywhere near to gaining some sort of representativeness? Is 10% feasible? Will 1% do? What about a sample under 1%? What about 'fringe' elements, and are they actually more important than the 'average'? Clearly, when there is a school population of nearly 20,000, and a learner population in the millions, sampling is a huge problem for researchers. But, in the analyses provided later in this report, data is considered from across the entire population of 19,983 schools, using attainment result data in 16,739 of those schools, and looking at outcomes relating to pupils at the end of Key Stage 2 within those schools with year 6 groups (aged 10 to 11 years) in a single year.

Although the evidence from this large total population can be considered from the data presented here, the link between the uses of the digital technologies and their impact on attainment results still needs to be made clear. Is there a link between the uses of the digital technologies and the outcomes of pupil attainment tests? Or, as Schachter and Fagnano (1999) said about the match of affordances and achievement:

> *"When administrators, teachers, and parents understand that **different computer technologies serve and augment different learning experiences**, they can make informed judgments about which technologies are best suited to enhance student learning and achievement." (p.341)*

In looking at evidence of impacts of specific forms of digital technologies on the learning of mathematics, Passey (2012a) concluded that impacts are identified not only when affordances are used, but also in how teachers use these with pupils:

> *"This range of **evidence shows [in mathematics]**, for **topic-specific software**, that there is evidence of impact that is both quantitative and qualitative. It can be conjectured that the quantitative impacts arise when the strong signature pedagogies associated with this educational technology category … are met. In terms of **curriculum-wide software**, there is evidence that (some) curriculum-wide software can impact quantitatively, particularly on more able and less able groups. It can be conjectured that difficulties in integrating signature pedagogies with this educational technology category … may have contributed to the decreasing use of this software over time, however. In terms of **teaching-wide software**, **parent-involved software** and **online learner support**, there is no evidence of effect size on learning outcome, but the importance of integrating certain specific signature pedagogies … with these educational technology categories is clear. In terms of **curriculum-supportive online resources**, there is quantitative evidence, but no evidence of effect size on learning outcome, but the importance of external access to resources by learners at times to suit their needs, and the importance of planned and longer-term use, is clear." (p.28)*

The specificity of learning certainly needs to be considered in forms of analysis concerned with identifying impact. Learning (whether across or within subjects) is not a single 'thing'. Learning mathematics is not the same as learning art; learning a fact in science is not the same as learning how to analyse scientific data. So, is all learning affected by a single form of digital technology? If not, then what learning should be explored? Is a focus on one or more aspects of learning sufficient? If not, what will be measured?

Measuring impact in the context of Espresso Education digital resources

Measuring impact of Espresso Education digital resources is no less or more difficult than exploring this requirement in the context of any digital technology. However, there are certain features that make this endeavour more readily possible:

- There are a range of background studies that positively support this form of exploration.
- There are a range of studies that have been conducted that have focused specifically on learning arising from uses of Espresso Education digital resources.
- There is evidence from these studies that is both qualitative and quantitative in form (offering perspectives on why and how impacts arise, as well as what and extents that levels arise).
- There is evidence that spans the quantitative area – including teacher survey data, logfile resource access data, data from across a range of schools nationally, data from across all schools in one LA, and data from across all schools in England.

In putting a picture of impact together, it is important to consider the four key areas identified earlier:

- **Affordances** – the features that Espresso Education digital resources offer. As stated in Passey (2011a):

  > *"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'." (p.3)*

- **Uses** – how pupils and teachers are using the resources. As stated in Passey (2011a):

  > *"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. (p.5) … 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." (p.7)*

- **Outcomes** – what results from using the resources. As stated by Passey (2011d):

  > *"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." (p.14)*

- **Impact** – measurable outcomes arising that relate to affordances, uses and outcomes. As stated by Passey (2011b):

  > *"Some impacts, such as engagement through visual material, are brought about almost entirely through resource features (which are constant). Other features, such as opportunities to use resources to consider the development of different learning strategies, are brought about through pedagogical features strongly (which are not necessarily constant)." (p.5)*

Looking at each of the measures in more detail in the context of Espresso Education resources

Affordances

Espresso Education resources are characterised by certain features that set them apart from other sets of online resources. 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 Education 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.

The affordances provided by Espresso Education resources mean that learners can:

- Gain from materials in a visual and auditory medium as well as those using a text-based medium. Importantly, many Espresso Education resources link the visual and auditory with the textual medium. This is vitally important for supporting memorisation patterns in different ways for different individuals.
- Gain from clear and uncluttered resources. This means that focal elements are emphasised, so that teachers can continue their focus on aspects of learning, rather than learners being distracted by other elements surrounding the key elements for learning (and focusing effectively to support memorisation and recall).
- Gain from teachers framing and using the resources within wider contexts, rather than using the resources in isolation outside a classroom environment. This means that the lessons learned do not need to be taken from one environment and then transferred within other learning contexts beyond those framed by teachers.
- Gain from video clips that contain 'real' material. This means that learners are exposed to material that is real and live, materials that they can relate to, or that they can use to extend their learning. This allows wider and deeper learning to be involved and to develop.

Uses

Teachers widely use Espresso Education resources. In September 2010, a total of 8,978 primary schools subscribed to Espresso Education resources. In itself, this level of subscription indicates that many schools see value in these resources. Many LAs have also supported bulk purchase for their schools. This too is an indication of the high value placed on the resources by LA advisors and consultants. By July 2012, the numbers of schools subscribing to Espresso Education had increased to 9,316 in England alone; this represents 47% of the total school population in England, for schools with pupils ranging across the 3 to 11 year age range.

Many teachers and schools use Espresso Education resources widely, not only to support learning in non-core areas, but also to support learning in the core subjects of numeracy, literacy and science (mathematics, English and science). In Figure 2 following, evidence is shown from 135 teachers reporting on their uses of the resources in an earlier study (Passey, 2012b). It is clear from these responses that uses by teachers to support numeracy and literacy feature strongly. Teachers are using these resources to support subject learning in those subject areas that will be ultimately tested through the SATs that pupils take at the end of Key Stage 2. It would be expected, therefore, that the resources could have direct or indirect impact on attainment results in these subject areas.

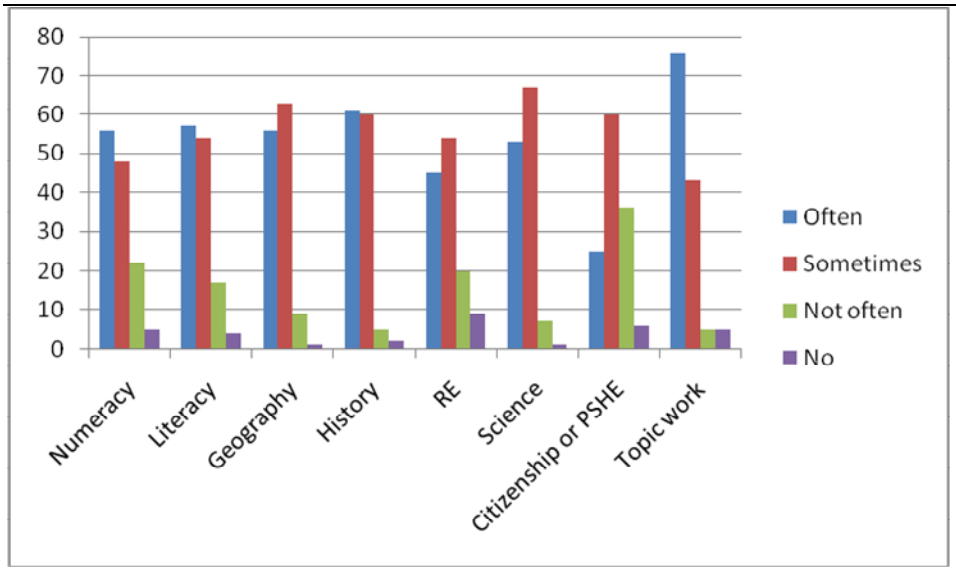

Figure 2: Teacher reports of uses of Espresso Education resources nationally (Source: Passey, 2011b)

This association is supported by the data gathered in a subsequent study (Passey, 2012b). From schools across a single LA, the picture found was similar. Of 97 teachers providing evidence, they used Espresso Education resources frequently to support teaching and learning in literacy and numeracy (shown in Figure 3 following).

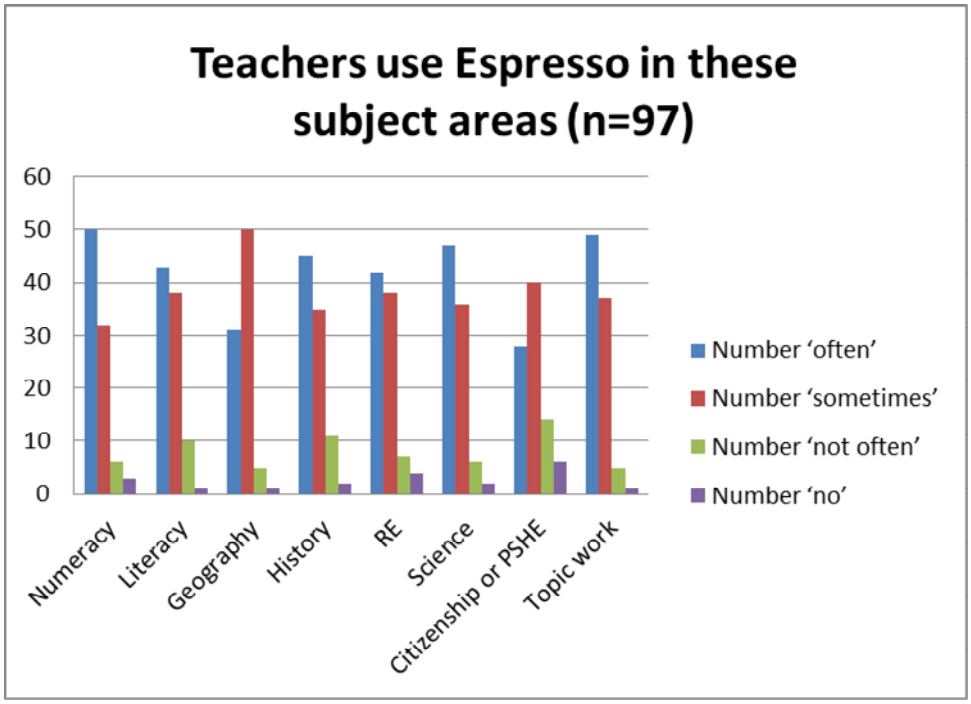

Figure 3: Teacher reports of uses of Espresso Education resources in one LA (Source: Passey, 2012b)

Outcomes

Results from in-depth interviews with teachers in an earlier study (Passey, 2011b) indicated that teachers found that Espresso Education digital resources supported wider and deeper learning. Figure 4 following, from that study, shows responses from 45 teachers, and indicates that teachers found that the resources supported pupil engagement, discussion, idea generation, understanding, and reflection.

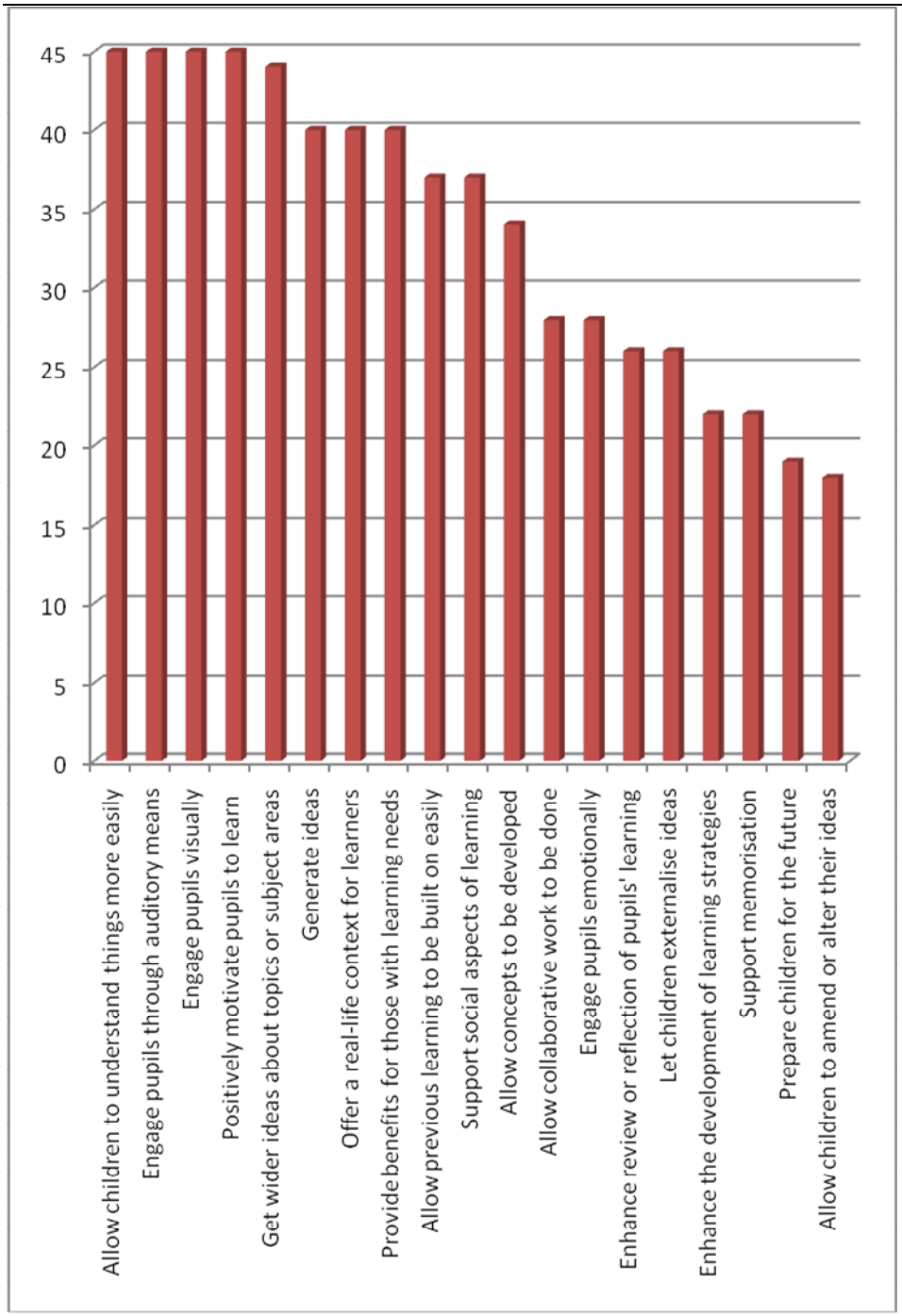

Figure 4: Teachers describing outcomes of using Espresso Education resources (Source: Passey, 2011b)

