Centre for Technology Enhanced Learning

Lancaster University

Digital technologies, collaborative endeavour and school improvement:

A case study on
Pheasey Park Farm Primary School

Don Passey
Professor of Technology Enhanced Learning
Director, Centre for Technology Enhanced Learning
Department of Educational Research,
Lancaster University, Lancaster, LA1 4YD, UK

steljes ®

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Additional note

It should be noted that throughout this text, spelling errors have been corrected where direct quotations are shown.

EXECUTIVE SUMMARY

Background and challenge

During 2014, an in-depth study explored how improvements in Pheasey Park Farm Primary School had rapidly been made in teaching and learning, where digital technologies had played important roles. Using a case study approach, evidence was gathered across the width of stakeholders (head teacher, teachers, learners, parents, and external consultant). In terms of a starting context, an Ofsted inspection in October 2012 placed this school in a 'Requires Improvement' category. The inspection indicated that teaching quality varied too much and was considered 'dusty', achievement in English and mathematics was not high, and lessons were often too dominated by the teacher.

Resources and facilities

When a newly-appointed head teacher took the post in 2013, information and communication technologies (ICT) were not used significantly by teachers within classrooms to support teaching or learning. Developing an integration of ICT into classroom practices was a major focal activity in actions that were implemented in seeking improvement. Teachers now (in 2015) have access to interactive whiteboards (IWBs), SMART boards, in every classroom from the Nursery to Year 6, multiple SMART boards in Reception, Year 2, Year 4 and Year 5 classrooms to support collaboration, access to devices (tablets, Netbooks and Fizzbooks) within the classroom, use of SMART tables, online resources such as Espresso, Purple Mash, Linguascope, Education City and Oxford Owl available for both school and home use, and a learning platform allowing access to work that is saved or newly-set, at home. The collaborative classroom has multiple facilities (see Figure 1), which enable learners to work in groups, and in ways that are collaborative.

Figure 1: Outline plan of the Year 4 collaborative classroom

Interactive White Board

Interactive White Board

Interactive White Board

Smart Table

The Research Study

This research study aimed to identify the value of the Steljes training programme and input that was provided by external and internal agents, the educational value of the technology products adopted, the continuing importance of large-screen interactive technologies, the educational benefits of a collaborative table, the types of teaching and learning that were being developed in a collaborative classroom, and any links of these features to school improvement.

To address these questions, evidence was gathered from the key people involved: the head teacher (an interview and a questionnaire); the external consultant (an interview and a questionnaire); the digital learning leader (an interview and a questionnaire); the Key Stage 2 teachers (3 interviews, 7 questionnaires in early 2014 and 10 in late 2014); the learners (271 questionnaires in early 2014, 298 in late 2014, and an observation of the collaborative classroom); and the parents (28 questionnaires in early 2014, 14 in mid-2014 and 10 in late 2014). An example questionnaire is shown in Appendix A.

Measures of improvement

Attainment data and attendance data both show measures of positive improvement across the period from 2012 to 2014: the level of absence decreased (see Figure 2); and the levels of reading, writing and mathematics attainment increased (see Figure 3) (although an interim drop in attainment in reading, a topic undertaken largely through non-collaborative endeavour, should be noted).
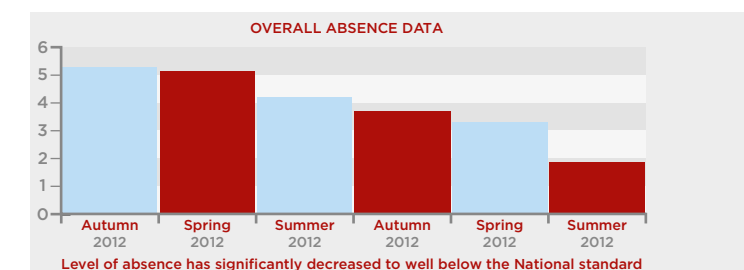
OVERALL ABSENCE DATA

Level of absence has significantly decreased to well below the National standard

Figure 2: Attendance shown through levels of absence since autumn 2012 (Source: School data)

PERCENTAGES OF CHILDREN ACHIEVING LEVEL 4 AND ABOVE – ALL SUBJECTS

Reading
Writing
Maths
Gaps

2	012	2013	014
Reading L4+	90 8	4	95
Writing L4+	61 7	0	82
Maths L4+	74 7	6	80
GAPS L4+	7	1	81

Academic years

Figure 3: Average attainment levels in reading, writing and mathematics since 2012 (Source: School data)

Teacher, parent and pupil views

Teachers, parents and pupils all agree in their views that SMART technologies and a SMART collaborative classroom have helped to remove the 'dust', so that teaching is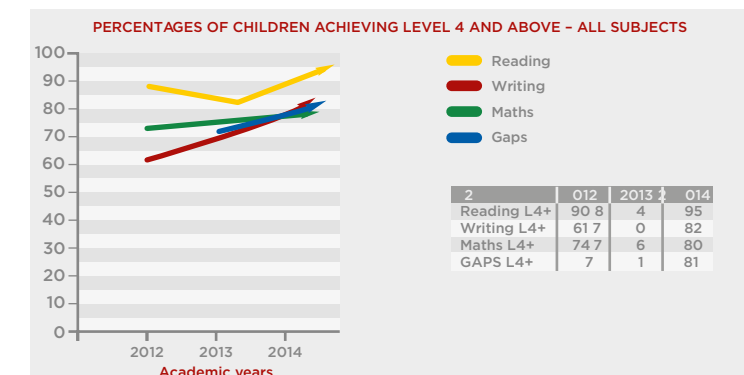 more diverse, and learning is more exposed. Evidence shows that learner enjoyment has increased and been sustained since 2012. That enjoyment is related to changes in learner experiences, arising from different activities deployed within classrooms. It is clear that a variety of activities are now in place and that learners are experiencing stimulating rather than passive interactions.

Typical learner statements from the 298 recent responses illustrate this:

"The technology makes me want to go to school more whereas before we didn't have this"

"We use technology more and work together more"

"It has affected my life since I'm more involved in the activities"

"Because you can collaborate and enjoy working with each other"

"I think it has affected this subject because when you're in class you just want to go and get more involved"

"I like the technology because it makes me listen more"

"It helps us be collaborative loads more and it helps us get involved in lessons and learn more"

A variety of parent statements across the 42 received mirror these responses. Parents have stated about their children:

"Being able to do more for themselves. Everything is based on technology now, so as much use of technology can only benefit my child"

""A" is more technically advanced than her parents are and often solves issues at home for us"

"My daughter has had a great time at school this year. She has enjoyed using the new technology. I really believe her attitude at school has changed. She is more attentive and works well with her friends. She talks about the lessons and the wonderful equipment. I know this will be a benefit in years to come"

Teachers state how they are changing from previously reported 'dusty' practices. From the teacher responses received, three state that:

"Lessons can be more visual. I can tailor my lessons to meet the needs of the children. For example, teach on one board and then set some children off and then extend others by teaching the next steps on the other board"

"The technology helps all learners to be involved and engaged in lessons. It also encourages learners to interact with each other and challenge ways of thinking as well as understanding the opinions of others"

"Involved in their learning, doing things that are practical and very closely linked to learning; stimulating - tactile, visual; rewarding - stars/sounds/points/achievement of finishing a game; being able to show examples of their work on screen through Apple TV/iPad."

Pedagogic variety

The variety that is now possible is evident from the 9 different activities that a teacher set up during a single one-hour lesson. In this lesson, learners were involved in group tasks, collaborative activity, individual activity, paired work, listening, and discussion. Pupils now 'expose their learning' – both to their peers and to their teachers. The large-screens support sharing, visualisation, movement and amendment of items, and wider engagement by a teacher or a number of pupils Co-operation and collaboration have been developed with the result that more stimulating teaching opportunities support learning in more active and dynamic ways. This has happened as a result of a sequence of focuses on outcomes – the management support approach adopted, leadership encouragement, the development of teaching diversity - and it has been recognised that learning has consequently been stimulated. As a result, there has been a move from 'dusty' teaching to 'collaborative endeavour'.

Outcomes

The head teacher's action plan and intentions were crucial, as was her concern for management approaches and the ways that technologies would enable and integrate with these. She wanted to enable teachers to develop, and be supported through and with the technologies. Data from attendance and attainment results indicates that school improvement has resulted, as measured in these fairly standard ways. When evidence

from learners, parents and teachers is viewed, the link between improvement and the ways that technologies have been introduced and used is clear.

Importantly, it is not the technologies alone that bring about the shifts; it is the ways they are deployed, used and managed. School improvement in this case has been focused through collaboration: with external and internal consultants and agents of change; with teacher interaction and collaboration; and with learner involvement with a variety of approaches to engage them in collaborative as well as independent learning activities.

In summary, key factors concerned have been: school leadership and management focused on enabling teaching with active involvement of learners; external consultancy and support; resource priorities; internal ICT leadership and deployment of digital leaders; use of a training plan; gaining support of teachers, parents and learners; shared responsibility supporting greater ownership of learning; collaboration being managed, rather than expected; technologies providing a 'transitory medium' exposing learning, while paper-based activities provided a 'committed medium'; and collaboration through a 'transitory medium' that was moved to independence using a 'committed medium'.

