THE IPAD AS A TOOL FOR EDUCATION

A study of the introduction of iPads at Longfield Academy, Kent

This study was undertaken on behalf of Naace (The ICT Association) and supported by 9ine Consulting Ltd

"The iPads have revolutionised teaching"
—LONGFIELD ACADEMY TEACHER

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About

This research was jointly commissioned by NAACE and 9ine Consulting to assess the impact of iPads at Longfield Academy.

Longfield Academy

Longfield Academy is an oversubscribed mixed non selective secondary school for students aged 11-18. It is situated near Darford in Kent and forms part of the Leigh Academies Trust. The current role is around 970 students with around 160 of these in the sixth form.

The Academy comprises of 3 Colleges and each College has its own Principal. Results over the past 3 years have improved significantly and the Academy was described by OFSTED in May 2011 as Good with outstanding features.

Naace (The ICT Association)

Naace is the ICT association. We are a community of educators, consultants, school leaders, technologists and policy makers from all phases of UK education, who share a vision for the role of technology in advancing education. We represent the education technology community and support it through conferences, courses and the dissemination of resources, research and reflection. We play a key role in members' professional development through the challenge and support of a community of practice, the development of the profession as a whole and through sharing innovation and expertise.

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9ine Consulting – www.9ine.uk.com

9ine is an integrated consultancy providing services and solutions to education organisations. Our business is fundamentally different from any other consultancy operating within the Education market. We manage the full ICT operations life cycle from cradle to grave. This encompasses technology consultancy, curriculum integration, solutions architecture, management of project delivery, embedding the solution and delivering through efficient operations management. This unique different means we can talk about current and future technology and advise on the implementation of those technologies within a live environment.

We have supported Longfield Academy since 2009 in the development of the iPad scheme. We provide technical consultancy, change management and project management to Schools, Academies, Universities and commercial organisations in the UK and internationally on the integration of iPads and other emerging or new technologies. *www.9ine.uk.com*

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EXECUTIVE SUMMARY

This study, one of the most extensive yet regarding the use of tablet devices finds that with the majority of pupils at the school now having iPads there has been a significant and very positive impact on learning together with further significant and still developing changes in pedagogy. In particular it was found that:

- The overwhelming majority of teachers regularly use iPads in their teaching
- iPad use is particularly strong in English, Maths and Science
- There is high demand from students for iPad use to be extended further
- Teachers have identified significant benefits for their workload and have also identified cost savings
- Use of the iPads is increasingly being developed for homework and beyond school activities
- Students are more motivated when using iPads
- The quality and standard of pupil work and progress is rising
- Both staff and student feel they can work more effectively with iPads
- Levels of collaborative working have improved
- Appropriate use of Apps aids learning
- All find the iPad easy to use
- Minor technical issues have arisen, often due to user error, but are readily dealt with
- Effective project management has been critical to the success of this development.

The outcomes at Longfield clearly demonstrate the value of the iPad as an educational tool and the role that it can play in learning and teaching.

ABSTRACT

The iPad as a Tool for Education:
A study of the introduction of iPads at Longfield Academy

This study reviews the impact on learning and teaching of the introduction of iPad devices at Longfield Academy, Kent since September 2011. It finds that with the majority of pupils now having the devices, there has been a significant and very positive impact on learning, as well assignificant and still developing changes in pedagogy. Students are very positive about the devices and the impact they have on their motivation, ability to research, communicate and collaborate, while staff increasingly exploit the range of educational Apps made available. While some technical issues have been identified, these are dealt with through excellent project management. The outcomes at Longfield clearly demonstrate the value of the iPad as an educational tool.

INTRODUCTION AND BACKGROUND

Although use of conventional computers including laptops and netbooks is well established in schools and a considerable body of literature confirms their value and impact, the integration of tablet devices such as the iPad is still, in early 2012, at the innovation stage of development. There is currently only limited published research on the impact of such devices on learning and teaching, although the work of Melhuish & Falloon (2010) and Smith (2011) demonstrate the benefits and innovative practice engendered. This is further supported by reports in non-academic blogs such as those at *http://www.ipadinschools.com* and *http://www.ipadineducation.co.uk* .