Across the entire evidence base for the national and LA studies (Passey, 2011a; 2011b; 2011d; 2012b), it is clear that teachers associate their uses of Espresso Education resources with outcomes that they can recognise in their learners, across a wide range of areas of learning. Figure 5 following (from the study by Passey, 2012b) shows a learning framework analysis to illustrate this key point. This framework presents evidence of outcomes and impacts gathered from teacher responses across the range of schools involved in both studies (Passey, 2011b; 2012b), and from survey responses in the second of these studies (Passey, 2012b). The level of teacher response is shown in the case of each relevant learning element by using a colour: red shows a very high level of response (over 80%), orange a high level (55% to 80%), yellow a low level (25% to 54%), and cream a shallow level (less than 25%). Areas shaded green indicate that there is evidence from schools, but the level cannot be quantified through responses provided, and white shows there is no evidence from schools from their responses.

MEGACOGNITIVE

- Knowing about the big picture
- Working in a Zone of Proximal Development
- The transfer of learning
- Involving meaningful and authentic learning
- Reflecting on previous learning

COGNITIVE

Internalisation

Attention

Sensory stimulus

- Visual
- Auditory
- Kinaesthetic
- Emotional
- Social
- Textual
- Musical
- Interpersonal
- Intrapersonal

Acquisition or reception

Internal cognitive processing

Subject knowledge

- Searching
- Generating or developing ideas
- Hypothesising
- Imagining
- Gaining skills
- Gaining understanding

ICT knowledge

- Skills
- Understanding

Knowledge handling

- Acquisition
- Comprehension
- Application
- Analysis
- Synthesis
- Evaluation

Thinking

- Creativity
- Enquiring
- Questioning
- Conceptualising
- Comparing
- Reasoning
- Interpreting

- Concept formation
- Reconstruction of ideas

Retention

Rehearsal

- Short-term memory
- Long-term memory

Recall

Externalisation

Motor stimulus

- Writing
- Reporting
- Speaking
- Presenting
- Drawing
- Completing
- Moving

METACOGNITIVE

Monitoring task performance	Keeping place, sequence
	Detecting and correcting errors
	Pacing of work
Selecting and understanding appropriate strategy	Focusing attention on what is needed
	Relating what is known to material to be learned
	Testing the correctness of a strategy

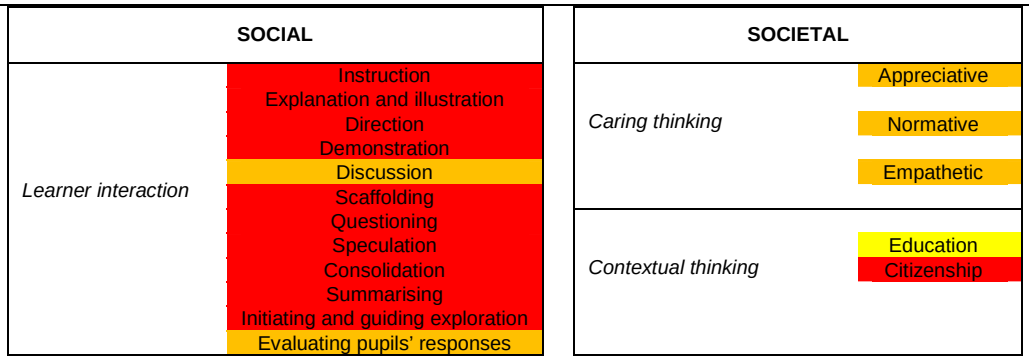

Figure 5: Learning framework analyses of teacher-reported aspects of learning supported by uses of Espresso Education resources (Source: Passey, 2012b)

The fact that teachers recognise outcomes of use in areas of engagement with learning, interaction with aspects of learning, acquisition and comprehension of knowledge, gaining understanding, generating ideas, and memorisation and recall, all indicate that the outcomes of using Espresso Education resources can relate to attainment results in core subject areas – mathematics and English.

Impact

Impacts are measurable outcomes. In this report two sets of measurable outcomes are explored:

- Differences in attainment results (SATs) at the end of Key Stage 2 in core subjects for schools using Espresso Education resources in different ways across the entire age range of their pupils.
- Differences in attainment results (SATs) at the end of Key Stage 2 in core subjects for schools having access to the Espresso Education resources for varying and long periods of time.

In terms of differences in attainment results at the end of Key Stage 2 in core subjects for schools using Espresso Education resources in different ways across the entire age range of pupils, the study of Espresso Education resources (Passey, 2011d) looked specifically at this point. Logfile access and usage statistics provided by Espresso Education included the 'top pages' accessed by schools. For 72 schools in a sample where logfile data and SATs results were matched by year, a comparative analysis of access and attainment results (SATs) was undertaken. For 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 30 schools with higher attainment results (85% or above at Level 4 or above in English in 2009), the 'top pages' accessed by these users were identified. Looking at 'top pages' accessed was used in this analysis as a way to identify whether there were differences between these two samples in terms of the types of pages accessed (although it should be recognised that uses of 'top pages' could occur in any specific year group within a Key Stage, as their uses within the logfiles were not specifically related to year 6 classes, where learners are focused most strongly on SATs tests in any given year).

The 'top 10' pages accessed between September 2008 and July 2009 in each school in the sample were identified and recorded. Frequencies were used to calculate a ratio, in order to take account of the number of schools involved in each sub-sample. Using the 'top 10' pages as indicators of resources most commonly accessed across the group of schools with lower attainment results, it was clear that:

- Key Stage 2 resources were accessed more than Key Stage 1 resources, which in turn were accessed more than Early Years resources.
- Mathematics was the subject that was accessed most commonly.
- Shared sound activities, search facilities and the route creator were the forms of activity most commonly accessed.
- It was difficult to identify any specific topics that were more commonly accessed than any others.

Using the 'top 10' pages as indicators of resources most commonly accessed across the group of schools with higher attainment results, it was clear that:

- Key Stage 2 resources were accessed more than Key Stage 1 resources, which in turn were accessed more than Early Years resources, but the balance was different from the schools with lower attainment results.
- Mathematics was the subject that was accessed most commonly, but at a lower level than that for schools with higher attainment results.
- Shared sound activities, search facilities and the route creator were the forms of activity most commonly accessed, but again balanced differently from those in schools with lower attainment levels.
- It was difficult to identify any specific topics that were more commonly accessed than any others.

The ratios of access to different forms of pages can be placed alongside each other. While patterns are similar, it is clear that there are differences. These are shown in Table 1 following.

Table 1: Ratios of access of Espresso Education resources by school group (Source: Passey, 2011d)

Page group	Page identifier	Ratio for schools in the lower attaining group	Ratio for schools in the higher attaining group
Age group	Key Stage 2	1.88	1.40
	Key Stage 1	1.26	1.37
	Early years	0.67	0.77
Subject	Mathematics	1.64	1.17
	Modules (without any further identifier)	1.00	1.00
	Topics	0.81	1.07
	Science	0.52	0.67
	English	0.40	0.17
	History	0.36	0.33
	Literacy	0.24	0.27
	Geography	0.14	0.20
	Music	0.10	0.03
	Religious education	0.07	0.13
	Modern foreign languages	0.07	0.13
	Art	0.00	0.03
Forms of activity	Activity shared sound	1.26	1.47
	Search	1.00	0.97
	Route creator	0.76	0.83
	News	0.36	0.33
	Presentation	0.31	0.33
	Video	0.21	0.10
	Web link	0.19	0.17
	Book reviews	0.02	0.00
	Jotter	0.00	0.03
Specific topics	Maths mansion	0.07	0.03
	World	0.07	0.10
	Egyptians	0.05	0.00
	Numbers 100	0.05	0.03
	Bites	0.05	0.00
	Shape and space	0.05	0.00
	Time	0.02	0.00
	Rat-a-tat-tat	0.02	0.03
	Premiership	0.02	0.00
	Plymouth	0.02	0.00
	Vikings	0.02	0.00
	Toys	0.02	0.07
	Mountains	0.02	0.00
	Weather	0.02	0.00

Page group	Page identifier	Ratio for schools in the lower attaining group	Ratio for schools in the higher attaining group
	Counting	0.00	0.03
	Word machine	0.00	0.03
	Romans	0.00	0.03
	Electricity	0.00	0.03
	Growing plants	0.00	0.03
	Light	0.00	0.03
	Materials	0.00	0.03
	Habitats	0.00	0.03
	20th century archive	0.00	0.03
	Faiths	0.00	0.03
	Tudors	0.00	0.07
	Vamos	0.00	0.07

By comparing 'top 10' pages 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 suggested that the schools that were attaining higher levels at the end of Key Stage 2 were using 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 the differences in levels of access at the different Key Stages (2, 1 and Early Years) were compared using a Chi-squared test, then the differences were found to be statistically significant (χ^2=6.446, df=2, p=.004).

Differences in attainment results (SATs) at the end of Key Stage 2 in core subjects for schools having access to the Espresso Education resources over long periods of time was explored in the study of Espresso Education resources in a single LA (Passey, 2012b). The report concluded that:

> *"There are some indications from the analysis of correlation statistics that background factors being put in place at early stages (such as school-wide use of Espresso resources to support learning and teaching reported in school self-reviews in 2004) may be related or contribute to longer-term increases in attainment results. Those schools with higher levels of attainment at Level 4 in English in 2010 had a higher average number of Espresso resource references in their planning documents (indicating a possible wider school integration of the resources), when compared to those schools with lower levels of attainment. Those same schools also gained increasingly higher SAT results in English and mathematics across the period of time from 2004 to 2010, which coincided with the time period that Espresso resources were being integrated more fully across school curricula through a continuity of training events." (p.4)*

Exploring impacts on learning with a national data set

When data from all schools across England are explored, similar findings emerge. To explore impacts measured by attainment results (SATs) at the end of Key Stage (KS) 2 when learners are 11 years of age, schools with cohorts of year 2 or year 6 learners and where SATs results are reported were selected for the analysis. From the initial total population, this means that special schools and independent schools are taken out of the selected population. Of the 16,739 schools that are within this latter population, 7,260 subscribe to Espresso (43% of the total). Of these, 1,540 have subscribed for between 1 and 5 years, 5,451 have subscribed for 6 to 10 years, and 269 have subscribed for 11 years or more.

For analyses exploring impacts on learning through the national data set, a number of variables associated with each of the 16,739 schools were selected. These were:

- Years the school has subscribed to Espresso Education resources.
- Percentage in the cohort below the expected level at the end of KS1.
- Percentage in the cohort above the expected level at the end of KS1.
- Percentage of pupils for whom English is not a first language.
- Percentage of pupils with statements or supported at school action plus.

- Percentage of pupils making expected progress in English.
- Percentage of pupils making expected progress in mathematics.
- Percentage of disadvantaged pupils (those eligible for free school meals (FSM) and children looked after (CLA)) achieving Level 4 or above in English and mathematics.
- Percentage of pupils making expected progress in English: low attainers (below Level 2).
- Percentage of pupils making expected progress in English: middle attainers (at Level 2).
- Percentage of pupils making expected progress in English: high attainers (above Level 2).
- Percentage of pupils making expected progress in mathematics: low attainers (below Level 2).
- Percentage of pupils making expected progress in mathematics: middle attainers (at Level 2).
- Percentage of pupils making expected progress in mathematics: high attainers (above Level 2).
- Percentage achieving Level 4 or above in both English and mathematics.
- Percentage of pupils achieving Level 4 or above in English.
- Percentage of pupils achieving Level 4 or above in mathematics.
- Percentage achieving Level 4 or above in both English and mathematics: low attainers (below Level 2).
- Percentage achieving Level 4 or above in both English and mathematics: middle attainers (at Level 2).
- Percentage achieving Level 4 or above in both English and mathematics: high attainers (above Level 2).
- Spend on ICT learning resources (£ per pupil).