AN OVERVIEW OF THE STUDY

The background

To put this study into context, Pheasey Park Farm Primary School is a large primary school in the West Midlands, with 3 classes in each year group. From an Ofsted inspection report in October 2012, the school was placed in a 'Requires Improvement' category. 'Requires Improvement' is a serious category for schools in England to be placed in, indicating that they are underperforming but given a chance to improve. The following issues were identified by Ofsted:

■ Teaching quality varied too much and was not typically good, particularly in some Year 1, Year 3 and Year 4 classes.

■ Achievement in English and mathematics required improvement. Pupils did not make consistently good progress in writing, especially boys. The more-able pupils were not challenged enough in mathematics.

■ Lessons, especially in Years 1, 3 and 4, were often too dominated by the teacher, and this meant that there were missed opportunities for pupils to think and learn for themselves. Learning activities in these years did not always challenge all pupils, especially those who were more able.

■ Marking did not always help pupils to improve their work.

■ Subject leaders missed opportunities to help other teachers improve lessons so that standards could rise.

■ Instability in the leadership of the school meant that senior leaders had not checked the quality of teaching and learning robustly enough to inform training.

■ The governing body did not consistently and thoroughly question senior leaders about the performance of teachers, especially when making decisions about any increases in teachers' salaries that were related to the standards that pupils achieved.

Following the Ofsted report, the school appointed a new head teacher. She took up post in January 2013, and it is recognised that her actions have been instrumental in moving the school out of difficulty. A part of the process has involved implementing a range of ambitious plans for using ICT to improve standards. The newly-appointed head teacher implemented a plan to integrate digital technologies across the school. It was found by key personnel involved in the initiative that teachers developed their practices with these technologies rapidly. Consequently, learners in the 2013-14 school year gained access to facilities and practices that they had previously not experienced. Additionally, in Year 4, learners gained access to a SMART collaborative classroom, as well as to the other digital technologies accessible within the other year group classrooms.

Aim of this report

This report has a central and clear aim: to describe and detail the roles of digital technologies in changing the fortunes of a school in a poor Ofsted category.

Aims of the study

When the newly-appointed head teacher took over post in 2013, ICT was not used significantly within classrooms, by teachers, to support teaching or learning. Developing an integration of ICT into classroom practices has been a major focal activity in seeking improvement. The school has:

■ Gained input from Steljes training.

■ Been provided with ICT facilities that enable the educational value of SMART products to be used within a flexible classroom environment.

■ Begun to explore the deeper use of large screen interactive technologies.

■ Started to explore the educational benefits of the SMART table.

The research study aimed to identify clearly:

■ The value of the Steljes training product and input.

■ The educational value of SMART products.

■ The continuing importance of large screen interactive technologies.

■ The educational benefits of the SMART table.

■ The types of teaching and learning that were being developed in the SMART collaborative classroom.

■ Any links of the features above to school improvement.

Focus

The research focused on the following main areas:

- The deployment and use of SMART technologies in the collaborative classroom environment.

- Associated training and professional development in the whole school setting.

- How technology training and professional development were integrated into a whole school change management plan.

- The way in which SMART technologies were integrated with other technologies to involve, motivate and engage the major stakeholders in the management activities of the school, of and for:
  o Teachers/staff.
  o Learners.
  o Parents.
  o Governors.

- The ways in which the SMART collaborative classroom was managing learning and how it was developing and encouraging collaboration and co-operation.

- How the following technologies influenced the management of teaching and learning: multiple screens; SMART tables; and device management software.

- The role of the SMART table, how this technology was managed and what type of learning it enabled.

- How this development was managed, and the perceived and measurable impacts it had on school improvement.

Research evidence was gathered at various points across the period of the study:

- At the outset, to enable a baseline from which to explore concepts and outcomes of improvement. This involved: interviews or surveys with key school staff, to identify what digital technologies were available and being used before the new head teacher came into post; interviews or surveys with key support personnel, to identify what digital technologies and training had been provided, the reasons behind these, and what plans for the coming year were; surveys with students, parents and governors, to identify their perceptions of the current and past position of the school with regard to uses of ICT, teaching and learning. An example questionnaire is shown in Appendix A.

- At a mid-point, to enable outcomes arising after a further 6 months concerned with concepts of outcomes of further improvement. This involved: surveys with key school staff, to identify what digital technologies had become available and which were being used for what purposes; surveys with key support personnel, to identify what were seen as outcomes concerned with digital technologies and training provided, the reasons behind these, and to consider further plans for the remainder of the year; surveys with parents to identify their perceptions of the position of the school with regard to uses of ICT, teaching and learning after a further 6 months.

- At the end of the study period, to enable concepts and outcomes of improvement to be identified at the end of the year. This involved: interviews or surveys with key school staff, to identify what digital technologies had been used for what purposes; interviews or surveys with key support personnel, to identify what were seen as outcomes concerned with digital technologies and training provided, and the reasons behind these; surveys with students and parents, to identify their perceptions of the position of the school with regard to uses of ICT, teaching and learning at the end of the study period.

Evidence gathered

Evidence in March 2014 was gathered using questionnaires from learners, teachers and parents about their perceptions of the changes in uses of digital technologies from the previous year. Questionnaires were completed by all learners and parents who agreed to do so, while teachers were more specifically targeted in terms of width of experiences. Evidence was gathered from:

- 271 learners, comprising 61 in Year 6, 73 in Year 5, 75 in Year 4, and 62 in Year 3.

- 28 parents.

- 7 Key Stage 2 teachers.

Evidence in July 2014 was gathered using questionnaires, from the head teacher and from parents about their perceptions of the changes in uses of digital technologies from the previous year. Questionnaires were completed by all parents who agreed to do so. Evidence was gathered from:

- The head teacher.

- 14 parents.

Evidence in November 2014 was gathered using surveys from key personnel, interviews with teachers, and an observation in the collaborative classroom. Evidence was gathered from:

- The head teacher and the digital learning leader.

- The external consultant.

- 2 teachers.

- An observation of the collaborative classroom and discussion with 3 learners.

Evidence in December 2014 was gathered using questionnaires from learners, teachers and parents about their perceptions of the changes in uses of digital technologies from the previous year. Questionnaires were completed by all teachers and parents who agreed to do so. Evidence was gathered from:

- 10 parents.

- 10 teachers.

- 298 pupils.

Additionally, the school provided documentary evidence of shifts in pupil attainment outcomes and attendance records across the period of the study.

These data are reported in subsequent sections of this report, grouped according to key personnel involved, showing their reports of their experiences and perceptions.

SCHOOL IMPROVEMENT AND COLLABORATION

School improvement

Research into school improvement has been conducted over the past twenty or more years, and fundamentally considers the processes schools adopt and implement when they wish to improve an element of their provision (Hargreaves and Hopkins, 1994). School improvement practice has tended to focus on the development of long-term change plans or processes that are intended to bring about improvement at organisational or curriculum levels (Hargreaves and Hopkins, 1994). How this should be done is somewhat contended; some schools believe that this should be based on top-down approaches, while others believe that gaining details from teachers, parents or learners can more adequately inform change. That change should be specific to context and culture, to match processes and actions to features of a school, is generally held to be important (Hargreaves and Hopkins, 1994). School improvement, therefore, often concerns understanding a specific culture and context of an individual school and the requirements of learners and teachers within that context.

Hopkins, Ainscow and West (1994) identified how positive change was brought about through three successive stages: initiation; implementation; and institutionalisation. They identified criteria within each of these stages that they found needed to be considered and fulfilled if that stage was to be addressed adequately. In initiation the criteria were: the innovation should meet a local agenda and local need; there should be a clear, well-structured approach; it should involve an active advocate or champion who understands the innovation and supports it; there should be active initiation to start the innovation (top-down or bottom-up to match local circumstances); and it should be considered of 'good-quality'. In implementation the criteria were: there should be clear responsibility for co-ordination (head teacher, co-ordinator, external consultant); shared control through implementation (not entirely top-down); effective relations; empowerment of individuals as well as the school; a mix of pressure, an insistence on 'doing it right', and support; adequate and sustained staff development and in-service support (an external or internal co-ordinator, or a combination to build personal and organisational capacity); and rewards for teachers early in the process (empowerment, collegiality, meeting needs, classroom help, load reduction, supply cover, expenses, resources). In institutionalisation, the criteria were: an emphasis on embedding the change within the school's structures, its organisation and resources; elimination of competing or contradictory practices; strong and purposeful links to other change efforts, the curriculum and classroom teaching; widespread use in the school and local area; and an adequate bank of local facilitators – such as advisers

for skills training. As will be shown, these factors featured strongly in the description of practices and outcomes in this case study school.

Collaboration

In this school, there was a clear focus on collaboration as an element of both the development of the improvement, and the outcome of the improvement. In order for practice to be collaborative, some researchers state that the practice should move beyond what could be considered to be co-operation; for example, Dillenbourg (1999) states that, *'in cooperation partners split the work, solve sub-tasks individually and then assemble the partial results into the final output. In collaboration, partners do the work together'*. Acts of negotiation, working with original ideas that may be presented or developed, and outcomes that are representative of an agreed rather than a collected knowledge, tend to be features of this form of collaboration. The outcome in collaboration does not necessarily enable the individual to easily identify where a single contribution has been made (Stahl, 2006). Learning through co-operation, by contrast, is concerned with a series of individual activities, where individuals may not be involved in negotiation or any sharing or development of wider understanding.