However, considerable debate remains regarding the educational benefits of tablet and other personal devices for learners. Most studies to date have involved trials with class sets of tablets rather than the pupils using their own personal devices. While clearly demonstrating benefits of the technology, the shared nature of the trials raised its own problems.

Thus the recent introduction of iPads throughout Longfield Academy provides an excellent opportunity for a small scale research study of the initial impact of the iPad on learning and teaching throughout the school and the social and technical issues arising. There is also scope for a more significant longitudinal study of these aspects.

We are at a point in the evolution of technology where the personal tablet device postulated by Hepple (1998) is becoming a reality. However, we do not yet understand how access to and use of these devices will change learning and teaching. Without such understanding we are left with an inadequate analysis that creates the conditions for ill-informed policy decisions at both school and national level and a self-sustaining cycle of misunderstanding and doubt.

This study will address a gap in the literature by examining the impact on learning and teaching in an innovative school that already has a strong commitment to ICT. In particular, it will focus on changes in teaching and learning styles, impact on standards and on pupil's attitudes to learning with the devices, together with any whole-school technical and management issues arising.

INSIGHTS FROM THE LITERATURE

Several studies of the use of the iPad as an educational tool have been undertaken since the introduction of this product, together with others relating to tablet computers in general. However, the focus of most has been on the iPad due to the functionality of the tool compared to some others, the range of apps available and the attractiveness and street credibility of the iPad to young people.

Researchers have explored the impact of iPads in a number of situations to date, though mostly where small scale trials of the device have taken place as in that reported by Glicksman (2011) on the website *iPads for Education* and also by Garcia and Friedman (2011) in a study in a United States history classroom. Other similar studies have taken place in Germany at Kaiserin Augusta Schule, where a six month evaluation with 600 students was reported by Spang (2011) at *http://ipdkas.wordpress.com* and by Learning Exchange (2011) in Australia.

In the above examples, the devices were owned by and managed by the school, yet it must be remembered that iPads and similar tablet devices are designed as personal devices and thus *'will cause significant shifts in the idea of ownership, the ownership of technology and knowledge.'* (Traxler 2010). It is only recently that schools such as Longfield have begun to equip the majority of pupils with a personal iPad, thus enabling the full impact of the device to be evaluated both in a snapshot view and potentially as part of a longitudinal study.

However, there is considerable convergence in the findings of these various studies which, while highlighting considerable benefits of iPads, also highlight a number of technical, pedagogical and management issues that schools will need to address. The results from the Longfield study, using similar research methodologies, serve to further confirm the significant potential of tablet devices as ubiquitous tools for learning.

It is useful here to consider the nature and potential of mobile devices in education identified by researchers thus far, while noting that the situation regarding ownership of a range of personal, net connected devices is expanding rapidly. For example, a study by the Speak Up National Research Project (2011), with a sample of 416 000 US 3rd to 12th grade students, found that by of secondary age pupils 50% owned Smartphones and 21% personal tablets. The level of ownership is likely to have increased since then as prices generally become more competitive as the technology matures.

As ownership of devices increases, so does student demand to use them in school and in parental acceptance of such devices in school. However, the Speak Up research also

notes that, as is evident in the UK, school management is reluctant to allow such use! Curiously only 40% of parents see value in ubiquitous Internet access in a modern school, a view totally at odds with exploiting the benefits of personal devices. Students, conversely, find the filtering restrictions on school networks frustrating.

Current research findings from Melhuish and Falloon (2010), Gliksman (2011), Learning Exchange (2011) and Spang (2011) all demonstrate educational value and positive learning outcomes from the use of iPads, as does this writer's study at Longfield Academy. There are however some, such as Traxler (2010), who continue to urge caution and express reservations about the convergence of multiple technologies in modern smart devices. He expresses concern that we have yet to see the emergence of a generic converged device and that, *"an architecture based on dedicated closed boxes means that this situation will not change".* While true of Apple technology, this ignores the wide range of devices based on variants of the Android operating system now available. Traxler (2010) further notes that, "*devices owned by students will be, at best, poorly suited for learning, different and changing, often for reasons that are not technical, not educational, and probably not even rationale and foreseeable."* This view does, indeed, have some validity at the time of writing since early adopter schools are adapting what is essentially a device created for individual personal use into a ubiquitous classroom tool. The technology is still developing rapidly and this poses its own problems for schools, such as ensuring that there is a commonality of platform and Apps. However, where the school recognises the personal nature of the device and adapts its approach and pedagogy to suit, it is possible, as at Longfield Academy, to integrate iPads as just another tool for learning. Indeed, Traxler (2010) note that mobile technologies are difficult to ignore as they are, *"woven into all times and places of students' lives",* something that can only increase as devices become more affordable and powerful.