When the first of these variables (number of years a school has subscribed to Espresso Education resources) is used as a factor to compare distribution of the other variables, ANOVA tests indicate that in all cases except two (the percentage in the cohort at the expected level at the end of KS1, and the percentage of pupils making expected progress in mathematics for low attainers) the distribution is statistically significantly different between the elements of the selected factor. The levels of significance for all but two cases are all below p=0.05, and they are shown in Table 2 following.

Table 2: Results of ANOVA tests calculating variances of schools grouped by years subscribing to Espresso Education

Variable		Sum of Squares	df	Mean Square	F	Sig.
Percentage in cohort below expected level at the end of KS1	Between Groups	.612	12	.051	3.125	.000
	Within Groups	99.962	6127	.016		
	Total	100.574	6139			
Percentage in cohort at expected level at the end of KS1	Between Groups	.430	12	.036	1.697	.061
	Within Groups	129.286	6127	.021		
	Total	129.715	6139			
Percentage in cohort above expected level at the end of KS1	Between Groups	.555	12	.046	2.304	.006
	Within Groups	122.955	6127	.020		
	Total	123.510	6139			
Percentage of pupils for whom English is not first language	Between Groups	10.665	12	.889	16.885	.000
	Within Groups	322.495	6127	.053		
	Total	333.160	6139			
Percentage of Pupils with statements or supported at school action plus	Between Groups	.185	12	.015	2.040	.018
	Within Groups	46.251	6127	.008		
	Total	46.436	6139			
Percentage of pupils making expected progress in English	Between Groups	1.554	12	.130	3.906	.000
	Within Groups	203.134	6127	.033		
	Total	204.689	6139			
Percentage of pupils making expected progress in maths	Between Groups	1.492	12	.124	3.605	.000
	Within Groups	211.397	6127	.035		
	Total	212.890	6139			
Percentage of disadvantaged pupils	Between Groups	23.221	12	1.935	19.095	.000

(FSM and CLA) achieving level 4+ English and maths	Within Groups	620.932	6127	.101		
	Total	644.154	6139			
Percentage of pupils making expected progress in English: low attainers	Between Groups	.570	12	.047	1.972	.023
	Within Groups	64.800	2692	.024		
	Total	65.369	2704			
Percentage of pupils making expected progress in English: middle attainers	Between Groups	6.208	12	.517	6.928	.000
	Within Groups	456.499	6113	.075		
	Total	462.707	6125			
Percentage of pupils making expected progress in English: high attainers	Between Groups	7.068	12	.589	3.481	.000
	Within Groups	984.033	5815	.169		
	Total	991.102	5827			
Percentage of pupils making expected progress in maths: low attainers	Between Groups	.837	12	.070	1.578	.091
	Within Groups	118.812	2688	.044		
	Total	119.649	2700			
Percentage of pupils making expected progress in maths: middle attainers	Between Groups	6.012	12	.501	6.739	.000
	Within Groups	454.475	6113	.074		
	Total	460.487	6125			
Percentage of pupils making expected progress in maths: high attainers	Between Groups	7.496	12	.625	3.001	.000
	Within Groups	1210.504	5815	.208		
	Total	1217.999	5827			
Percentage achieving Level 4 or above in both English and mathematics	Between Groups	1.400	12	.117	3.236	.000
	Within Groups	220.984	6127	.036		
	Total	222.385	6139			
Percentage of pupils achieving Level 4 or above in English	Between Groups	1.299	12	.108	3.251	.000
	Within Groups	204.016	6127	.033		
	Total	205.314	6139			
Percentage of pupils achieving Level 4 or above in maths	Between Groups	1.092	12	.091	2.762	.001
	Within Groups	201.835	6127	.033		
	Total	202.927	6139			
Percentage achieving Level 4 or above in both English and maths: low attainers	Between Groups	1.191	12	.099	2.262	.008
	Within Groups	118.292	2695	.044		
	Total	119.483	2707			
Percentage achieving Level 4 or above in both English and maths: middle attainers	Between Groups	6.299	12	.525	7.183	.000
	Within Groups	446.740	6113	.073		
	Total	453.039	6125			
Percentage achieving Level 4 or above in both English and maths: high attainers	Between Groups	8.267	12	.689	2.868	.001
	Within Groups	1396.468	5814	.240		
	Total	1404.735	5826			
ICT learning resources (£ per pupil)	Between Groups	70940.214	12	5911.685	2.171	.011
	Within Groups	19665534.220	7223	2722.627		
	Total	19736474.434	7235			

Correlation analyses were run, to explore strength of relationship of each variable against numbers of years schools subscribed to Espresso Education resources. Although correlation analysis results were statistically significant in all cases where ANOVA results were statistically significant, the strength of relationship was weak in all cases. So no firm relationship can be stated between number of years subscribing to Espresso Education resources and progress and attainment results reported in 2011.

Interestingly, more schools with higher numbers of learners where English is not the first home language subscribe to Espresso Education than do those with lower numbers. For all schools, there are 21% of pupils where English is not the first language at home. For non-subscribing schools, the level is 18%, while for those subscribing to Espresso Education for 1 to 5 years it is 22%, for those subscribing for 6 to 10 years it is 24%, and for those subscribing for 11 or more years it is 21%. This is clearly shown in Figure 6 following, which plots mean percentages of pupils where English is not the first language at home against numbers of years subscribing to Espresso Education.

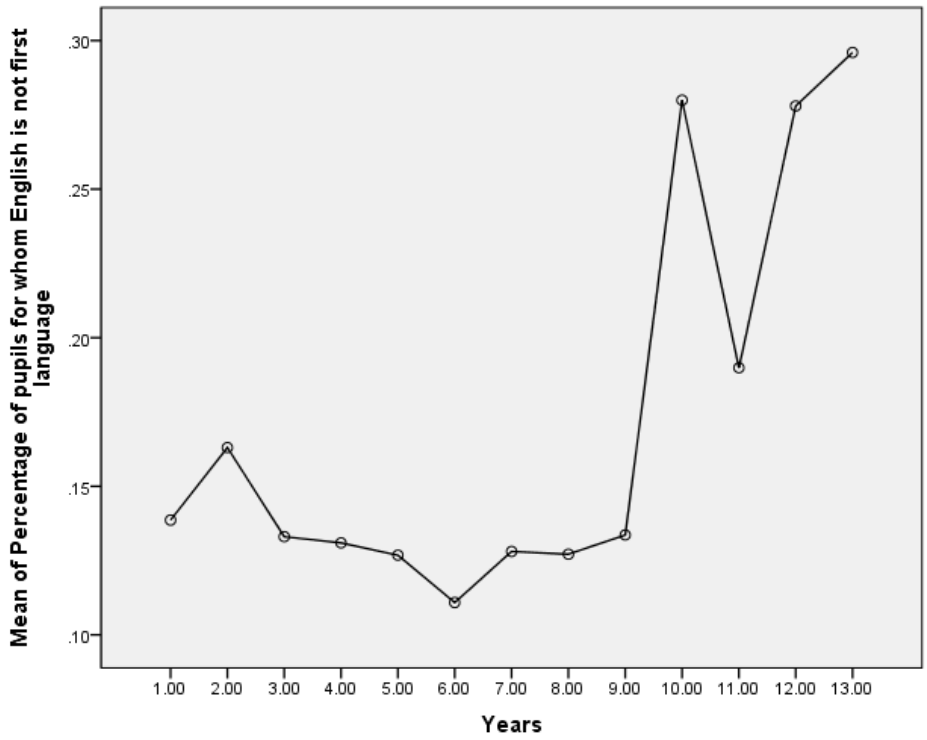

Figure 6: Average proportions of pupils for whom English is not a first language at home against years subscribing to Espresso Education resources

There is a similar pattern when learners eligible for free school meals (FSM) are considered. For all schools the level is 19% of pupils eligible for FSM, but for non-subscribing schools the level is 18%, while for those subscribing to Espresso Education for 1 to 5 years it is 20%, for those subscribing for 6 to 10 years it is 19%, and for those subscribing for 11 or more years it is 26%.

These data support the evidence gathered from studies that have looked at uses and outcomes of Espresso Education resources; schools and teachers select Espresso Education resources in order to support all learners, to provide width and depth for their learning, and to support a provision of experiences where these might be more restricted within certain family, home or social backgrounds. These data also suggest that national attainment scores (SATs) for the subscribing schools might be lower than those for non-subscribers, since greater language challenges might result when pupils are taking national tests within an England-language medium. This concern is also supported by national evidence about learners falling below and above expected national attainment levels at the end of Key Stage 1 (at 7 years of age). While the same proportions of learners fall below the expected level of English at the end of Key Stage 1 (57%), the proportions are different for those who fall above the expected level. For all schools, 26% of pupils fall above the expected level, but for non-subscribing schools the level is 26%, while for those subscribing to Espresso Education for 1 to 5 years it is 25%, for those subscribing for 6 to 10 years it is 25%, and for those subscribing for 11 or more years it is 22%. These data are illustrated in Figures 7 and 8 following.

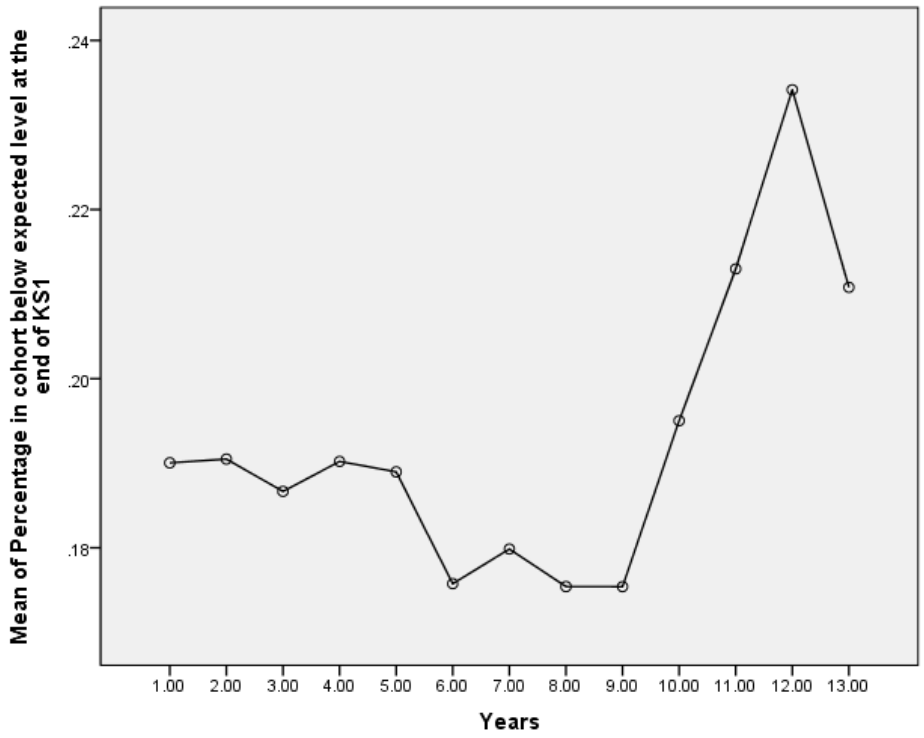

Figure 7: Average proportions of pupils below the expected level at the end of Key Stage 1 against years subscribing to Espresso Education resources

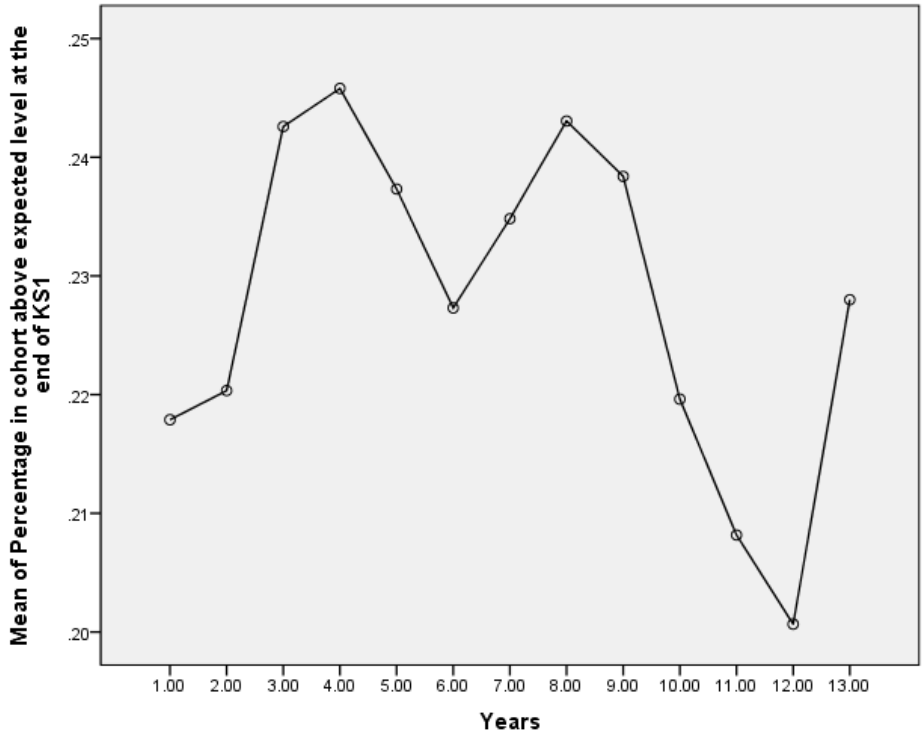

Figure 8: Average proportions of pupils above the expected level at the end of Key Stage 1 against years subscribing to Espresso Education resources

These data suggest that subscribing schools could expect to gain at lower levels than non-subscribing schools in terms of later attainment (SAT) results. This anticipated pattern is not the pattern that is found, however. Overall, the expected progress in English at Key Stage 2 is slightly higher for subscribing schools (86%) compared to the overall level and the level for non-subscribing schools

(85%). At the end of Key Stage2 the numbers of learners attaining level 4 or above in English and in mathematics is not markedly different for non-subscribing and subscribing schools, shown in Table 3 following.