John-Steiner (2014) considers distinctions between collaboration and team-work. She says that:

"they [activities] need to be further examined and analyzed in different settings to counter the frequent distortions of collaborations into "teamwork."

Collaboration can be considered as being distinct from teamwork, where those involved:

"convert inputs to outcomes (e.g. product development, rate of work, team commitment, and satisfaction) through cognitive, verbal, and behavioral activities directed toward organizing taskwork to achieve collective goals"
Marks, Mathieu, and Zaccaro, 2001.

The distinction here may rely on the definition of the goal; in collaboration, the endeavour itself is important, while in teamwork, the goal is the key factor. From descriptions and reports in this case study, it will be clear that both of these elements have been important contributors within the entire improvement process.

SCHOOL IMPROVEMENT

Test-bed schools

In this school, the endeavour itself has clearly been as important as the entire, or each individual, goal. The use of technology to support these practices is not unique, but a strong focus on using ICT through collaborative processes to bring about school improvement is not widely researched or reported. The ICT test-bed schools in 2002-2006, an initiative of the then government department for education, used ICT as a means to support teaching and learning, and to enable home-school links, but the focus on collaboration with school improvement was not stipulated within those pilots beyond 'collaboration with other institutions'. As the evaluation report (Somekh et al., 2007) stated, the initiative was intended to, 'raise standards and performance, especially in the areas of school and college improvement, student attainment, and raising the quality of teaching and learning.'

Nevertheless, the outcomes of those ICT test-bed pilots were not dissimilar to outcomes that are shown in this report of this case study school. As the evaluation report of the ICT test-bed school initiative (Somekh et al., 2007) stated, 'As technology was embedded, schools' national test outcomes improved beyond expectations. The impact of ICT on attainment levels was greater for primary schools than for secondary schools. Effective use of presentation technologies led to greater interaction between teachers and learners. Effective use of ICT personalised learning by enabling greater learner choice within the curriculum, improved assessment for learning and more learner-directed teaching.' The remainder of this report will show strong similarities in terms of outcomes.

KEY PEOPLE INVOLVED

The Head Teacher

Appointed as head teacher in January 2013, this appointment followed the school being placed into the "Requires Improvement" Ofsted category in October 2012. When the head teacher was appointed, she was aware that there were:

"Old RM boards in classrooms which were either not used at all or in some cases used as blackboards. The ICT room was a "storage" room with thousands of pounds worth of damaged or new (still boxed) equipment. The technician said he had nothing to do (he was costing the school) and cameras and other small items had been "lost".

At the outset, a full audit was completed. SMART boards were put into all classrooms, a collaborative classroom was created, and several SMART tables were deployed in the school and the adjacent children's centre. Cameras and a visualiser were also made accessible to teachers. The reason for doing this was, as the head teacher said:

"Ofsted said in October 2012 teaching was "dusty and dated". The introduction of SMART technology was part of the school's drive to raise standards by: improving lesson content and delivery; enhancing personalised learning; improving access to resources/ information; improving communication/consistency/ progression; motivating pupils; enhancing home learning; training and updating staff."

In early 2014, the head teacher reported that signs of impact of the ICT initiative were beginning to emerge.

"Although too early to see impact upon achievement over time the technology has: improved quality of teaching (more good/outstanding lessons); motivated children/improved attendance; improved planning/ differentiation/lesson content; results are going up across the school."

As the head teacher emphasised, attendance, motivation, achievement, differentiation, and home learning, were all being seen to be enhanced and to be improved. However, it was not clear at that time that these initial impacts and effects would be sustained in the long term.

The head teacher identified factors affecting these positive indicators: strong leadership; governor support; including all staff in discussions and change; staff quality training; monitoring and feedback to

staff; better lesson content and delivery; better differentiation; and better planning. The training was identified specifically as contributing in important ways to the change being seen: setting a vision for use of technology; appointing a digital learning leader; appointing digital leaders; appointing a technical support/consultant providing links with SMART/Steljes; agreeing training programme content; including all staff, both teaching and support, in training; including governors; offering different forms of training – in staff ability groups, drop-in workshops, whole staff groups, and digital leaders' training groups. Introductory sessions were run, on using the SMART board, SMART Note Book at different levels, SMART Wrapper, collaborative learning, SMART Gallery, SMART Exchange, and the online training portal. She felt that the end focus on collaborative learning was important at that early stage, and that this was later showing early signs of strong impact.

Specific elements of change were contained within a School Development Plan. The elements of that plan concerned: vision; leadership; audit; a training plan; schedule of activities; delivery; training providers; a programme for the whole school, involving individual sessions and drop-ins; monitoring; and measuring impact.

By late 2014, the head teacher was able to identify more specific outcomes that had arisen:

- Resources were being used more effectively.

- There was improved knowledge and skills about how to use the resources.

- Staff were more motivated, and more confident.

- There was improved team work, between staff and pupils, and with parents.

- Results were seen to be improved in specific ways in specific classrooms.

- Mathematics results were improved most in the collaborative classroom environment.

- Practice from the collaborative classroom was being shared with other groups across the school.

- Lesson content and delivery was seen to be improved across the school as a whole.

- Lessons were seen as being more visual and more exciting.

- Better communication amongst the pupils was recognised.

- More creative approaches were being seen.

- Collaboration was improving understanding, through more discussion and learning from mistakes.

- Pupils were gaining confidence, especially those who were less able in some subject areas.

- Pupils were gaining greater ownership of their learning.

- Attendance had improved so it was above the national average.

- Pupils were being seen to help each other more, and to share responsibility.

- Success was celebrated more.

- Lessons were being conducted at a faster pace.

- Boys' attainment in mathematics had overtaken that of girls.

The head teacher felt that the ICT had become embedded to the point where it would affect teaching and learning negatively if it was removed:

- Staff would struggle to deliver lessons to the same level of quality.

- Access to resources and information would be lost.

- Loss of visible elements would limit pupil engagement.

- Collaboration would be reduced.

The external consultant
The external consultant shared complementary perspectives regarding the ways in which improvement and change were handled. As he said,

"I have challenged the school to articulate its vision for learning with technology; I have acted as a source of information and experience and have helped put together their strategic plan focussing on technology that will improve outcomes. I have acted as a broker for key technologies matching the school needs to key suppliers. I have then helped the school establish key working partnerships. I have mentored the digital learning leader and developed him in his role as technology lead. I have also acted as a critical friend to the head teacher. I have used my international contacts to set up collaboration opportunities."

The role of the external consultant clearly integrated with the head teacher's vision and approaches:

- *Consolidating a vision for learning enhanced by technology.*

- *Supporting the school with developing a strategy, and producing a three-year action plan with milestones.*

- *Putting in place an innovation strategy considered essential in such a large school with so many staff.*

- *Developing the SMART collaborative classroom to enable the school to try out new ideas for teaching and learning within a technology-rich environment.*

- *Setting up a group of teacher digital leaders, who received additional training, which was SMART accredited.*

- *Developing a consistent approach to use of SMART Notebook, with agreed formats and sections to each notebook including lesson objectives, main content, student activity and plenary activity.*

- *Developing collaborative learning within the school, putting together an incremental framework for development moving from contribution to co-operation through to full collaboration.*

- *Supporting the implementation of a full Office 365 learning platform to improve workflow allowing access to work beyond school.*

- *Raising the profile of the technology work at the school by liaising with commercial partners to produce videos, arranging photo shoots and media releases, having a positive effect on the way in which parents perceive the work of the school.*

The external consultant was involved in:

"Strategic planning, focusing on improving the quality of teaching with technology, obtaining staff accreditation for professional development with SMART technologies, working with the school to develop and implement their change management strategy, suggesting key measures for impact assessment such as attendance, pupil outcomes and lesson observations linked to performance management targets."

The external consultant and Steljes provided bespoke audit, consultancy, training and staff development in:

- *Strategic planning (supporting the review of hardware, software and infrastructure provision, consolidating the school vision for digital technologies pre-purchase and installation).*

- *Teacher technologies (developing a whole school approach to teaching and learning utilising commonly agreed hardware and software systems).*

- *Pupil uses of ICT (auditing and devising a common approach to learner hardware and core software mapped to a digital curriculum).*

- *Developing online learning (matching school needs to an appropriate online learning environment and setting up this environment and training staff according to a strategic implementation plan).*

Following the initiation and implementation stages of the initiative, the external consultant stated that,

"Steljes now has an effective process model of using technology to support school improvement which could be offered to other schools. [This school] now has the in-school expertise which could be offered to other schools in its immediate locality as part of the head teacher's desire for the school to become a teaching (training) school."