Melhuish and Falloon (2010) lead us to a consideration of how mobile technologies are redefining what constitutes a learning space, one that is no longer fixed in time but based on connecting people with each other and information through virtual collaborative spaces and communities. Such use is evident at only a low level in the Longfield study, where much use is classroom based. However, there is evidence from both pupil interviews and questionnaires indicating that some, but not all students, are using their iPads in just this way. In this respect the findings reflect those of the Speak Up 2011 study.

Exploring the issues

While these recent studies are demonstrating the benefits of personal devices, their introduction does give rise to many issues: technical, pedagogical and in management. However, lessons are being learned from the early adopters, though not always by the manufacturers.

Traxler (2010) considers current mobile technologies are not designed for educational use and are poorly suited to learning. However, this is a generalisation and takes little account of the speed of development over the last two years during which the iPad has become the dominant tool and the technology of choice in schools. There are clear reasons for this, the most important being the consistency of the operating system and interface and the availability of educational apps. This is simply not (yet) the case with other systems. Speirs (2012) notes in his blog that while iOS 5 is deployed in the vast majority of iOS devices in the field, the main competition, Android platforms, are largely using the outdated Android 2.x, with little likelihood of upgrade. Further, there are no Android Apps equivalent to e.g. GarageBand, Keynote, ArtRage etc. As ever, it is the availability of educational tools, as well as issues of security, backup and restore and lifecycle support that are important to school users. Currently only the iPad provides all of these.

As noted above, the iPad and similar products are produced and marketed as personal devices and as such are not designed for educational use. Thus Traxler (2010) considers typical student owned devices to be, *"poorly suited to learning".* However, this is too simplistic a view since it applies to the range of devices that a learner may own, including Smartphones, while successful use of tablet devices has taken place where there has been use of a consistent technology, typically iPads.

Yet a device is only as useful as the tools or apps that it uses and in the case of the iPad there appears to be a developing use of a small but growing number of apps – GarageBand, Brushes, KeyNote, Pages etc that are proving their worth. These meet the concerns expressed by Melhuish and Falloon (2010) that, *"For applications to be effective as part of an individual's learning pathway they must be pedagogically sound in their design, foster interactions that is grounded . . . in m-Learning theory, rather than focusing solely on content, engagement or 'edutainment'."*

This brings us to matters of pedagogy and school practice, an area that has been widely debated since mobile and hand-held technologies became readily available. There is broad agreement on the potential of such tools, notably around the idea of anytime, anywhere learning and the facility for learners to access courses and resources at will and to both ask questions of and to publish to an audience far beyond school. This has not however translated into radical pedagogical approaches in schools. Personal classroom observations and those of e.g. OFSTED (2012) reinforce the notion that schools wish to remain in full control of a pupil's learning through restrictions on web access, virtual learning environments (VLEs) that are largely document repositories with little or no direct student participation and where learning is directed along narrow and sometimes shallow paths. This at a time when universities are complaining (Cambridge Assessment 2012) that students are poorly

prepared in critical/higher order thinking skills and independent inquiry/research skills, the development of which can be supported by effective use of mobile technologies.

There are, however, dangers if appropriate pedagogies are not evolved. Traxler (2010) notes a changed sense of both ownership and knowledge brought about by personal devices, while expressing concern that such devices deliver knowledge, *"chunked, i.e. structured and connected in very different ways from earlier learning technologies such as the lecture, the web and the book."*. Yet is this markedly different from the way in which a school curriculum is often delivered – small chunks of knowledge sufficient to pass an exam, something that may well become worse under a Hirsch style knowledge-based curriculum as currently proposed for England. Melhuish and Falloon (2010) are similarly concerned that there is now a blurred distinction between formal and 'just in time' learning and no association with the sustained, deep and formalised learning that society has demanded.