Table 3: Average levels of subject attainment at Level 4 or above according to number of years schools have subscribed to Espresso Education resources

Subject level	Non-subscribing schools	Subscribing schools 1-5 years	Subscribing schools 6-10 years	Subscribing schools 11+ years	All schools
Percentage of pupils achieving Level 4 or above in English	83%	82%	83%	81%	83%
Percentage of pupils achieving Level 4 or above in mathematics	82%	81%	82%	81%	82%
Number of schools	9,479	1,540	5,451	269	16,739

These data are illustrated in more detail in the figures following. Figures 9 to 11 show the levels of attainment against numbers of years schools have subscribed to Espresso Education.

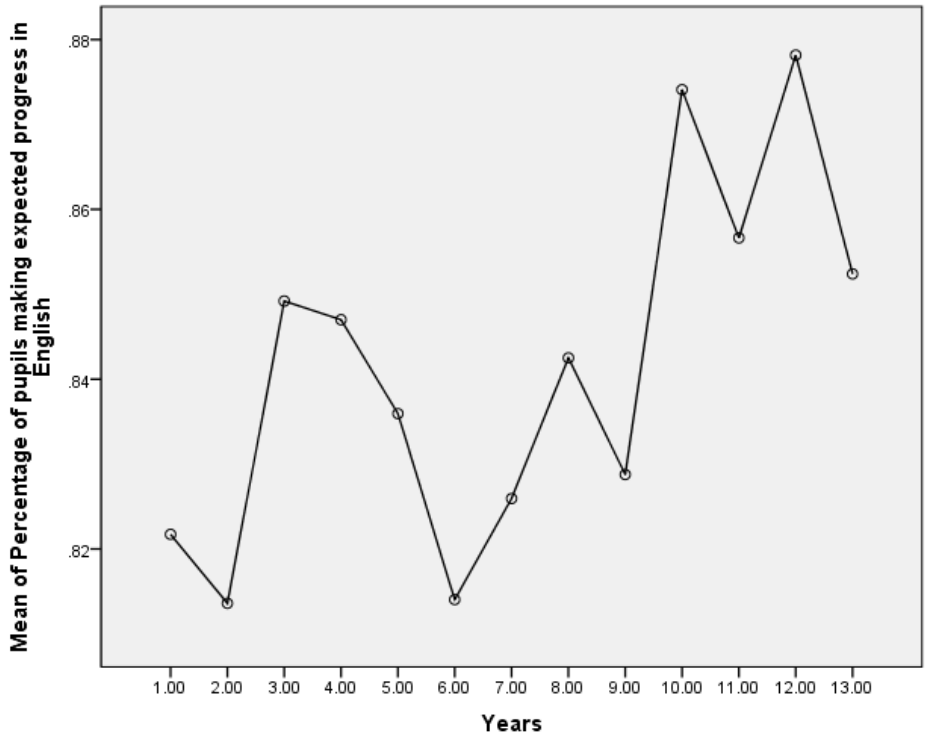

Figure 9: Average proportions of pupils making expected progress in English against years subscribing to Espresso Education resources

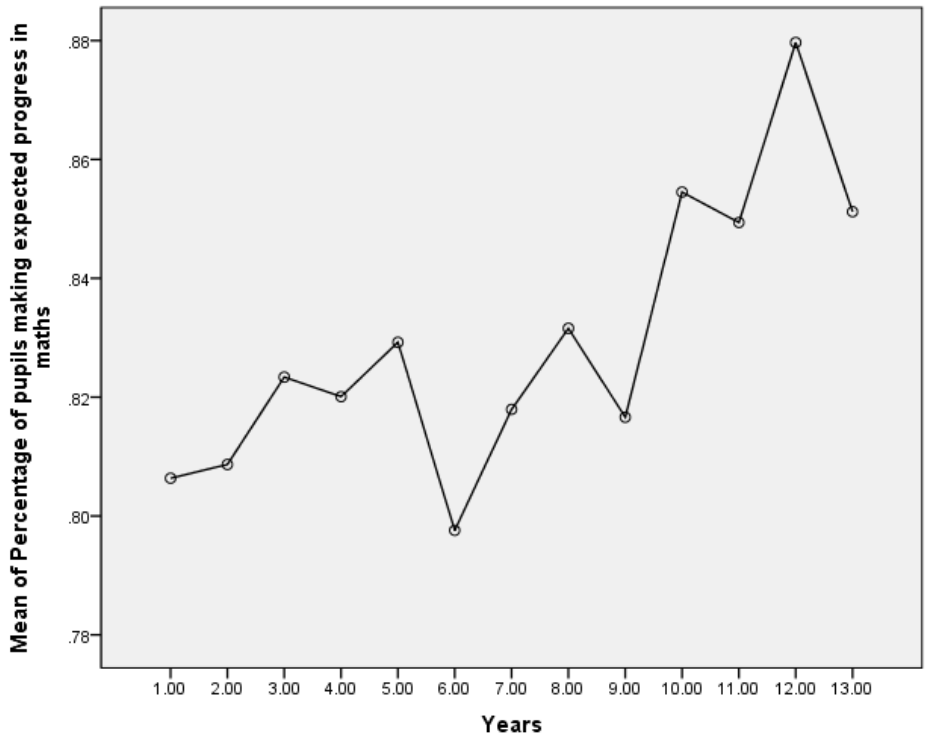

Figure 10: Average proportions of pupils making expected progress in mathematics against years subscribing to Espresso Education resources

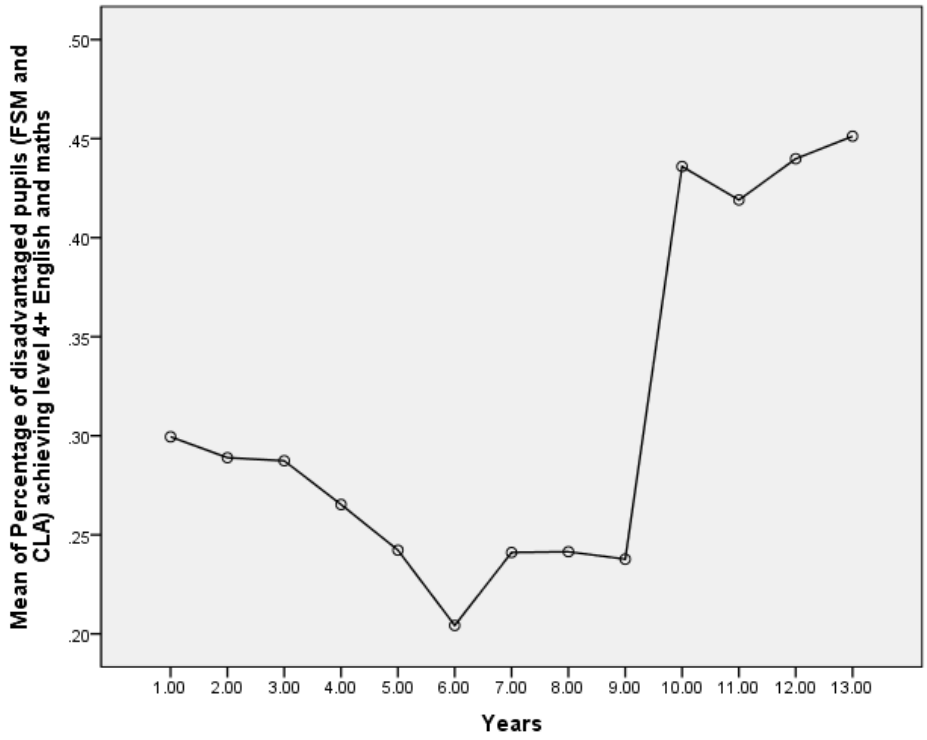

Figure 11: Average proportions of disadvantaged pupils achieving Level 4 or above in English and mathematics against years subscribing to Espresso Education resources

Of particular interest is the levels of attainment gained when the learner cohort is divided into three bands – low attainers (below Level 2); middle attainers (at Level 2); and high attainers (above Level 2). In this case, the longer the schools have had access to Espresso Education resources, the higher is

the attainment at Level 4 in English and mathematics for low and middle attainers. The table following shows the patterns for all three bands.

Table 4: Average proportions of pupils at different attainment levels at the end of Key Stage 1 achieving at Level 4 or above in both English and mathematics according to numbers of years schools have subscribed to Espresso Education resources

Subject level	Non-subscribing schools	Subscribing schools 1-5 years	Subscribing schools 6-10 years	Subscribing schools 11+ years	All schools
Percentage achieving Level 4 or above in both English and mathematics: low attainers	31%	30%	32%	35%	31%
Percentage achieving Level 4 or above in both English and mathematics: middle attainers	82%	82%	83%	84%	82%
Percentage achieving Level 4 or above in both English and mathematics: high attainers	99%	99%	99%	100%	99%
Number of schools	9,479	1,540	5,451	269	16,739

These data are shown in more detail in the figures following. In Figures 12 to 17, levels of attainment are plotted against numbers of years schools have subscribed to Espresso Education resources.

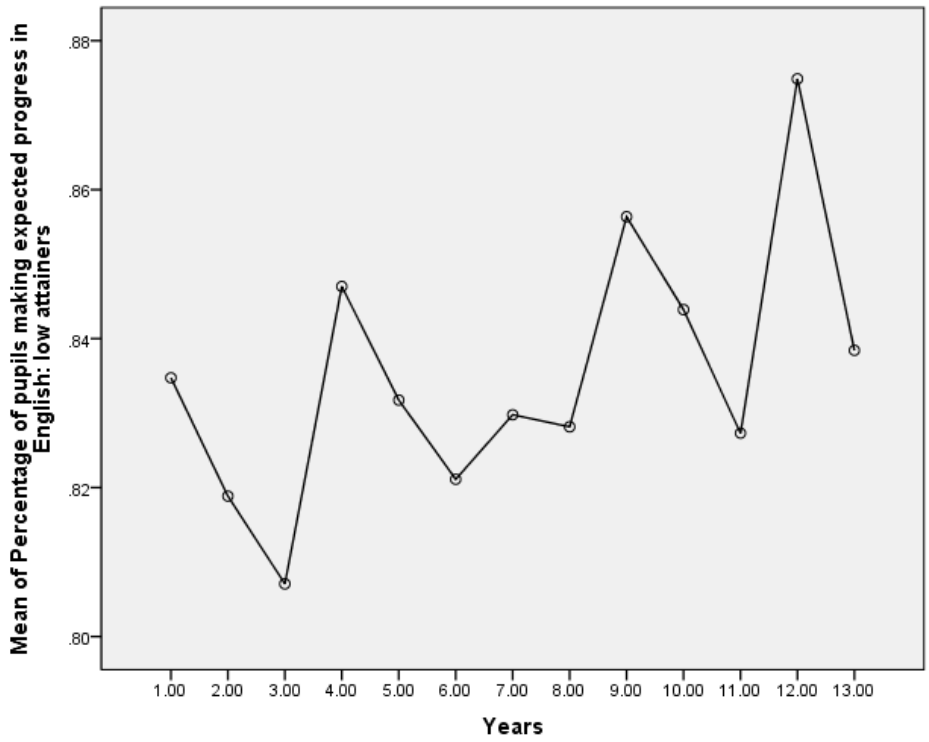

Figure 12: Average proportions of low attaining pupils making expected progress in English against years subscribing to Espresso Education resources

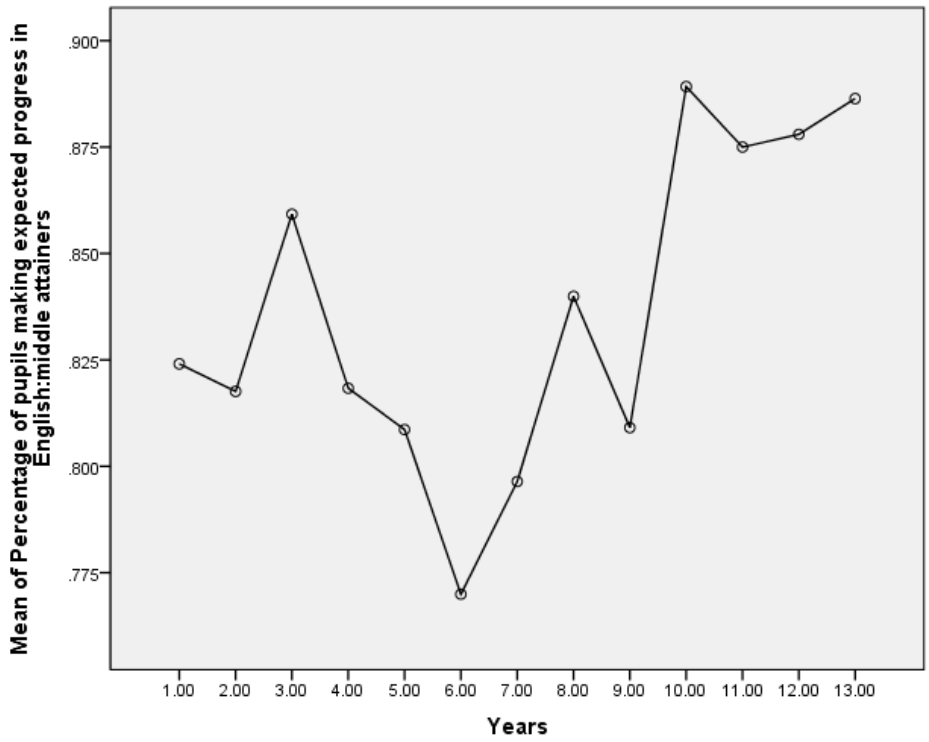

Figure 13: Average proportions of middle attaining pupils making expected progress in English against years subscribing to Espresso Education resources