The digital learning leader
The internal lead on developing the uses of ICT across the school described his roles as:

- *Initially auditing the resources and the skill levels at school.*

- *Analysing how the school was using technology and the levels of skills and usage.*

- *Installing technology into the classrooms.*

- *Training and support.*

- *Managing the whole staff change development programme.*

- *Implementing collaborative teaching and learning within the collaborative classroom and rolling out good practice to other year groups.*

This involved:
- *Making the 'right' decisions on what to buy and how to implement it.*

- *Giving learners access to SMART boards in every classroom from the children's centre to Year 6, and multiple boards in Reception, Year 2, Year 4 and Year 5 classrooms to enable collaboration.*

- *Giving access to devices, tablets, Netbooks and Fizzbooks within the classrooms.*

- *Enabling access to online resources such as Espresso, Purple Mash, Linguascope, Education City and Oxford Owl for both school and home use.*

- *Offering a learning platform to allow learners to access and download saved or newly-set work at home.*

- *Training – differentiated into 4 groups including a digital leader group of 7 staff with higher ability to disseminate to the rest of the staff. The training was not [offered through] a one-off staff meeting but was delivered over 10 sessions.*

- *Offering drop-in sessions to support any issues.*

- *Supporting staff throughout the journey, with a focus on small steps of learning to not overpower or scare any staff who found it difficult. For example, not implementing a learning platform straight away as teachers would not have been ready.*

- *Focusing on the success of the collaborative classroom to drill down deeper into elements of collaboration and how it can be used within the lesson, involving using a new pro-forma for planning, where there is a 15 minute element of collaboration with the classroom.*

The digital learning leader said that he focused specifically on:

- *Teachers' ownership of the technology, starting with the teachers rather than the learners, installing a new Interactive White Board (IWB) and laptop into every classroom.*

- *Then moving to the learning and focusing on devices, online resources and the learning platform.*

- *More recently moving onto more advanced aspects such as computing and the roll-out of collaborative teaching and learning.*

- *Development and roll-out of good practice seen in the collaborative classroom.*

- *Installation of multiple SMART boards and SMART tables in Reception and Year 2.*

- *Embedding collaborative teaching and learning throughout Key Stage 2 by creating smaller-scale collaborative classrooms consisting of 2 SMART boards in every classroom in Years 4 and 5.*

- *Increasing awareness of collaborative teaching and learning for staff/pupils.*

- *Standardising the format of using collaboration throughout the school.*

As a consequence of the measures and actions put in place, the digital learning leader stated that a range of outcomes had been recognised:

- *Technology had transformed teaching and learning.*

- *Learners were engaged.*

- *Lessons were more exciting and motivational.*

- *Children were more active in their learning; there was no passive didactic teaching within lessons.*

- *The classroom was now a 'modern learning inspirational environment', a working space that children were used to and expected the levels of technology they had outside of the school.*

- *The technology had generated positivity; the parents were involved from the beginning and were all on board. This had reversed the downward spiral the school was seeing due to the 'Requires Improvement', so more children were being enrolled at school.*

- *Through the collaboration classroom the children had developed collaborative learning. This innovation in pedagogy was promoting team working, problem solving, social and higher order thinking skills and was developing resilient, creative and collaborative learners.*

The digital learning leader also believed that ICT was so embedded that its removal would have negative impact:

- *I think the removal of ICT would have a devastating impact on the school.*

- *The majority of teachers would now struggle to deliver a lesson without technology.*

- *Learners would be deprived of 21st Century teaching and learning tools.*

- *Motivation throughout the whole school with both teachers and students would decrease.*

- *Once the technology is embedded through the school it becomes an intrinsic element to school life.*

Reports from the key personnel indicated that the school had moved through the stages of initiation and implementation and had reached the stage of institutionalisation (as defined by Hopkins, Ainscow and West, 1994). From this evidence, this movement to institutionalisation had been achieved within a period of 2 years.
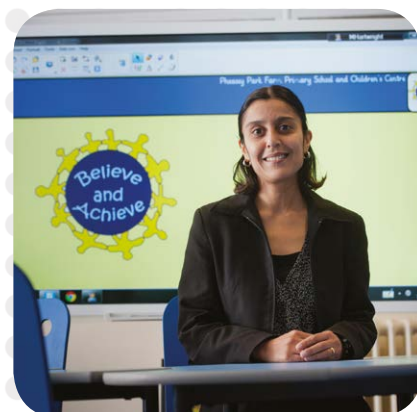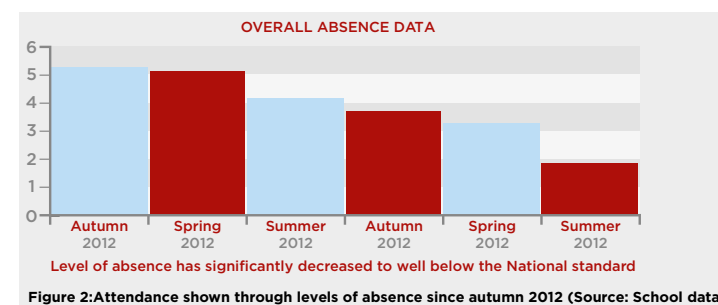
AND OUTCOMES

IMPROVEMENT MEASURES AND OUTCOMES

School attainment data and attendance data both offered measures showing positive improvement across the 2-year period from 2012 to 2014: the level of absence decreased (see Figure 4); and the levels of reading, writing and mathematics attainment increased (see Figure 5) (although an interim drop in attainment in reading, a largely non-collaborative endeavour, should be noted).

PERCENTAGES OF CHILDREN ACHIEVING LEVEL 4 AND ABOVE – ALL SUBJECTS

	2012	2013	2014
Reading L4+	90	84	95
Writing L4+	61	70	82
Maths L4+	74	76	80
GAPS L4+		71	81

Figure 3: Average attainment levels in reading, writing and mathematics since 2012 (Source: School data)

OVERALL ABSENCE DATA

Level of absence has significantly decreased to well below the National standard

Figure 2: Attendance shown through levels of absence since autumn 2012 (Source: School data)

It is important to recognise that these reductions in absence are due to impacts and effects upon individuals. As will be shown in the evidence reported by learners and by their parents, the technologically-rich environment will be seen to have had positive behavioural and attitudinal effects upon individual learners.
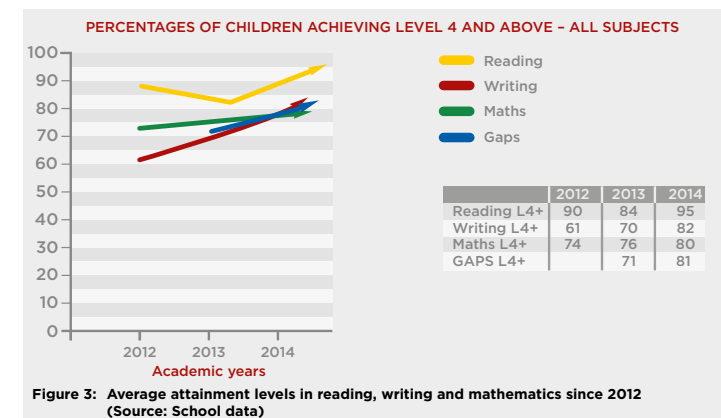
In terms of the attainment data, it is important to recognise that these shifts are due to 'average' shifts in attainment. In contributing to this average, some learners are likely to be much more affected by positive shift than are others. This 'average' shift will be shown also for shifts in perceptions of enjoyment, engagement and collaboration, reported by learners, teachers and parents, in their responses detailed in the sections following.

EVIDENCE FROM PUPILS

Learner responses in early 2014

Responses from surveys gathered in early 2014 showed that learners were well aware of shifts in terms of resourcing, forms of activities they were experiencing, and their wider perceptions of enjoyment of school and lessons. As the surveys indicated:

- In 2012-13, many learners reported using laptops or computers; about a half reported using interactive whiteboards, but very few reported using handhelds or mobile devices.

- In 2013-14, about the same proportion of learners (90%) reported using laptops or computers, but more (89%) reported using interactive whiteboards, and about a third (32%) reported using handheld or mobile devices.

- In 2012-13, on a scale from 3 'a great deal' to 0 'not at all', learners reported enjoyment of being in the classroom as 1.84, with teaching as 1.89, and with learning as 1.96.

- In 2013-14, on the same scale, learners reported enjoyment of being in the classroom as 2.47, with teaching as 2.41, and with learning as 2.43.

- In 2013-14, on a scale from 2 'yes' to 0 'no', learners reported enjoying school more (1.53), enjoying teaching more (1.51), enjoying learning more (1.54), making better progress (1.53), being more involved (1.50), doing more at home (1.12), using technologies more at home (1.40), and wanting to attend school more (1.21).

- In 2013-14, on a scale from 2 'yes' to 0 'no', learners reported the teaching was better (1.65), the teaching was worse (0.27), the learning was worse (0.28), and the learning was better (1.62).

- In 2013-14, on a scale from 2 'yes' to 0 'no', learners reported being less involved in listening (0.57), more involved in doing (1.59), less involved in doing (0.42), and more involved in listening (1.39).

- In 2013-14, on a scale from 2 'yes' to 0 'no', learners in Year 4 using the SMART collaborative classroom reported the learning being more visual (1.88), more listening (1.64), less doing (0.20), more discussion (1.88), less working together (0.27), more working together (1.77), less discussion (0.26), more doing (1.88), less listening (0.39), and less visual (0.27).

- In 2013-14, 70% of learners said digital technologies should be used more in the future, 14% said the same, 4% said less, and 21% said for different things.

- In 2013-14, 36% of learners said they received a lot of training in using digital technologies, 26% said some, 25% said little, and 11% said none.

From these responses, comparing the responses of learners using the collaborative classroom with all learners, those using the collaborative classroom reported higher levels of being involved in both doing and listening (see Table 1). As shown above, they also reported high levels of the learning being more visual, them working together more, and them being involved in more discussion.