Traxler (2010) further notes that as individuals can now exercise choice and control they begin to inhabit their own worlds of knowledge. Whether you agree or disagree with Traxler's view that, *"This erodes the idea of a commonly accepted canon, a common curriculum, of things we all need to know and are assumed to know, and replaces it with what some people referred to as a neo-liberal nightmare"* may depend on your personal political outlook. The very fact that learning is able to become much more personalised, and without the cost and effort of joining and travelling to libraries, lectures and seminars can only be positive. Learning is liberated from both the classroom and direct control of the school, indeed of the State. Dangerous times, or an exciting new freedom? Certainly it brings a conflict between a highly formalised traditional curriculum and testing regime and one based on a small core of fundamental knowledge and the open exploration of wider concepts and ideas. Thus Melhuish and Falloon (2010) suggest teacher and student must work together to develop individual pathways based on actual student need.

As ever, the reality of the classroom might lead to varied ways of utilising the opportunities presented by tablet devices, yet the studies published thus far and the evidence of Longfield Academy suggest that there is a remarkable similarity in modes of use and of teacher and pupil perceptions of the devices. Thus the Learning Exchange (2011) study in Australia identified that the iPad is a significant tool to support and enhance learning and in particular:

• Was used for tasks that best suited its use rather than simply because it was available,

• Offered quick access to Apps required for particular learning tasks,

• Was engaging learning, depending on choice of Apps,

• Enabled reinforcement and rote learning of basic concepts for learners at all levels,

• Supported creativity,

- Strongly supported research and information fluency and critical thinking, problem solving and decision making.

Vrtis (2010) further noted that students using tablets in the classroom felt better prepared with their homework and that the technology assisted them with their note taking skills. The latter use was clearly evident during classroom observations at Longfield, where a majority of students used their iPad for this purpose rather than pen and paper.

Glicksman (2011) reporting on a US high school study, while again noting use of a common set of Apps, also refers to annotation of notes while identifying particular use in subjects such as History, Religious Studies and Science. Perhaps of greater significance are the results of Glickman's student survey which identified that the majority of students:

- Found the iPad easy to use,
- Helped learning in class,
- Was easy to use, including the onscreen keyboard,
- Was preferred to a laptop.

This again mirrors the more detailed Longfield study and is further confirmed by the Spang (2011) study in a German grammar school. Whilst small scale the results are markedly similar to those obtained from Longfield Academy. In summary Spang found that:

- Use in Maths, Music and Religion was particularly strong,
- Internet research was the main use followed by use of Pages, Keynote, Popplet and GarageBand Apps plus annotation of documents,
- A significant majority of pupils felt they worked better with an iPad, found Apps beneficial to learning and wanted to make greater use of the devices.

Elsewhere, Garcia and Freedman (2011), using iPads with US high school History students, found that use of a particular App (Explore 9/11) identified small but significant learning gains compared to classes not using the App. In particular they note that use of the iPads facilitated and encouraged group collaboration that itself had a positive impact on achievement. This, of course, requires access to discussion boards, wikis, etc on a school VLE or via cloud tools, while also raising e-safety and security issues. The potential is there but perhaps as yet not fully exploited, regardless of the device or platform available within the school environment. Beyond school is another matter entirely.

There is now strong evidence that devices such as the iPad2 (and indeed the iPad in particular rather than Android tablets) are valuable educational tools. As will be seen in the detailed analysis of the Longfield study, there are issues to be resolved in using personal devices in an enterprise environment but the increasingly positive impact on learning and attitudes to learning are clearly identified, even after a mere two school terms.

BACKGROUND TO THE LONGFIELD ACADEMY IPAD PROJECT

Longfield Academy in Kent is a new build school of 960 students covering Years 7 to 13 (11-18 chronological ages). The school has a strong vision for ICT and intends to provide:

- A cutting edge learning experience including access to technology in every lesson and at home.
- Every student with their own learning device.
- Exciting and engaging lessons.
- Every student using technology to improve their learning wherever they are.

Working with 9ine Consulting, the school has been able to provide high quality cabled and wireless networking to support 400 iMac workstations located in three ICT suites, three plaza spaces and the post-16 learning area together with teacher MacBooks and staff and pupil iPads.