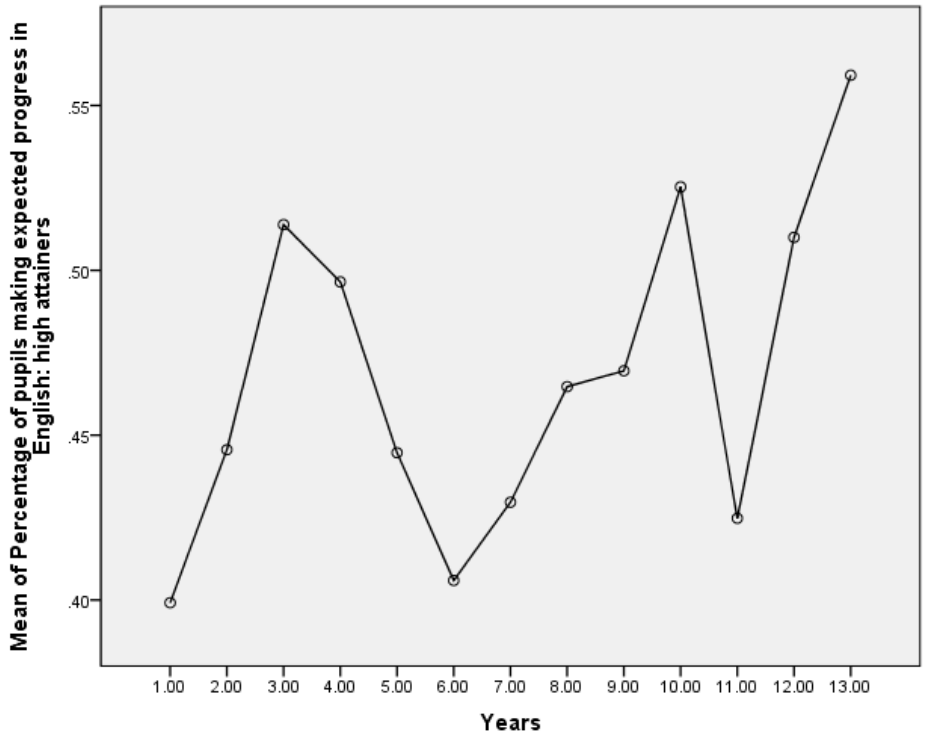

Figure 14: Average proportions of high attaining pupils making expected progress in English against years subscribing to Espresso Education resources

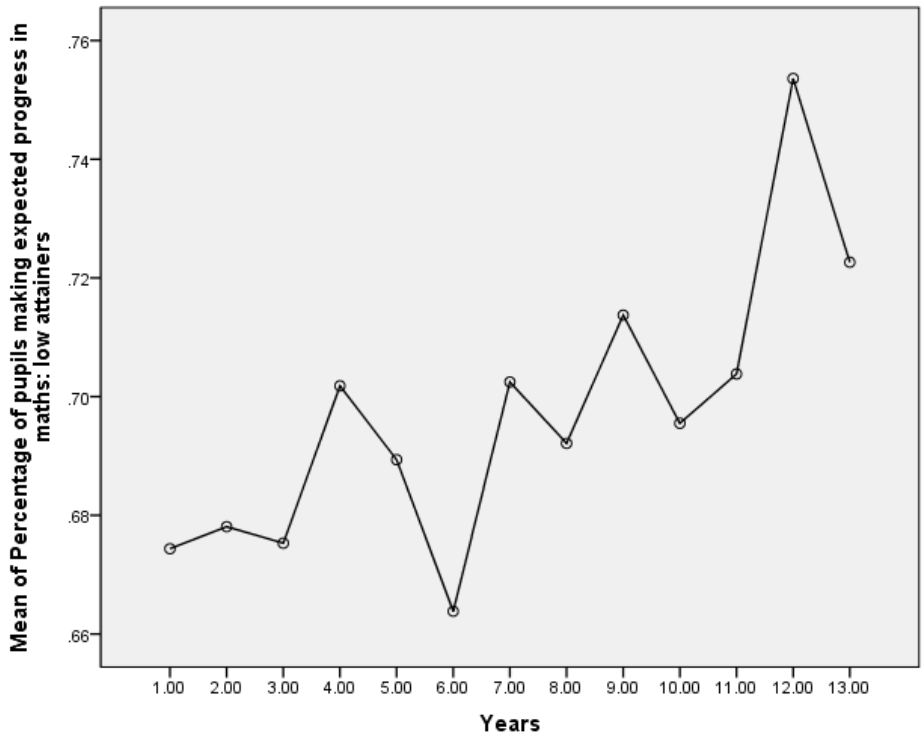

Figure 15: Average proportions of low attaining pupils making expected progress in mathematics against years subscribing to Espresso Education resources

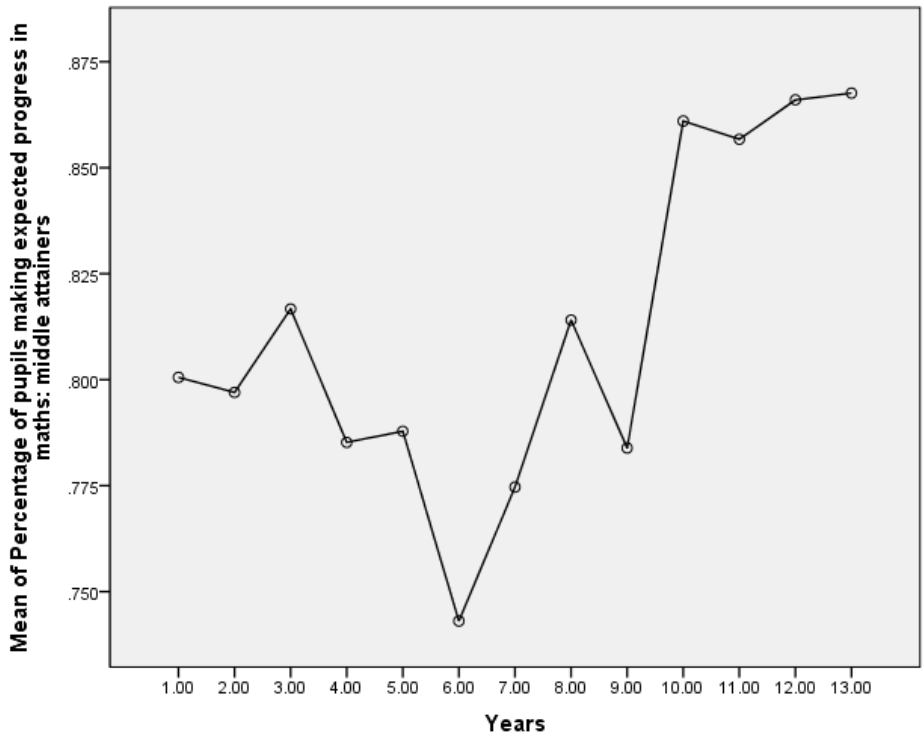

Figure 16: Average proportions of middle attaining pupils making expected progress in mathematics against years subscribing to Espresso Education resources

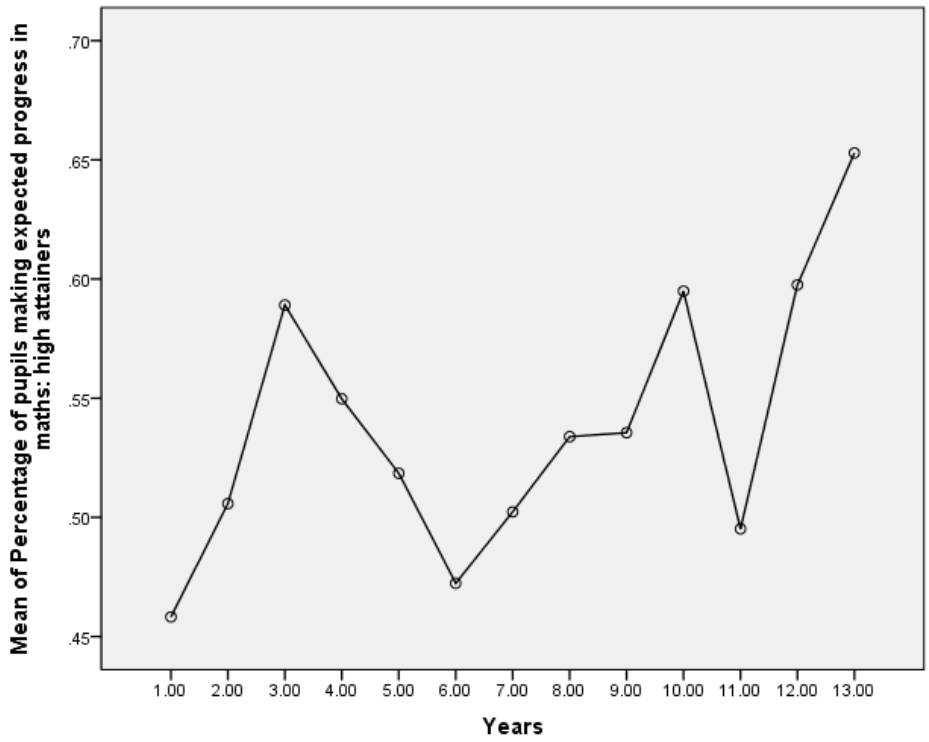

Figure 17: Average proportions of high attaining pupils making expected progress in mathematics against years subscribing to Espresso Education resources

Overall the data show that schools that subscribe to Espresso Education digital resources have higher proportions of learners with a first language other than English spoken at home, higher proportions of learners eligible for FSM, lower proportions of learners starting above the expected level of English at the end of Key Stage 1, but, for those low attainers (below Level 2), a greater level of attainment at Level 4 or above in both English and mathematics at the End of Key Stage 2 when access to Espresso Education resources has been possible for 6 or more years. At the same time, the data show that Espresso Education resources do not have a negative effect on the attainment of medium or high attainers (at or above Level 2). These results are shown in the table following.

Table 5: Proportions of disadvantaged and other pupils making expected subject progress according to number of years schools have subscribed to Espresso Education resources

Subject level	Non-subscribing schools	Subscribing schools 1-5 years	Subscribing schools 6-10 years	Subscribing schools 11+ years	All schools
Percentage of disadvantaged pupils (FSM and CLA) making expected progress in English	81%	83%	83%	84%	82%
Percentage of other pupils making expected progress in English	85%	86%	86%	87%	86%
Percentage of disadvantaged pupils (FSM and CLA) making expected progress in mathematics	76%	77%	78%	81%	77%
Percentage of other pupils making expected progress in mathematics	84%	84%	85%	87%	84%
Number of schools	9,479	1,540	5,451	269	16,739

Figures 18 to 23 following illustrate these points in more detail. In these figures, levels of attainment are plotted against numbers of years that schools have subscribed to Espresso Education resources.