Table 1: Comparing responses of learners using the collaborative classroom with all learners (on a scale from 0=no to 2=yes)

	Less involved in listening	More involved in doing	Less involved in doing	More involved in listening
All learners	0.57	1.59	0.42	1.39
Learners using the collaborative classroom	0.39	1.88	0.20	1.64

Learner responses in late 2014

By late 2014, surveys indicated that the shifts shown at the beginning of the year had been maintained. Evidence indicated that learner enjoyment had increased and had been sustained since early 2014, even for those learners who had moved from one year to the next.

Figure 6 shows the responses from learners in late 2014, and contrasts them with responses from early 2014. In the figure, the blue columns show their perceptions from 2012, the red columns show perceptions from early 2014, and the green columns show perceptions from late 2014. These data indicate shifts in enjoyment that are sustained across the calendar year, when learners move from one year group to another. These data suggest a consistency of perception, therefore, which is in one sense independent of the teacher.

Figure 6: Learner reported levels of enjoyment
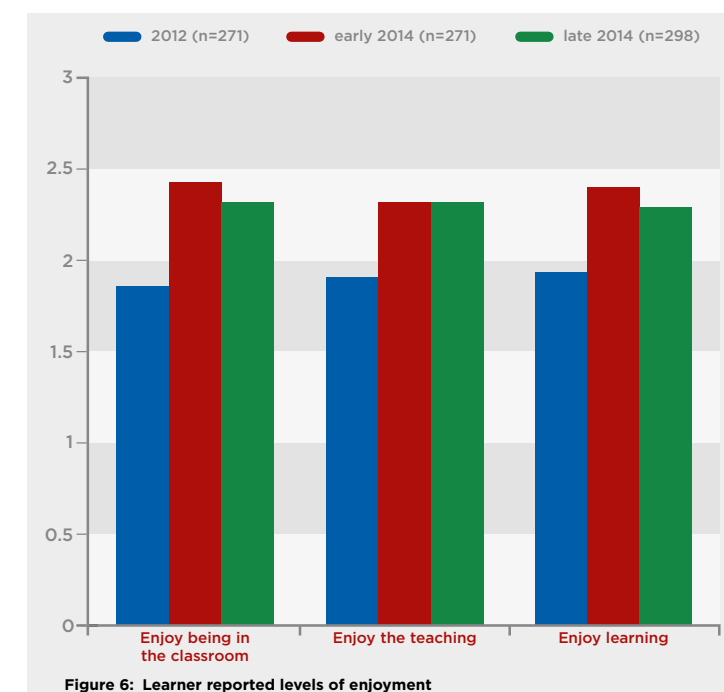
The increases of enjoyment that are reported can be related to learner experiences arising from different activities deployed within classrooms. The results in Figure 7 following clearly indicate that a variety of activities are now in place and that learners are experiencing stimulating rather than passive interactions.
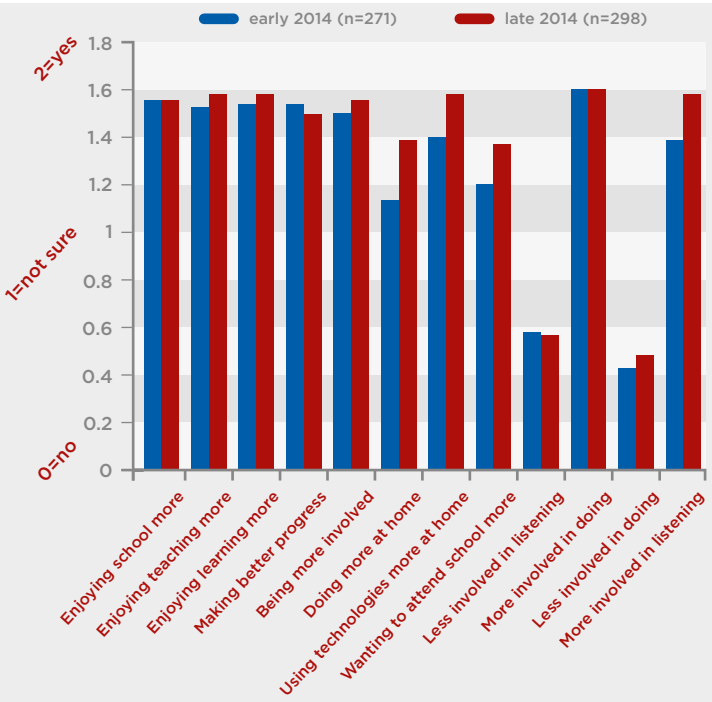

Figure 7: Learner reported levels of activities

It is important to note that over the period of the calendar year (2014), the levels of interactions at home had gone up to greater extents than had levels of interactions in classrooms. This would suggest that the impacts of improvement had initially been in classroom situations, but that these were later widening out to home situations. Also, levels of involvement in listening had increased over the calendar year. This would suggest that learners might be listening to each other and to teachers more.

Evidence presented below from learners, and also from teachers and parents, also suggests that this is the case. It appears that the collaborative endeavour of the school is having an effect on active rather than passive listening.

The quantitative results above are supported by specific statements from learners. Typical learner statements from the 298 recent responses are:

■ *The technology makes me want to go to school more whereas before we didn't have this.*

■ *We use technology more and work together more.*

■ *It has affected my life since I'm more involved in the activities.*

■ *Because you can collaborate and enjoy working with each other.*

■ *I think it has affected this subject because when you're in class you just want to go and get more involved.*

■ *I like the technology because it makes me listen more.*

■ *It helps us be collaborative loads more and it helps us get involved in lessons and learn more.*

Responses from girls and boys in late 2014

When the responses from boys and girls are separated, there are some differences that can be identified, but perhaps not as extreme as might be expected. The differences are shown in Table 2.

Table 2: Reported levels of engagement from boys and from girls (on a scale from 0=no to 2=yes)

	Enjoying school	Enjoying the teaching	Enjoying learning	Making better progress	Being involved in lessons	Doing school work at home	Using technology at home	Wanting to attend school
Boys	1.49	1.54	1.51	1.54	1.59	1.30	1.63	1.32
Girls	1.63	1.66	1.69	1.49	1.57	1.47	1.54	1.43

It is perhaps notable that boys are indicating a slightly higher self-reported level of making better progress, being involved in lessons, and using technology at home. When self-reported levels of involvement are considered, again the differences are not extreme, with boys indicating slightly higher levels of listening, and girls reporting slightly higher levels of doing (see Table 3).

Table 3: Reported levels of activity from boys and from girls (on a scale from 0=no to 2=yes)

	Less involved in listening	More involved in doing	Less involved in doing	More involved in listening
Boys	0.56	1.58	0.50	1.58
Girls	0.62	1.64	0.52	1.55

EVIDENCE FROM PARENTS

Parent responses in early 2014

Evidence from parents mirrors the evidence from learners (although it is important to note that the response level from parents was much lower than that from learners). In March 2014 responses indicated that:

- In 2012-13, many parents reported that their children were using laptops or computers, about a half reported their using interactive whiteboards, but very few reported their using handhelds or mobile devices.

- In 2013-14, about the same proportion (81%) reported their children using laptops or computers, more (85%) reported their using interactive whiteboards, and about a third (31%) reported using handheld or mobile devices.

- In 2012-13, on a scale from 3 'a great deal' to 0 'not at all', parents reported their children's enjoyment of being in the classroom as 2.50, with teaching as 2.46, and with learning as 2.50.

- In 2013-14, on the same scale, parents reported their children's enjoyment of being in the classroom as 2.54, with teaching as 2.54, and with learning as 2.54.

- In 2013-14, on a scale from 2 'yes' to 0 'no', parents reported their children enjoying school more (1.50), enjoying teaching more (1.46), enjoying learning more (1.46), making better progress (1.31), being more involved (1.38), doing more at home (1.15), using technologies more at home (1.54), and wanting to attend school more (1.08).

- In 2013-14, on a scale from 2 'yes' to 0 'no', parents reported the teaching was better (1.35), the teaching was worse (0.23), the learning was worse (0.27), and the learning was better (1.50).

- In 2013-14, on a scale from 2 'yes' to 0 'no', parents reported their children being less involved in listening (0.42), more involved in doing (1.62), less involved in doing (0.35), and more involved in listening (1.38).

- In 2013-14, on a scale from 2 'yes' to 0 'no', parents of learners in Year 4 using the SMART collaborative classroom reported the learning being more visual (2.00), more listening (1.25), less doing (0.38), more discussion (1.63), less working together (0.25), more working together (1.63), less discussion (0.50), more doing (1.88), less listening (0.63), and less visual (0.65).

- In 2013-14, 70% of parents said digital technologies should be used more in the future, 23% said the same, 4% said less, and 8% said for different things.

- In 2013-14, 31% of parents said their children received a lot of training in using digital technologies, 42% said some, 19% said little, and 8% said none.

Parent responses in mid- and late 2014

Parents in July 2014 (the questionnaire is shown in Appendix A) reported their views about their perceptions of their children's levels of enjoyment and forms of engagement. On a scale from 4 ('a great deal') to 1 ('not at all'), they reported that their children:

- Enjoyed being in the classroom more (3.79).

- Enjoyed school more (3.57).

- Enjoyed teaching more (3.5).

- Enjoyed learning more (3.69).

- Made better progress (3.57).

- Were more involved (3.38).

- Did more at home (3.29).

- Used technologies at home more (3.5).

- Wanted to attend school more (3.57).

Parents in December 2014, giving their views using the same scale, reported that their children:

- Enjoyed being in the classroom more (4.00).

- Enjoyed school more (3.50).