The iPads are provided through a leasing scheme with uptake as at March 2012 of 726 units representing 76% of the pupils on roll:

Year		Units
Y7	-	159
Y8	-	145
Y9	-	123
Y10	-	125
Y11	-	81
Y12	-	60
Y13	-	33

Additionally, a further 100 students have iPads not supplied by the school.

The implementation has been led at senior management level through an iLearning Group led by the Principal. This oversees the vision and takes a strategic overview of the iPad for learning. The group comprises staff with a range of responsibilities, experience and confidence, meets regularly and meetings are minuted with appropriate actions and deadlines.

Considerable initial and ongoing training and professional development has been provided.

The school has noted several challenges arising from this novel scheme, mainly technical such as ensuring that the VLE supports the Safari browser and also from licensing issues for Apps, since Apple do not currently offer enterprise licensing. Education challenges include the provision of ongoing CPD and to continually challenge teachers in their use of the devices.

METHODOLOGY

Within the constraints of time and budget, it was agreed with the school to gather data via questionnaire surveys of staff, students and parents. This was further supported by a structured site visit involving interviews and lesson observations in order to clarify and further develop issues identified in the questionnaire responses.

The questions and structure used in the questionnaires were reviewed by senior staff at Longfield and modified following comments and some limited testing, after which they were created on SurveyMonkey with appropriate web links provided for the school to distribute. The use of SurveyMonkey enabled rapid and automatic summarising and graphing of the data, thus saving considerable time and speeding analysis. Copies of the questionnaires can be found at Annex 1 (Staff), Annex 2 (Students) and Annex 3 (Parents).

Given the size of the school (960 on roll) and the number of students now with iPads, it was agreed that the sample should include all staff plus students with iPads and their parents. The questionnaires proved quick and easy to complete, resulting in 71 staff responses, 310 pupil responses but only 23 responses from parents. While the poor response rate from parents means that this data is of low statistical significance, parent comments have been included in the findings where appropriate.

Data collection and analysis

Student and staff questionnaires were completed in late March/early April 2012, largely during school hours thus ensuring ready access to the tools and support in the event of problems. Parents were informed in the last week of the spring term 2012 but in the event the response rate by the end of April was poor, with numbers (n=23) insufficient to provide valid data.

The use of SurveyMonkey resulted in a general analysis of responses to each question being available almost instantly.

FINDINGS

Overview

The iPads *"Have revolutionised teaching."* In the opinion of one Longfield teacher, a statement that, while not necessarily shared by all, sums up the views of most students and many staff.

Use by year group

While the majority of students have iPads, only one third of these completed the questionnaire and of these 68% were in key stage 3 (KS3) and 23% in key stage 4 (KS4) and the remainder in the 6th form.
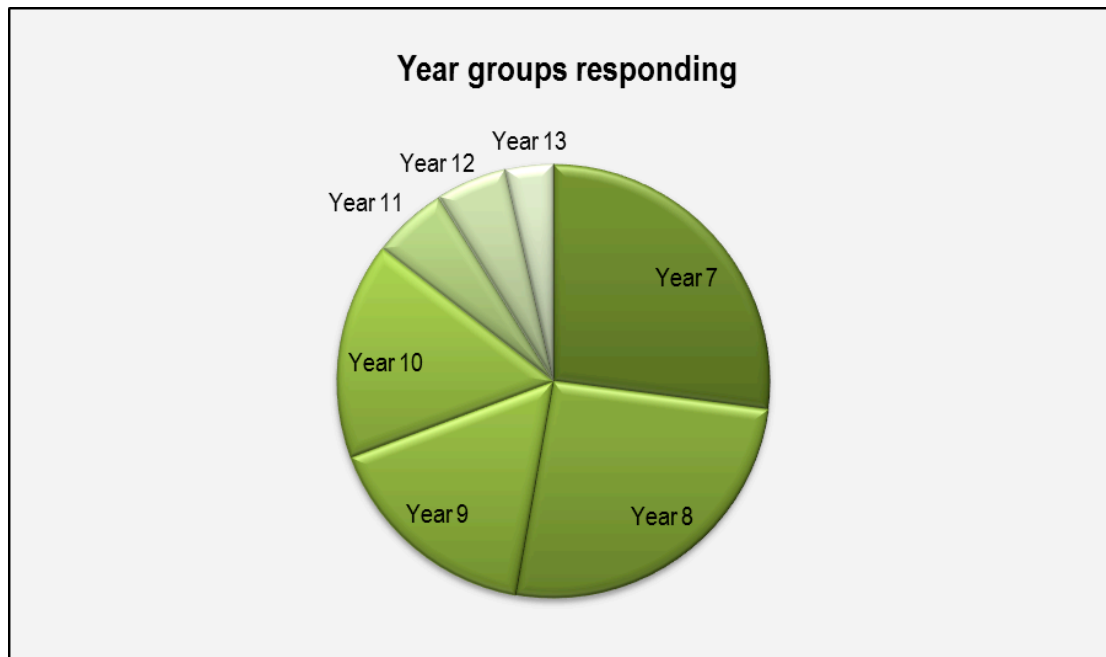