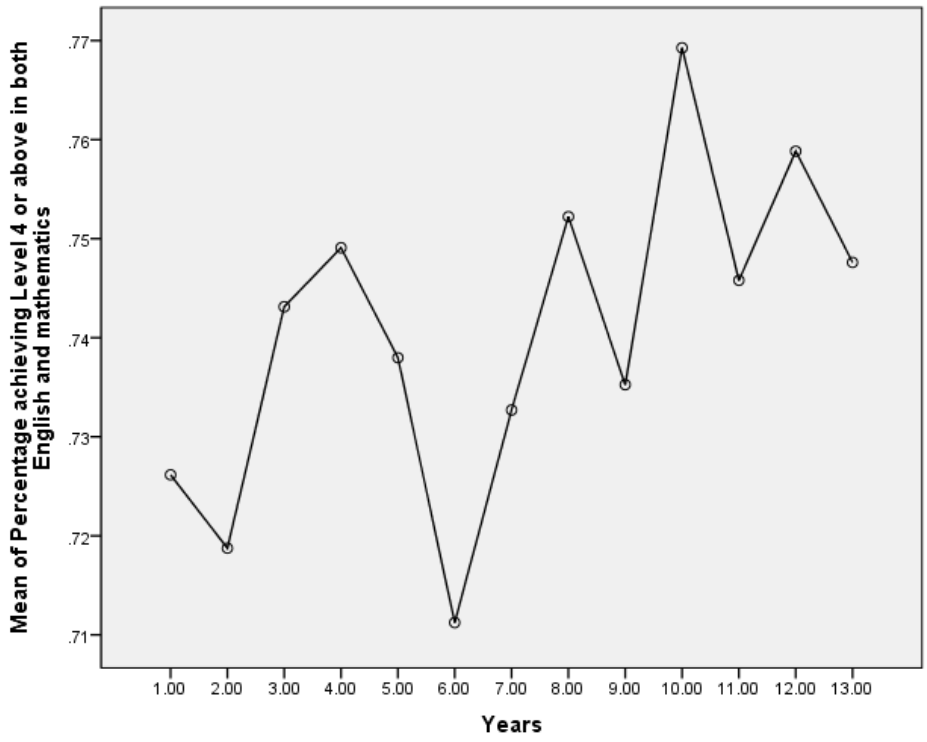

Figure 18: Average proportions of pupils achieving Level 4 or above in English and mathematics against years subscribing to Espresso Education resources

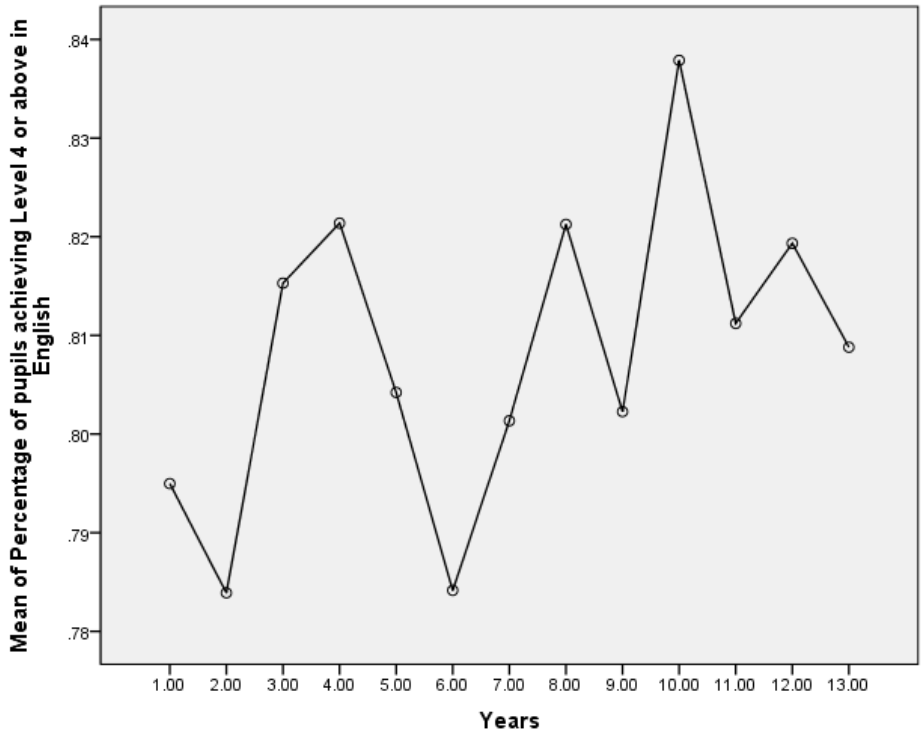

Figure 19: Average proportions of pupils achieving Level 4 or above in English against years subscribing to Espresso Education resources

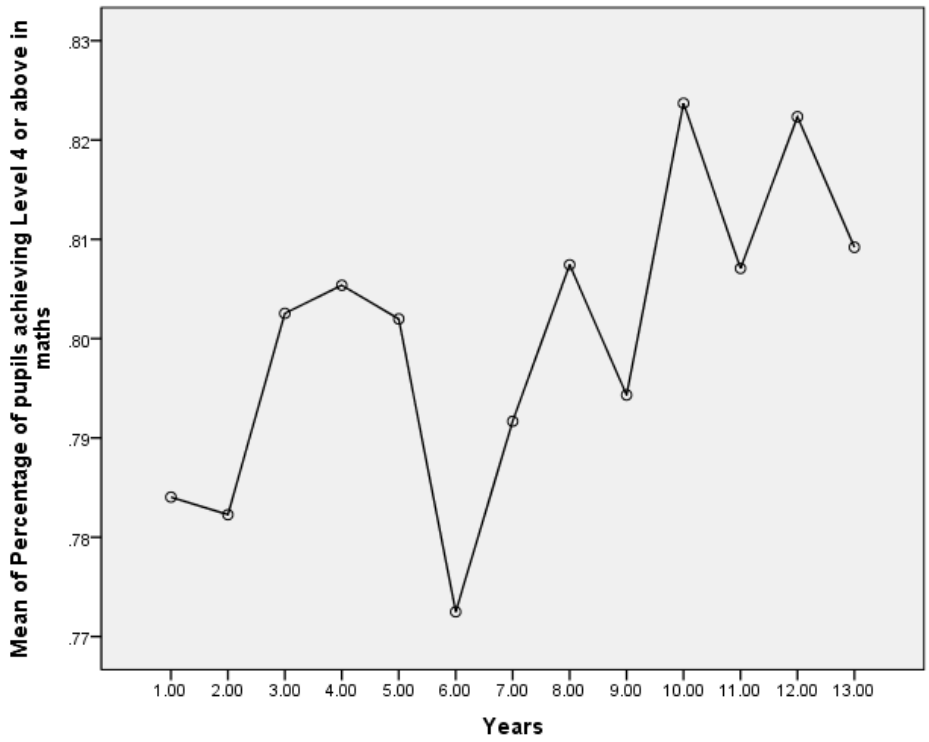

Figure 20: Average proportions of pupils achieving Level 4 or above in mathematics against years subscribing to Espresso Education resources

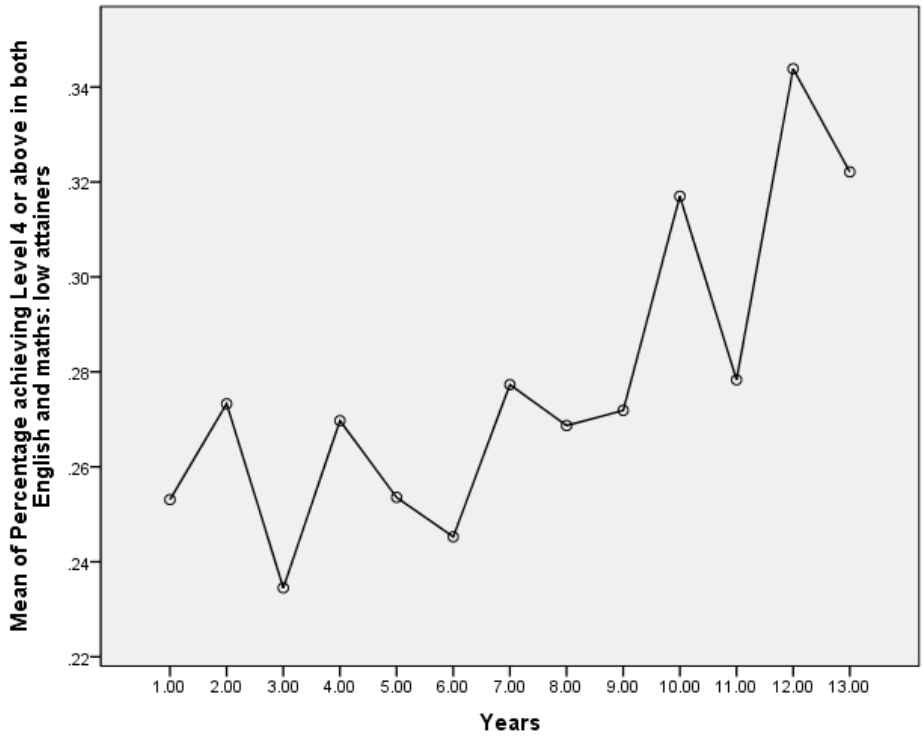

Figure 21: Average proportions of low attaining pupils achieving Level 4 or above in English and mathematics against years subscribing to Espresso Education resources

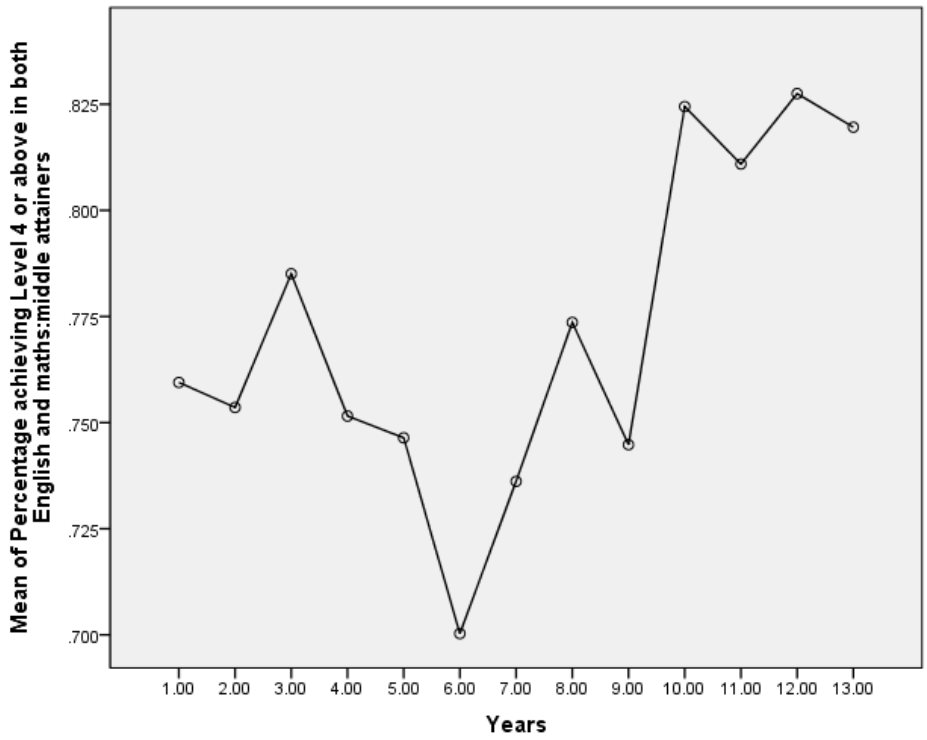

Figure 22: Average proportions of middle attaining pupils achieving Level 4 or above in English and mathematics against years subscribing to Espresso Education resources

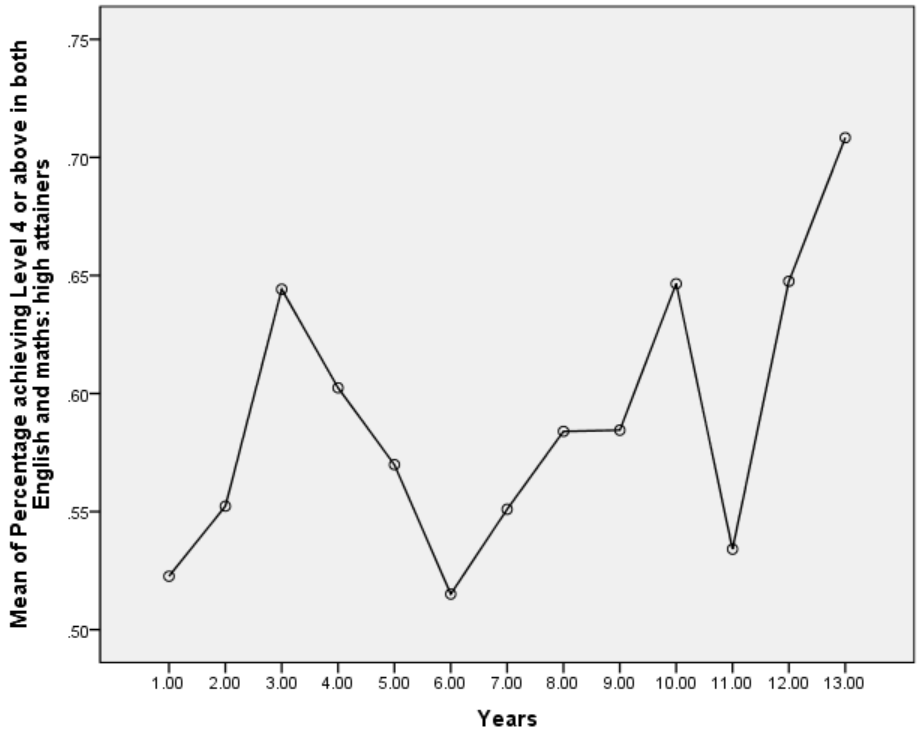

Figure 23: Average proportions of high attaining pupils achieving Level 4 or above in English and mathematics against years subscribing to Espresso Education resources

National data also indicate that the amount of budget spent per pupil (but not including ICT equipment) is lowest for those schools subscribing to Espresso Education resources for 11 or more years. It is higher in the other subscriber bands, but not more than an additional £3 per pupil above the average. This point is illustrated in the figure following, which shows spend on ICT resources. In

Figure 24, average spend is plotted against number of years that schools have subscribed to Espresso Education resources, and shows that longer periods of subscription are not related directly to highest spends on ICT.