- Enjoyed teaching more (3.80).

- Enjoyed learning more (3.80).

- Made better progress (3.60).

- Were more involved (3.80).

- Did more at home (3.30).

- Used technologies at home more (3.50).

- Wanted to attend school more (3.00).

Figure 8 shows how parent perceptions of their children's levels of involvement had shifted over time. However, it should be noted that the parent sample in each time period could be independent of the other, so an absolute comparison is not being shown here; it is an indicative comparison. From these data, it is interesting to note that enjoyment in being in classrooms and with teaching has increased to a greater extent than has enjoyment with school as a whole. Indeed, there is a slight decrease in perception of wanting to attend school more.


Figure 8: Parent reports of their children's enjoyment
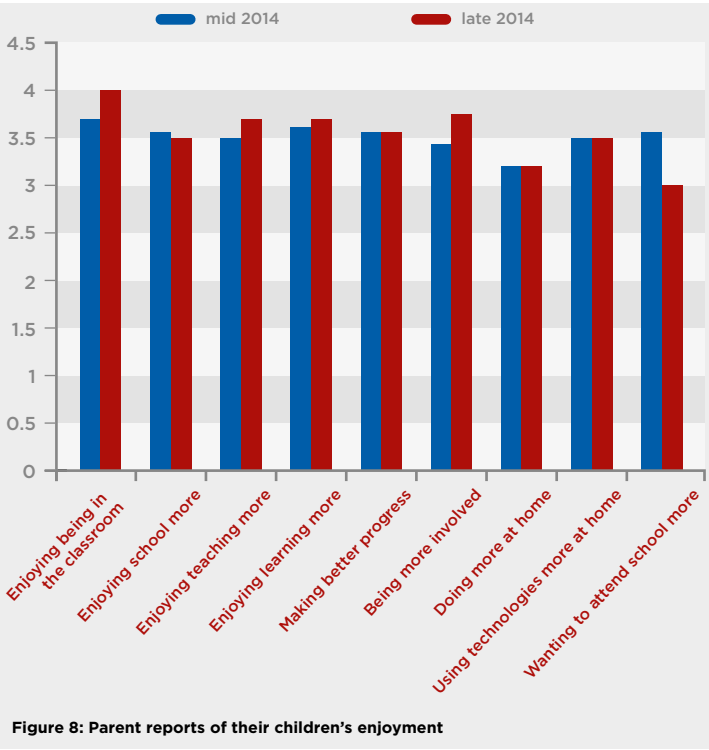
In terms of the forms of activity in lessons, parents reported on a scale from 2 ('yes') to 0 ('no') that their children:

- Were less involved in listening (0.31).
- Were more involved in doing (1.92).
- Were less involved in doing (0.33).
- Were more involved in listening (1.69).
- Used more visual resources (1.92).
- Discussed more with other learners (1.61).
- Worked less with other learners (0.25).
- Worked more with other learners (1.76).
- Discussed less with other learners (0.25).
- Used fewer visual resources (0.08).

In December 2014, parents reported that their children:

- Were less involved in listening (0.40).
- Were more involved in doing (2.00).
- Were less involved in doing (0.10).
- Were more involved in listening (1.70).
- Used more visual resources (1.90).
- Discussed more with other learners (1.50).
- Worked less with other learners (0.20).
- Worked more with other learners (1.80).
- Discussed less with other learners (0.20).
- Used fewer visual resources (0.30).

Figure 9 shows the responses from parents in mid- and late 2014 regarding forms of interaction that they perceived were happening with their children. Although these samples might be independent, it is clear to see that levels of active involvement, listening and doing, were remaining high if not increasing in some cases with time (which might occur as learners move from one class to another).

Figure 9: Parent responses about forms of interaction their children are experiencing
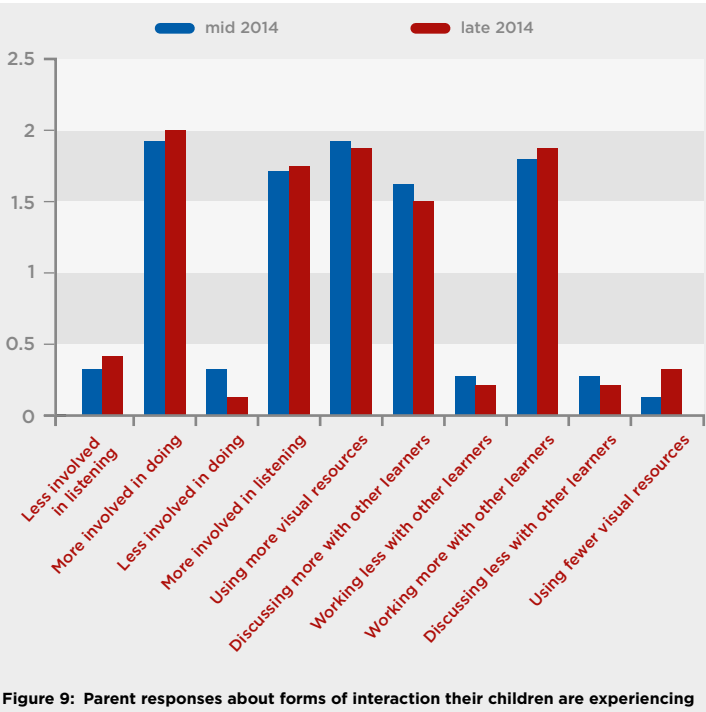
Parent responses clarify to greater extents their views about the shifts they report. In late 2014 parents indicated their views about the value of the measures and actions put in place. In terms of main issues, they said:

- *It is vitally important the children are up to date with modern technology. The SMART classroom has given these children a wonderful start in life.*

- *I think it is good that my son has been in the SMART classroom this year. He has had an opportunity that other kids have not had. He will be able to use this technology when he is older.*

- *It is a shame there are insufficient resources so each KS2 classroom can't have a SMART collaborative classroom.*

- *I don't think there are issues with the technology as they learn with the technology.*

- *I am very impressed with the new technology used in Year 4. However, I also hope they continue to learn in the conventional way - I think it is important to have a balance.*

- *I think the use of digital technology is vitally important in the modern age. I think this year will have improved his standard of education. It's a shame more classrooms are not equipped with SMART technology.*

- *Technology breakdown. Less traditional forms of recording work being used.*

- *I feel that there shouldn't be any issues with technology.*

- *Will traditional skills still be taught?*

- *They don't talk about using any technology so not sure how it impacts on them (learning or motivation).*

- *They don't use as much in Year 6 as year groups below.*

- *I am sad that my son did not use the SMART classroom in Year 4. I feel he would have been more prepared for technology classes in High School next year.*

- *There is no issue with technology, children should be learning with technology.*

- *I hope he still learns traditional methods of calculating, measuring, etc.*

In terms of main benefits they said:

- *I am delighted with the School and the teachers. My daughter is in Year Four. She has been so enthusiastic about lessons this year and has made wonderful progress. She plays with her friends and they all talk about the day's lessons and how fantastic school is. When she is doing her homework, she is more confident and positive.*

- *My son has problems concentrating at school and mixing with other kids. We think there has been some improvement in his behaviour since he has been in Year 4. He can use his laptop more at home and talks about the lessons and the teachers.*

- *She talks about the lessons and enjoys using the interactive whiteboard and net books. She is looking forward to using SMART in Year 4.*

- *I think it gives them a good grounding for the time after school and helps their prospects for a good job.*

- *My daughter has had a great time at school this year. She has enjoyed using the new technology. I really believe her attitude at school has changed. She is more attentive and works well with her friends. She talks about the lessons and the wonderful equipment. I know this will be a benefit in years to come.*

- *The difference in my son's attitude to school is amazing. He is eager to start lessons and when he comes home he talks about the day's activities and the teachers. He seems to concentrate more and is more tolerant of his class mates.*

- *Collaboration with other children. Developing thinking and reasoning skills.*

- *Preparing children for using technology in secondary school.*

- *They are used to using tech[nology] at home so need to use it at school.*

- *Understanding the future.*

- *He talks a lot about the few lessons he's had in the collaborative classroom. Digital technology is important to young children.*

- *Preparing them for the future.*

- *He is interacting more with the other children and talking more. He talks enthusiastically about school when he gets home.*

In terms of other comments they said:

- *It would be wonderful if more classrooms were equipped with this modern technology.*

- *Wish there was a SMART classroom for Year 5.*

- *I am impressed that [this school] is one of the few schools with a SMART collaborative classroom.*

- *I wish this wonderful technology was available to all the classes at [this school]. The skills of the teachers are amazing - I know they have spent many hours training and preparing the classroom and the lessons.*

- *I am so pleased my son has been in the SMART classroom, I am sure he will continue to be interested in digital technology in Year 5.*

- *Looking forward to my child using the collaborative classroom next year - hoping to see an impact on learning and enthusiasm.*

- *My child only managed to experience the collaborative classroom occasionally although has benefited from other forms of ICT.*

- *You need a balance between tech[nology] and traditional.*

- *I wish there were more rooms like in Year 4.*

- *I hope there are similar resources at the secondary school he attends.*

It is clear from a number of these reports that those parents believe there are benefits arising for their children. They indicate positive outcomes arising from the deployment and uses of the ICT resources. Negative responses are not being made here. However, it is clear that some parents are concerned about retaining traditional approaches and developing traditional skills, but at the same time there is a large concern by parents that their children experience new resources positively in schools, and encounter opportunities and resources that fit them for not just their next period of schooling, but also for their longer-term life needs. How teachers are doing this is explored through teacher reports in the following section.