Figure 1.   *Responses by year group*

Interestingly, staff reported slightly greater use with KS4 than with younger pupils, though interviews with pupils suggested that greater use was occurring in KS3. Certainly there were suggestions from KS4 students that they felt the tool was not being exploited in sufficient lessons, indicating that there is an issue here that could be followed up further.
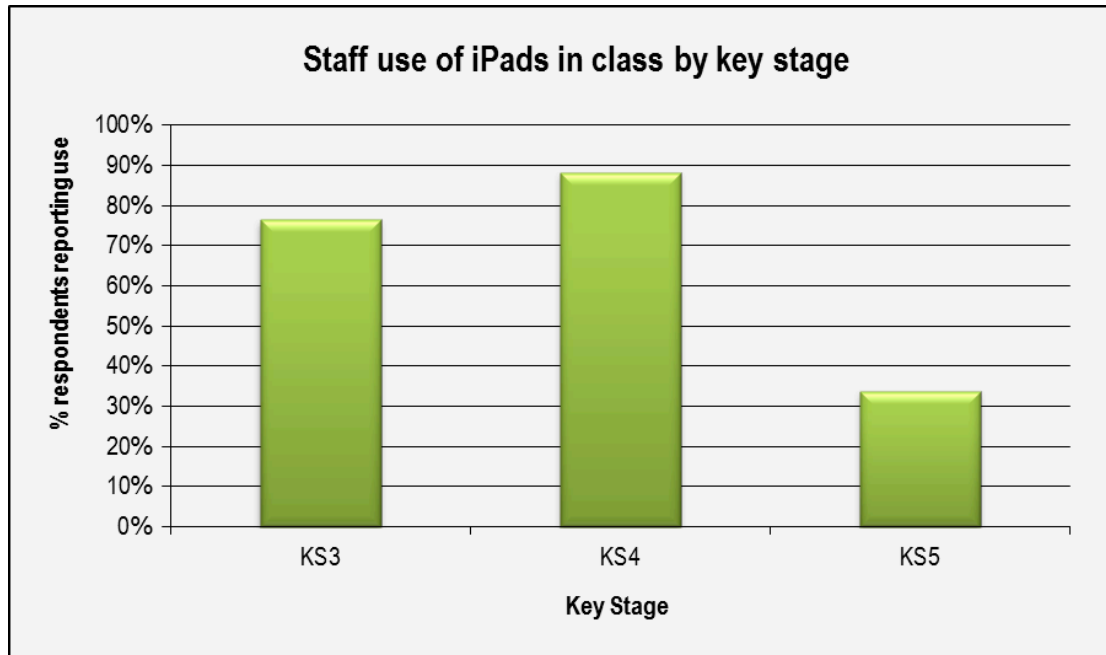
Teacher views are shown in the following table:

Figure 2. *Use of iPads in each key stage as reported by staff*

Level of use

The iPads are now regularly used in lessons by the overwhelming majority of teachers, although two respondents had not used them in the survey period. However, 80% of staff reported using the device in between one and ten lessons, with 38% reporting use in between six and ten. A significant number of staff, 17%, used the iPad in the majority of their lessons, though given the later responses on subject use this is also driven by the availability of suitable software and Apps.