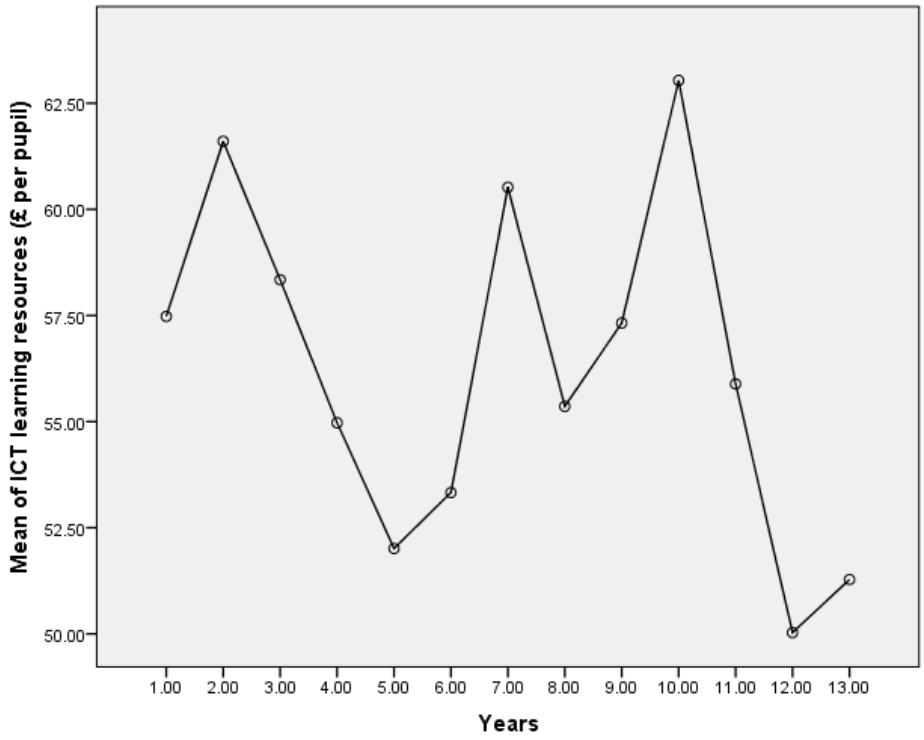

Figure 24: Average mean spend on ICT learning resources against years subscribing to Espresso Education resources

Pupil:teacher ratios for all these groups are largely similar, except for a slightly higher pupil:teacher ratio in the schools that have subscribed to Espresso Education resources for 11 years or more. As pupil:teacher ratios are slightly higher, but their resource spend is lower, and pupil attainment at the end of Key Stage 2 is higher, this suggests that these schools might well be using slightly different management patterns, which could well involve more integrated uses of Espresso Education resources. Such results would support the evidence in a previous study (Passey, 2011d), where schools integrating uses of Espresso Education across the entire period that pupils spend in their schools is associated with higher levels of overall attainment (SAT results) compared to different patterns and associated results in other schools. A subsequent study (Passey, 2012b) also found that schools integrating Espresso Education resources to greater extents into their planning documentation was also associated with higher levels of attainment outcomes.

OFSTED reports for the 269 schools subscribing to Espresso Education resources for 11 years or more

The Office for Standards in Education (Ofsted) inspect schools in England regularly, and report on their findings publicly. To explore whether schools subscribing to Espresso Education resources for 11 years or more might be using particular pedagogical patterns or approaches, these reports were examined, to see if they might provide indicators of such features.

From the 269 schools that fall into this group of subscribers, 100 reports were reviewed. These were selected by taking the first 100 that appeared in the MS Excel spreadsheet list. Six features from these reports were reviewed specifically:

- Overall school effectiveness (measured by Ofsted as either 1=outstanding; 2=good; 3=satisfactory; or 4=inadequate).

- Capacity for sustained improvement (measured by Ofsted as either 1=outstanding; 2=good; 3=satisfactory; or 4=inadequate).
- Quality of teaching (measured by Ofsted as either 1=outstanding; 2=good; 3=satisfactory; or 4=inadequate)
- Key current focus (key words taken from the overall descriptions with the sections reporting on school effectiveness).
- Comments within the reports on provision for lower attaining pupils, those who are vulnerable and those with special educational needs or disabilities (taken from the description of overall school effectiveness and the effectiveness of teaching and learning, and coded as either 1=well focused; 2=not always focused; or 3= not well focused).
- Comments within the reports on provision for more able or KS2 pupils (taken from the description of overall school effectiveness and the effectiveness of teaching and learning, and coded as either 1=well focused; 2=not always focused; or 3= not well focused).

From Figure 25 following, which shows the frequency of schools reported in terms of level of overall school effectiveness as judged by Ofsted, it is clear that the sample represents a range of levels of effectiveness. Some schools are outstanding, while only a few are inadequate.

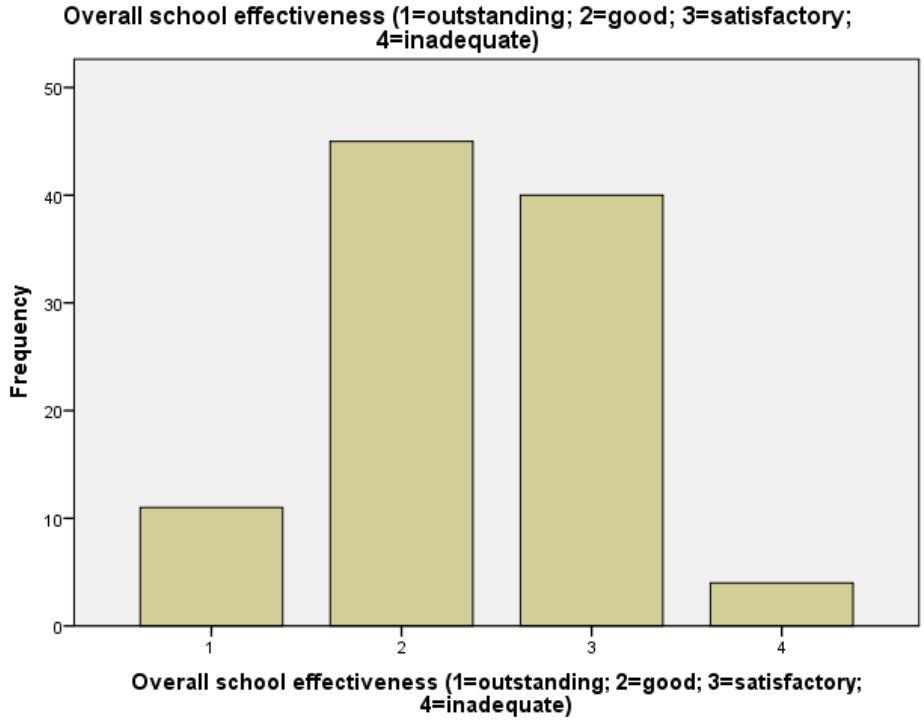

Figure 25: Overall school effectiveness for the sample of 100 schools subscribing to Espresso Education resources for 11 years or more

The average of school effectiveness for this sample of 100 schools is 2.37. So, overall, schools in this group are 'good' rather than 'outstanding'. Figure 26 following shows frequencies of schools across the sample that was judged by Ofsted to be capable of sustained improvement.

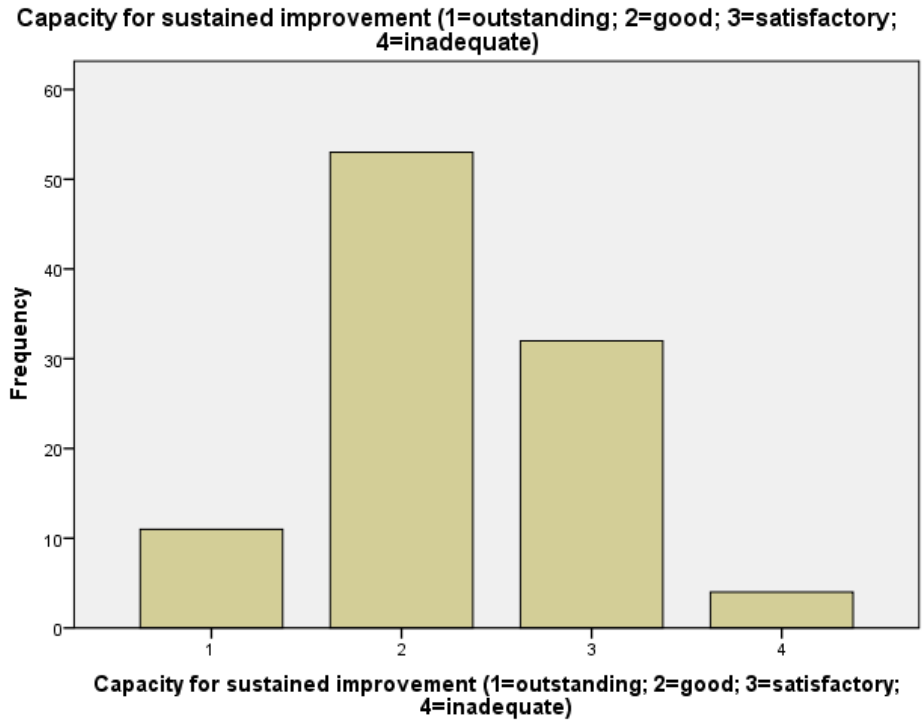

Figure 26: Overall capacity for sustained improvement for the sample of 100 schools subscribing to Espresso Education resources for 11 years or more

The average for all 100 schools is 2.29. So, overall, schools are 'good' rather than 'outstanding' in terms of their being judged to have capacities to sustain improvement. Figure 27 following shows a similar pattern for the judged quality of teaching and learning.

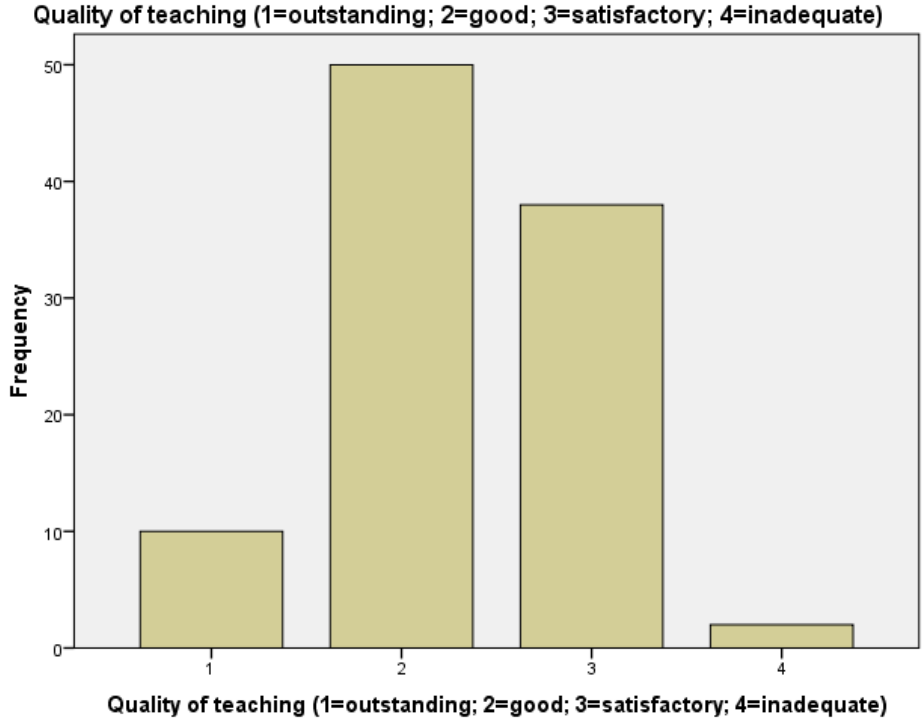

Figure 27: Overall quality of teaching for the sample of 100 schools subscribing to Espresso Education resources for 11 years or more

The average for all 100 schools is 2.32. So, again, the schools are 'good' in overall teaching and learning terms. Interestingly, perhaps, the key words and terms used by Ofsted to describe the focus of the schools tended to highlight a number of specific focal elements. The following table lists these terms in alphabetical order, showing their frequency of occurrence.

Table 6: Frequency of key words or phrases describing the focus of the 100 schools subscribing to Espresso Education resources for 11 years or more

Key current focus	Frequency
Achievement	1
Achievement and inclusion	1
Aspiration	1
Attendance	1
Behaviour and well-being	1
Care	2
Care and achievement	2
Care and behaviour	1
Care and belonging	1
Care and cohesion	1
Care and community	2
Care and guidance	1
Care and improvement	2
Care and inclusion	3
Care and learning	1
Care and partnership	1
Care and personal development	2
Care and support	4
Care and well-being	3
Community cohesion	1
Consolidation	1
Enthusiasm	1
Harmony	1
Harmony and cohesion	1
Harmony and community	1
Improvement	29
Improvement and care	2
Improvement and well-being	1
Inclusion	2
Monitoring	1
Partnership	2
Partnerships and care	1
Partnerships and parental links	1
Partnerships and well-being	1
Personal development	4
Personal development and well-being	1
Progress	7
Progress and care	1
Providing the best	2
Raising standards	1
Stability	2
Support	1
Working together	2

From this list it is clear that these schools are focusing quite largely on improvement, care, well-being and partnerships. These forms of focus are also highlighted by the data that relate to the ways that teaching is focused in the schools. Figure 28 following shows the frequency of stated focus on lower attaining pupils, those who are vulnerable and those with special educational needs and disabilities.