EVIDENCE FROM TEACHERS

Teacher responses in early 2014

Teachers in March 2014 (six out of seven) reported impacts that they had noted that were measurable, after only a short period of time following implementation of the initiative:

■ *It is perceived that the children work more collaboratively and cooperate better. I know that Maths levels in the class that use the collaborative classroom have greatly improved since September.*

■ *Attendance has improved (especially in Y4 where the collaborative room is where children in "early/on time" sign in on an iPad) and as a whole; levels across school have improved; lessons (% of teaching good and above has increased).*

■ *More collaborative learning/pupil engagement is evident throughout the school. Unsure of impact upon pupil progression.*

■ *Attendance is only area so far which is measurable, particularly in Y4 where Collaborative Classroom is.*

■ *All pupils seem to be able to use the net books with more speed and accuracy. All pupils comfortable working on the SMART board.*

■ *There are impacts on attendance - absence has reduced overall from last year to this year. Year 4 has the best attendance in the school. The children in SCC have better attendance this year to last year. (I have graphs to back this up.) Children are happier, lessons are more exciting. Children want to be in class when using technology.*

Teacher responses in late 2014

Teachers in December 2014 did report some issues that had arisen, however:

■ *Netbooks taking too long to log on/not connecting.*

■ *Sharing devices can sometimes be an issue. Setting up equipment and creating content takes a long time.*

■ *With two boards, some children don't always get a "go" each lesson. Some children do activities with mini-whiteboards or card activities whilst other children do the same activity on the SMART boards.*

■ *Space to sit on carpet and move to board; not enough so not all can be on it at once; time to prepare resources.*

■ *It doesn't always work, especially netbooks which impacts pupils' learning, i.e. not being able to log on.*

■ *Reliability and resources. Technology can often be unreliable and this can cause severe disruption as there is often no alternative to the tasks that the technology is required to perform requiring either a constant supply of back-up plans or quick thinking within the lesson.*

■ *When the server goes down and you have planned a lesson involving the internet.*

■ *When children get the opportunity to do work on netbooks they are not reliable due to technical difficulties that arise.*

■ *The netbooks at school are slow to login and some do not work. Not everyone can get up and use the SMART board!*

It is clear that some teachers have reported both technical and resource issues. However, those same teachers also report benefits that can arise:

■ *Engaging learners.*

■ *The technology helps all learners to be involved and engaged in lessons. It also encourages learners to interact with each other and challenge ways of thinking as well as understanding the opinions of others.*

■ *Lessons can be more visual. I can tailor my lessons to meet the needs of the children. For example, teach on one board and then set some children off and then extend others by teaching the next steps on the other board.*

■ *Involved in their learning, doing things that are practical and very closely linked to learning; stimulating - tactile, visual; rewarding - stars/sounds/points/achievement of finishing a game; being able to show examples of their work on screen through Apple TV/iPod.*

■ *Children are more actively engaged - special effects on SMART Notebook can create a sense of awe and wonder at times.*

■ *Keeping pupils interested, access to technology outside school makes other school work seem dull.*

■ *Familiarity with technology, since it is such a large part of modern life. It also allows access to the internet, which contains so many more resources than would be available if only using books.*

■ *Opens a world of information for observing, discussing, comparing, and basing written work on. Interactive games/activities provide another media to support teaching and learning, often enabling children to extend their skills independently.*

- *Children are more excited about learning and therefore more engaged in lessons.*
- *Children are eager to use the SMART board. Like to listen and watch videos showing the techniques being learnt. They like to play the interactive games.*

Observation and teacher experiences of collaborative classroom practice

The variety of ways of engaging learners in classrooms that has been developed is evident from the 9 activities that a teacher set up during a single one-hour lesson in the collaborative classroom. In this lesson, learners were involved in group tasks, collaborative activity, individual activity, paired work, listening, and discussion (see Table 4).

Table 4: Activities undertaken during a single 1-hour lesson within the collaborative classroom

11.15	The teacher sets the mathematics task, and 4 groups of 7 learners are asked to use the 4 technologies, discussing and taking turns to address problems and put in answers
11.26	They return to their desks, and immediately it is quiet, while they listen and individually consider what is being said
11.28	They are asked to answer a more difficult problem by 'telling their partner'
11.30	Learners go back into groups, to drag and drop onto a grid, and immediately discuss the problems. The teacher monitors and ensures discussion is fair, as well as supporting the subject content
11.35	Learners are asked to stop and listen to the teacher
11.36	The learners are asked to continue working in their groups
11.40	The learners return to their tables, where they are set work to do on their own. Learners work quietly on their own
11.57	The teacher talks to the whole class
12.13	In summary, the teacher asks one learner to write responses on the board, and asks learners to discuss the written answer with their partners

Observation in the classroom indicated that learners were involved in easy turn-taking (a practice that the teacher said he had had to develop with the children through discussion and practice). There were elements across these activities that could not have been undertaken without the technologies – moving, and rubbing out in the same ways on large boards, for example. The teacher was encouraging collaboration, which increased co-operation, and this was deemed to impact engagement and learning. However, it was clear that the teacher needed to focus on social and emotional needs more. The teacher was encouraging practices concerned with "supporting one another" rather than "contributing". After learners had done this through group work on SMART boards, learners then returned to their desks and worked on paper. They were working in collaborative ways on a 'transitory medium' and were then encouraged to work independently on a 'committed medium'. On the transitory medium they could easily amend what they did, as they discussed it; on a committed medium they could amend things less easily, as they worked on their own. The large-screen interactive boards enabled these processes, supporting learners in sharing and seeing easily what others were doing and demonstrating.

Three learners from the Year 4 class who used the collaborative classroom at the beginning of 2014 said that it was possible for:

- *All to have a go – but then step back and explain – discussion rather than argument.*
- *Boards can be used to communicate and make friends with others.*
- *"Not all about you" "Collaborating" rather than doing it by yourself.*
- *"Better understanding of lesson".*
- *Can't wait to get into lesson.*
- *Don't like doing work in books.*
- *Important not to be on the board all the time – need to change round.*
- *"Learned how to work with other people" and "Be more sociable".*

The teacher of the Year 4 group who worked in the collaborative classroom, in the early part of 2014, said that important features of the facilities were concerned with his abilities to:

- *Be able to be more lively and dynamic.*
- *Teach what they [learners] want to do, rather than what was needed.*
- *See what needs doing easily.*
- *Move them in ability groups.*
- *Push children in their groups at their own pace.*

However, he also stated that collaboration was more likely to be possible to develop for learners in Year 4 than it would have been in Year 2. So, he saw collaboration as being a feature that needed to be considered in terms of age and emotional and cognitive development. But, as he said, when collaboration was developed, then 'ownership and learning happens more'. He said with collaboration there was a 'greater reliance on each other, and greater ownership of what they are doing'. But he then took his experience from working with Year 4 learners, setting up in Year 2 what might be done to get them involved in collaborative tasks. With 2 SMART boards and a SMART table he could demonstrate children's work more easily.

In managing collaboration, he said that it was important to show value of others' work, to develop a greater reliance on others, and to enable discussion. He said this would have been 'virtually impossible without the technology'. Because of the transitory nature of the medium, failure and learning could be integrated successfully together.

For another teacher, who had taken on the previous Year 4 class that worked in the collaborative classroom, he noticed a range of practices with this class group:

- *They shared so well – they could take it in turns – while normally there were arguments, for these there was seamless sharing.*
- *When they did their work – they said it, and discussed their work. They talked about their work even though they were doing their own work. They discussed naturally.*

Specific skills or abilities he felt these children had that others had not had were concerned with:

- *Helping with learning. Helping to say things.*
- *They worked better when they said it first.*
- *It's easier to manage discussion – they just said it.*
- *They were quieter in collaborative work, using ideas of others largely.*
- Imagination might not have been developed in those children, but this was not necessarily an issue. They tended to use mainly the ideas of others – accept them without taking it further. He noticed this a lot in mathematics, but also in literacy (but less so) and other subjects.

The teacher valued what had come out of the collaborative classroom. He recognised that technology involved engagement more. Paired discussion, group work, and collaborative work were all very positive. But he indicated the need for a mixture of approaches, to keep it fresh, and ensure that all skills were learned.

CONCLUSIONS

Background

Since the early days of single computers in classrooms, studies have explored the ways that digital technologies have continued to support and enhance learning (reviewed in Passey, 2014). As new digital technologies have emerged, so opportunities for teaching and learning have been extended. During the past year, this in-depth study of Pheasey Park Farm Primary School has explored how improvements have rapidly been made, and where digital technologies have played important roles.

In terms of context, in this case study school, from an Ofsted inspection in October 2012, Pheasey Park Farm Primary School was placed in a 'Requires Improvement' category:

- Teaching quality varied too much and was considered 'dusty'.

- Achievement in English and mathematics was not high.

- Lessons were often too dominated by the teacher.

- Marking did not always help pupils to improve their work.

- Subject leaders missed opportunities to help other teachers.

- Senior leaders had not checked the quality of teaching and learning robustly.

- The governing body did not consistently and thoroughly question senior leaders about performance of teachers.