Student interviews, albeit a very small sample, suggested a somewhat different picture. While KS3 students were overwhelmingly positive and talked readily about the regularity and range of use of the iPads, those in KS4 were, in some cases, quite negative. They reported only limited use by a small number of teachers. However, this is at variance with the staff survey responses, where greater use in KS4 compared to KS3 is indicated (88% compared to 76% of staff). It would thus appear that the interview sample of KS4 students were not representative of the key stage as a whole.
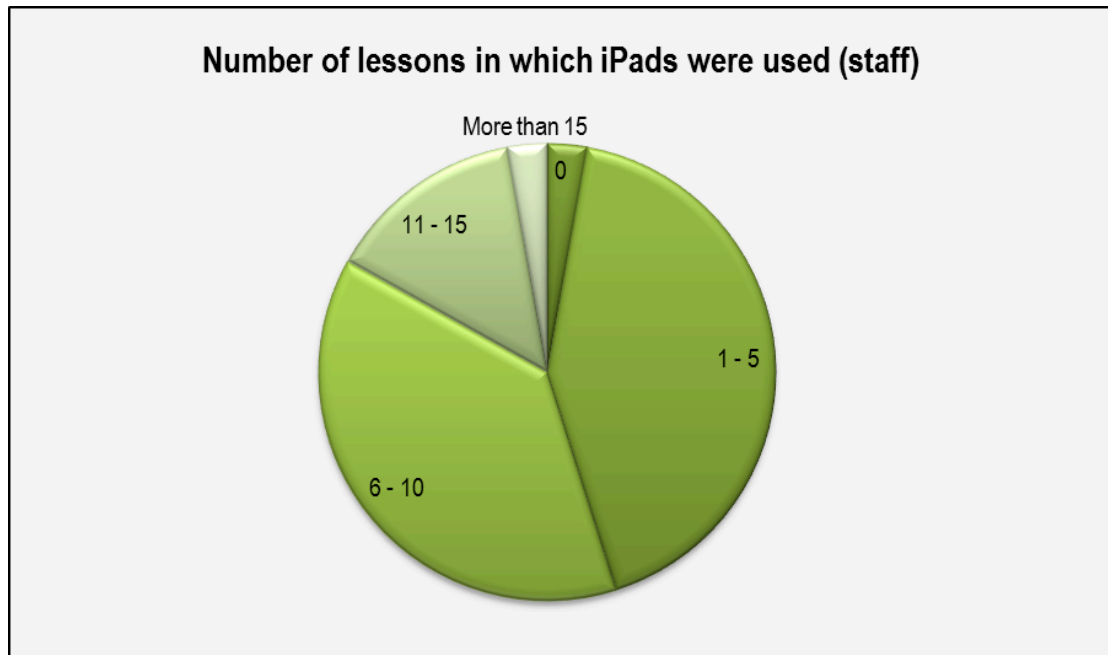
Number of lessons in which iPads were used (staff)