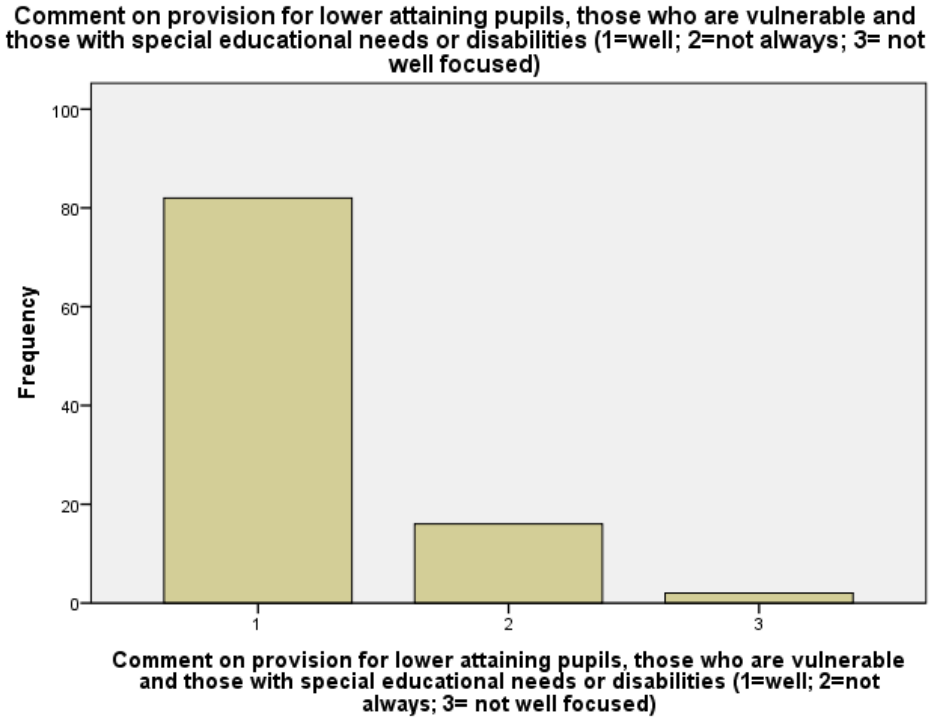

Figure 28: Comment on provision for lower attaining pupils and those who are vulnerable and with special needs or disabilities for the sample of 100 schools subscribing to Espresso Education resources for 11 years or more

The provision for lower attaining pupils, those who are vulnerable and those with special educational needs is a clear focus for most of these schools. They are providing an appropriate curriculum and using approaches that seek to support each individual learner or groups of learners as much as possible. Figure 29 following shows that the focus on higher attaining learners is not the same.

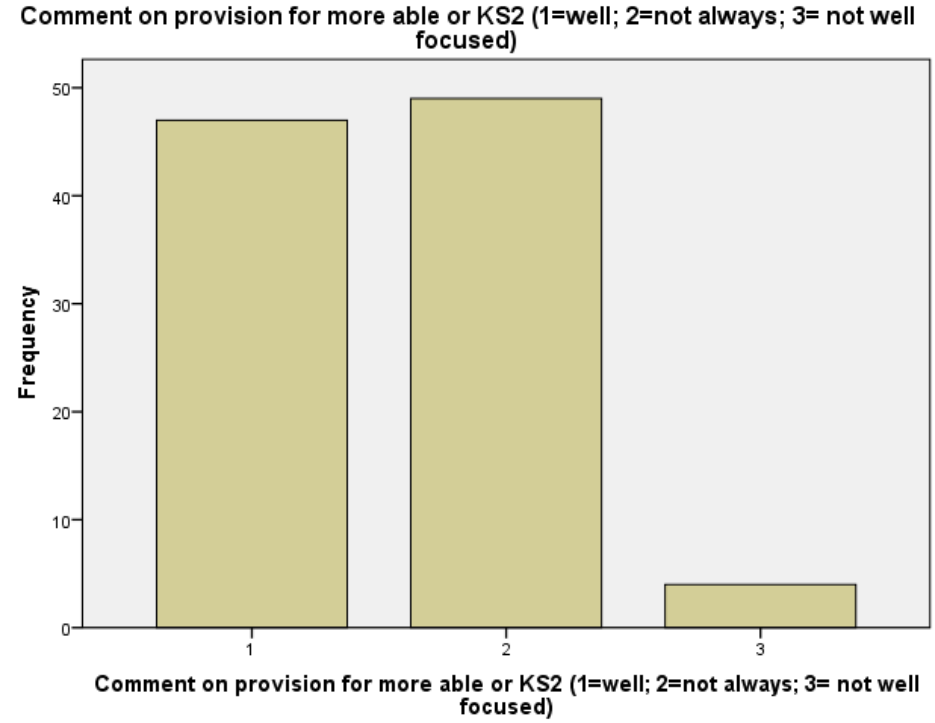

Figure 29: Comment on provision for more able or Key Stage 2 pupils for the sample of 100 schools subscribing to Espresso Education resources for 11 years or more

From these data it is clear, indeed, that the mode is 'not always' providing for the more able. So, these schools focus on individual support for the less able and more vulnerable, but in many (but not all) cases they also focus on the needs of every individual learner or groups of learners.

The Ofsted reports are less useful in terms of identifying how these schools do this. Although the Ofsted reports often indicate that a range of approaches and resources are used by these schools, ICT resources are only highlighted in a small number of the reports. So the direct link between the use of Espresso Education resources and attainment outcomes of these schools is not clarified by Ofsted reports.

Espresso Education resources and special schools

An earlier study (Passey, 2011b) identified that uses of Espresso Education resources occurs in special schools as much as it does in mainstream schools. Indeed, reports from teachers in that study indicated that Espresso Education resources were supporting teaching and learning needs as they were within mainstream schools.

The national data set allows an exploration of uses of Espresso Education resources by special schools, and whether these might be associated with levels of progress or attainment. Overall, there are 680 special schools in the total population of 16,739 schools with primary age pupils on roll. Of these 680 special schools, 376 are non-subscribers and 304 are subscribers (45% of the total). At the end of Key Stage 1, fewer subscribing schools (93%) were below expected levels compared to non-subscribing schools (95%), and a higher proportion of pupils were making expected progress in mathematics (28%) and in English (30%) compared to non-subscribing schools (26% and 25% respectively). Higher expected progress was associated with low attainers (below Level 2), while lower expected progress was associated with middle attainers (at Level 2), when subscribing schools were compared to non-subscribing schools.

By the end of Key Stage 2, however, the picture was somewhat different. For subscribing schools, there were higher proportions achieving Level 4 and above in both English and mathematics (17% compared to 13%), as well as in English (22% compared to 20%) and in mathematics (22% compared to 21%). However, the proportion achieving Level 4 or above in English and mathematics for low attainers (below Level at the end of Key Stage 1) was higher (14% compared to 9%) but was lower for middle attainers (34% compared to 67%). This pattern has also not necessarily been consistent each year since 2008. The proportion achieving Level 4 or above in English and mathematics was not higher for subscribing schools in 2008 or 2009, but it was slightly higher in 2010 and 2011.

When disadvantaged pupils are considered (those eligible for FSM or CLA), then the proportion making expected progress in English was higher for those in subscribing schools (34% compared to 28%). This was also the case with the proportion making expected progress in mathematics (36% compared to 32%). These higher proportions also arose for the other pupils (those not eligible for FSM or not CLA), where expected progress in English was higher (32% compared to 25%) and in mathematics was higher (29% compared to 24%). Proportions achieving Level 4 or above in reading, writing and mathematics was the same (14%) in both cases, but in the case of subscribing schools it was higher in achieving Level 4 or above in reading (24% compared to 23%) and in writing (18% compared to 12%).

Interestingly, subscribing schools spent less on ICT than non-subscribing schools (£843 compared to £918 per pupil). Their pupil:teacher ratio was also higher (6.5 compared to 6.1). Overall, therefore, special schools that subscribed to Espresso Education spent less on average on ICT resources, had higher class sizes on average, had higher proportions of disadvantages and vulnerable pupils on average, but achieved higher proportions of expected progress and attainment results at Level 4 or above on average.

In summary

Across the studies reported and drawn together here, the evidence shows that:

- Espresso Education resources have distinctive and strong features and affordances. These features and affordances are used by many teachers to support specific pedagogical approaches across a range of topic and subject areas with learners.
- Teachers use Espresso Education resources (and often regularly) to support teaching and learning in the core subjects of literacy and numeracy (English and mathematics).
- Teachers recognise the outcomes of using Espresso Education resources in terms of widening and deepening aspects of learning. They recognise that resources engage learners, enhance understanding, provide opportunities to generate ideas, support the discussion of learning points and issues, and support memorisation and recall.
- Some schools focus their uses of Espresso Education resources in particular year groups, while others integrate uses across the entire age range of their pupils.
- Longer-term uses of Espresso Education resources that are embedded in practices across the entire school age range are associated with higher levels of attainment results (SATs).
- Schools that have used Espresso Education resources for the longest time periods have also often had intakes of pupils who are more disadvantaged and vulnerable in terms of learning.
- The focus of these schools has in recent years been on improvement, care and well-being, and partnerships with families and others.
- Those same schools have focused on early as well as later uses of resources across the school, and have been concerned with specific and targeted use with more vulnerable pupils.
- The Espresso Education resources have been used with a range of other strategies (including effective ways to identify learner weaknesses and strengths on a regular basis) and practices to ensure that individual needs of individual pupils or groups of pupils are met.
- Impacts measured by enhanced attainment results (SATs) and progress through raised levels of attainment indicate that on average schools subscribing to Espresso Education resources for longer periods of time are associated with anticipated or improved performance compared to expected national attainment averages.
- A similar pattern holds true for special schools that subscribe to Espresso Education resources when they are compared to non-subscribers.
- While these patterns hold true for the data for this current year, patterns in previous years have not been explored in any depth.

References

Association for Learning Technology (2012). *Evidence-based policy development in Learning Technology*. Accessible at: http://repository.alt.ac.uk/2213

Becta (2001a). *Primary Schools of the Future – Achieving Today*. Coventry: Becta.

Becta (2001b). *The Secondary School of the Future – A Preliminary Report to the DfEE*. Coventry: Becta.

Becta (2003a). *Primary Schools – ICT Standards. An Analysis of National Data* from *Ofsted and QCA.* Coventry: Becta.

Becta (2003b). *Secondary Schools – ICT and Standards. An Analysis of National Data from Ofsted and QCA* Coventry: Becta.

Cox, M., Abbott, C., Webb, M., Blakeley, B., Beauchamp, T. and Rhodes, V. (2003a). *ICT and Attainment: A Review of the Research Literature. ICT in Schools Research and Evaluation Series No. 17.* Coventry/London: Becta/DfES.

Cox, M., Webb, M., Abbott, C., Blakeley, B., Beauchamp, T., and Rhodes, V. (2003b). *ICT and Pedagogy: A Review of the Research Literature. ICT in Schools Research and Evaluation Series No. 18.* Coventry/London: Becta/DfES.

Espresso Education (2012). *Research from the USA: Espresso has a significant positive impact on pupil performance in maths.* Accessed at: http://www.espresso.co.uk/reviews/?tabJump=2#tab=2

Harrison, C., Comber, C., Fisher, T., Haw, K., Lewin, C., Lunzer, E., McFarlane, A., Mavers, D., Scrimshaw, P., Somekh, B. and Watling, R. (2002*). ICT in Schools Research and Evaluation Series No. 7 – The Impact of Information and Communication Technologies on Pupil Learning and Attainment*. London: DfES.

Ofsted (2004). *ICT in Schools: The Impact of Government Initiatives Five Years On, HMI 2050*. London: Ofsted.

Passey, D. (2011a). *Independent evaluation of the uses of Espresso online digital resources in primary schools: Final Report – Summary*. Lancaster University: Lancaster. Accessible at: http://eprints.lancs.ac.uk/40904

Passey, D. (2011b). *Independent evaluation of the uses of Espresso online digital resources in primary schools: Final Report – School Uses and Learning Impacts*. Lancaster University: Lancaster. Accessible at: http://eprints.lancs.ac.uk/40905

Passey, D. (2011c). *Independent evaluation of the uses of Espresso online digital resources in primary schools: Final Report – Management, Time and Cost Benefits*. Lancaster University: Lancaster. Accessible at: http://eprints.lancs.ac.uk/40906

Passey, D. (2011d). *Independent evaluation of the uses of Espresso online digital resources in primary schools: Final Report – Attainment and Usage Levels*. Lancaster University: Lancaster.

Passey, D. (2012a). *Independent evaluation of uses and outcomes of Espresso digital resources in Wolverhampton Local Authority schools: Final Report.* Lancaster University: Lancaster.

Passey, D. (2012b). Educational Technologies and Mathematics: Signature Pedagogies and Learner Impacts. *Computers in the Schools, 29*(1-2), 6-39

Schachter, J. and Fagnano, C. (1999). Does Computer Technology Improve Student Learning and Achievement? How, When, And Under What Conditions? *Journal of Educational Computing Research, 20* (4), 329-343

Tamin, R.M., Bernard, R.M., Borokhovsi, E., Abrami, P.C. and Schmid, R.F. (2011). What Forty Years of Research Says About the Impact of Technology on Learning: A Second-Order Meta-Analysis and Validation Study. *Review of Educational Research, 81*(1), 4–28

Underwood, J. (2009). *The impact of digital technology: A review of the evidence of the impact of digital technologies on formal education.* Coventry: Becta