School improvement initiation

When a newly-appointed head teacher took over post in 2013, information and communication technologies (ICT) were not used significantly within classrooms, by teachers, to support teaching or learning. Developing an integration of ICT and collaborative activity into classroom practices has been a major focal activity in seeking improvement. The school has:

- Been supported through external consultancy and internal digital leader posts.

- Gained input from Steljes training.

- Been provided with ICT facilities that have enabled the educational value of SMART products to be used within a flexible classroom environment.

- Begun to explore the deeper use of large screen interactive technologies.

- Started to explore the educational benefits of the SMART table.

The research focus
This research study has identified:

- The value of the training product and input that was provided by external and internal agents (reported by the head teacher, digital learning leader and teachers).

- The educational value of the technology products adopted (reported by all stakeholders).

- The continuing importance of large-screen interactive technologies (reported by teachers, learners, and observed in practice).

- The educational benefits of a collaborative table (reported by learners, teachers, parents, and observed in practice).

- The types of teaching and learning that were being developed in a collaborative classroom (reported by teachers, learners, parents, and observed in practice).

- Any links of these features to school improvement (demonstrated by reports from all stakeholders).

School improvement implementation and institutionalisation

Attainment data and attendance data both show measures of positive improvement across the period from 2012 to 2014: the level of absence decreased; and the levels of reading, writing and mathematics attainment increased (although an interim drop in attainment in reading, a largely non-collaborative endeavour, should be noted).

Teachers, parents and pupils all agree in their views that SMART technologies and a SMART collaborative classroom have helped to remove the 'dust', so that teaching is more diverse, and learning is more exposed. Evidence shows that learner enjoyment has increased and been sustained since 2012. That enjoyment can be related to learner experiences arising from different activities within classrooms. It is clear that a variety of activities are now in place and that learners are experiencing stimulating rather than passive interactions.

The variety that is now possible is illustrated by the 9 activities that a teacher set up during a single one-hour lesson. In this lesson learners were involved in group tasks, collaborative activity, individual activity, paired work, listening, and discussion (see Table 5).

Table 5: Activities undertaken during a single 1-hour lesson within the collaborative classroom

11.15	The teacher sets the mathematics task, and 4 groups of 7 learners are asked to use the 4 technologies, discussing and taking turns to address problems and put in answers
11.26	They return to their desks, and immediately it is quiet, while they listen and individually consider what is being said
11.28	They are asked to answer a more difficult problem by 'telling their partner'
11.30	Learners go back into groups, to drag and drop onto a grid, and immediately discuss the problems. The teacher monitors and ensures discussion is fair, as well as supporting the subject content
11.35	Learners are asked to stop and listen to the teacher
11.36	The learners are asked to continue working in their groups
11.40	The learners return to their tables, where they are set work to do on their own. Learners work quietly on their own
11.57	The teacher talks to the whole class
12.13	In summary, the teacher asks one learner to write responses on the board, and asks learners to discuss the written answer with their partners

Pupils now 'expose their learning' – both to their peers and to their teachers. Co-operation and collaboration have been developed with the result that more stimulating teaching opportunities support learning in more active and dynamic ways. This has happened as a result of a sequence of focuses on outcomes – the management support approach adopted, leadership encouragement, the development of teaching diversity, and stimulation of learning. As a consequence, there has been a move from 'dusty' teaching to 'collaborative endeavour'.

This study has explored uses of technologies in helping to bring about school improvement. This is about the ways that technologies support people, and the ways that a school-based action plan has integrated technologies to enable teachers and learners to adopt a width of pedagogical and learning approaches that have affected their attitudinal as well as cognitive interactions in classrooms. Part of this change has been concerned with developing collaboration, as a means within lessons of creating ways for learners to engage with others, supporting each other, and finding ways to solve problems.

As the head teacher said:

- *The implementation of technology has had an uplifting impact on the way in which parents, pupils, teachers and governors perceive the way the school is.*

- *This has had a positive impact on the morale of the school community after a negative Ofsted.*

- *The approach has been changed, into a proactive vision of the school.*

- *The technology is 'the magic' that transforms the school.*

- *To change a school you need to change perceptions.*

The head teacher's action plan and intentions were crucial, as was her concern for management approaches and the ways that technologies would enable and integrate with these. She wanted to enable teachers to develop, and be supported through and with the technologies. Data from attendance and attainment results indicates school improvement has resulted, as measured in these fairly standard ways. When evidence from pupils, parents and teachers is viewed, the link of the ways that technologies have been introduced and used is clear.

Importantly, it is not the technologies alone that bring about the shifts; it is the ways they are deployed, used and managed. School improvement in this case has been focused through collaboration: with external and internal consultants and agents of change, with teacher interaction and collaboration, and with learner involvement with a variety of approaches to engage them in collaborative as well as independent learning activities.

Summary of key outcomes

In summary, key factors in bringing about positive school improvement through uses of ICT and collaborative activities have been:

- School leadership and management focused on enabling teaching with active involvement of learners.

- External consultancy and support, resource priorities, internal ICT leadership and digital leaders, a training plan, gaining support of teachers, parents and learners.

- Shared responsibility supporting greater ownership of learning.

- Collaboration being managed, rather than expected.

- Technologies providing a 'transitory medium' exposing learning, while paper-based activities provided a 'committed medium'.

- Collaboration using a 'transitory medium' being moved to independence of pupil actions using a 'committed medium'.

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Appendix A: Example questionnaire – parents in early 2014
Digital Technologies in Pheasey Park Farm Primary School Parents

The Purpose of the Research

The Centre for Technology Enhanced Learning in the Department of Educational Research at Lancaster University has been commissioned by the school support company, Steljes, to research how digital technologies recently introduced into school, and supported by training, are being used.

As part of this study, a number of questionnaire surveys will be conducted, in July and in November 2014. Taking part in these surveys is completely voluntary. Any decision not to take part will in no way affect your relationship with the school.

It is intended that the information collected will be used to create reports for the company and the school, and may later be used for public reports or for articles in research journals and used at conferences.

The Questionnaire Survey

Your responses will be reported anonymously. The questionnaire does not ask for any personal details. It will ask about your past and current views and experiences of digital technologies in the school, and what you think about their uses and outcomes. Your submission of the questionnaire will indicate your consent to use the details, as described here, and that the details are correct as far as you are aware.

The questionnaire information will be stored securely at Lancaster University for 6 years or more, as required by any publisher. After that time it will be destroyed.

If you have any questions before agreeing to take part, please do contact us.

Contact Details

Professor Don Passey – Principal Investigator

Tel: 01524 592314 **Email:** d.passey@lancaster.ac.uk

Room: County South, D25, Lancaster University, Lancaster, LA1 4YD, UK.

Or in case of concerns or complaints you can contact:

Dr Paul Ashwin – Head of Department

Tel: 01524 594443 **Email:** Paul.Ashwin@Lancaster.ac.uk

Room: County South, D32, Lancaster University, Lancaster, LA1 4YD, UK.

Please give us a little background

The year group of your child (please tick one of these):

3 ☐   4 ☐   5 ☐   6 ☐

Their gender (please tick one of these):

M ☐   F ☐

1. Did you complete a questionnaire for us in March 2014 (please tick one of these)?

Yes ☐   No ☐

Digital technologies

2. What digital technologies are you aware of that are now provided in the school, in classrooms? (Please tick all that apply.)

• Laptops or computers ☐   • Interactive whiteboards ☐

• Handhelds or mobile devices ☐   • A SMART collaborative classroom ☐

• Other (please say what) ☐

3. Do you think these have made a difference to your child? (Please tell us which is appropriate, on a scale from 1 'a great deal' to 4 'not at all' by placing one tick in each row.)

Is your child now?	A great deal	A little	Not really	Not at all
Enjoying being in the classroom	☐	☐	☐	☐
Enjoying school more	☐	☐	☐	☐
Enjoying the teaching more	☐	☐	☐	☐
Enjoying learning more	☐	☐	☐	☐
Making better progress	☐	☐	☐	☐
Being more involved	☐	☐	☐	☐
Doing more at home	☐	☐	☐	☐
Using technologies at home more	☐	☐	☐	☐
Wanting to attend school more	☐	☐	☐	☐

4. How do you think any change in your child's learning is happening? (Please tick either 'Yes', 'Not sure' or 'No' in each row.)

Is your child now?	Yes	Not sure	No
Less involved in listening	☐	☐	☐
More involved in doing	☐	☐	☐
Less involved in doing	☐	☐	☐
More involved in listening	☐	☐	☐
Using more visual resources	☐	☐	☐
Discussing more with other learners	☐	☐	☐
Working less with other learners	☐	☐	☐
Working more with other learners	☐	☐	☐
Discussing less with other learners	☐	☐	☐
Using fewer visual resources	☐	☐	☐

5. What do you think are the main issues with the uses of the digital technologies with your child?

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6. What do you think are the main benefits arising from the uses of the digital technologies with your child?

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7. Do you have any other comments you would like to offer at this time?

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Thank you for taking the time to answer these questions. Your help with this is very much appreciated.

18th February 2015

Any correspondence about this report should be addressed to the author:

Don Passey

Professor of Technology Enhanced Learning
Department of Educational Research
Lancaster University
Lancaster, LA1 4YL

Tel: 01524 592314
Email: d.passey@lancaster.ac.uk

Administrative support for the evaluation was provided by:

Kathryn Doherty

Department of Educational Research
Lancaster University
Lancaster, LA1 4YL

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