Figure 3.   *Level of use in lessons (Staff)*

Data from pupils provides a similar picture, with 84% reporting use in between one and ten lessons per week, of which 27% indicating use in six to ten. Again a significant number, 12%, indicated use in the majority of their lessons. Thus after just two terms of the implementation programme, the use of the iPads is becoming firmly embedded.
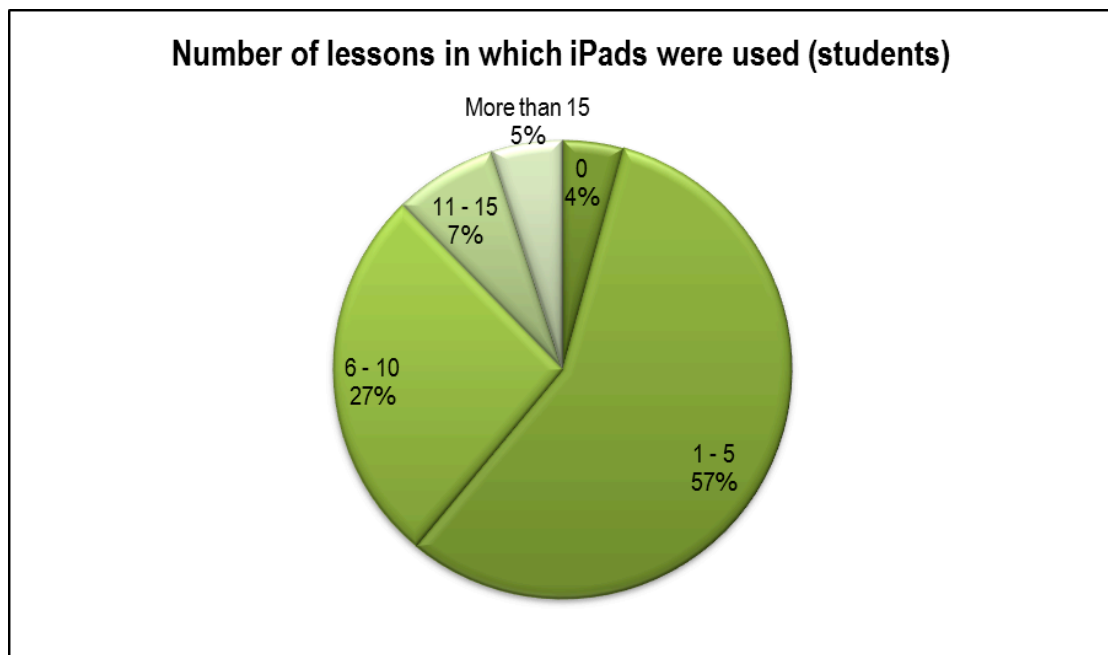

Number of lessons in which iPads were used (students)

Figure 4.   *Level of use in lessons (Students)*

Use of the iPads in curriculum subjects

It is clear that particular use of the iPads is made in a small number of subjects, though all are reported to have made some use. Three subjects in particular dominate use – English, Maths and Science, though strong usage in Geography, History, Art, Music and Drama is also reported.
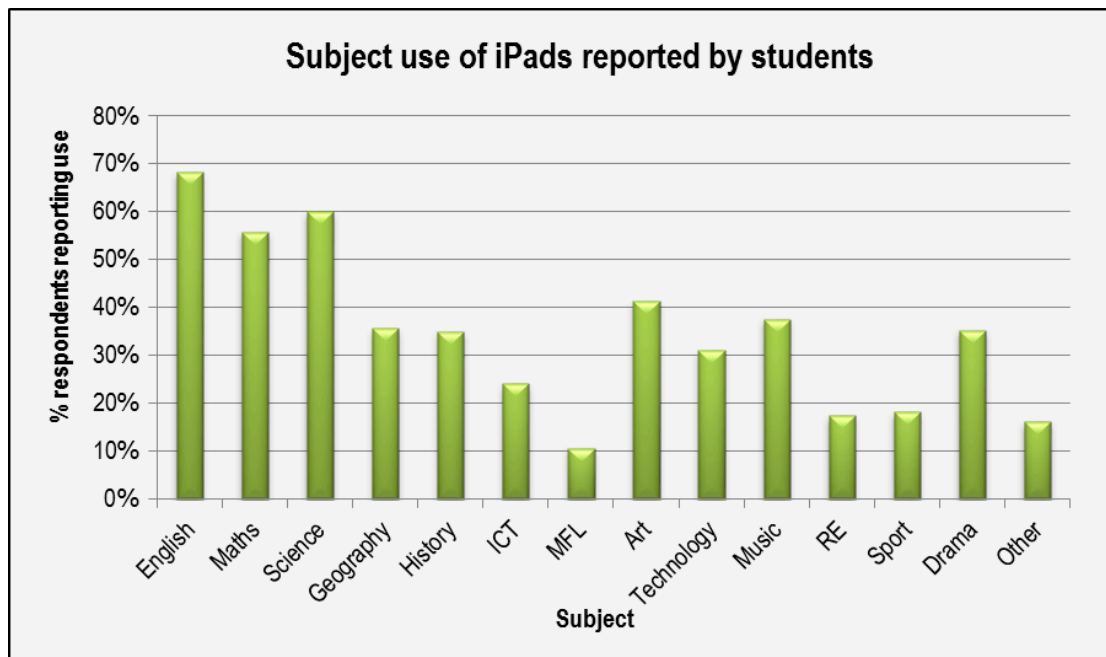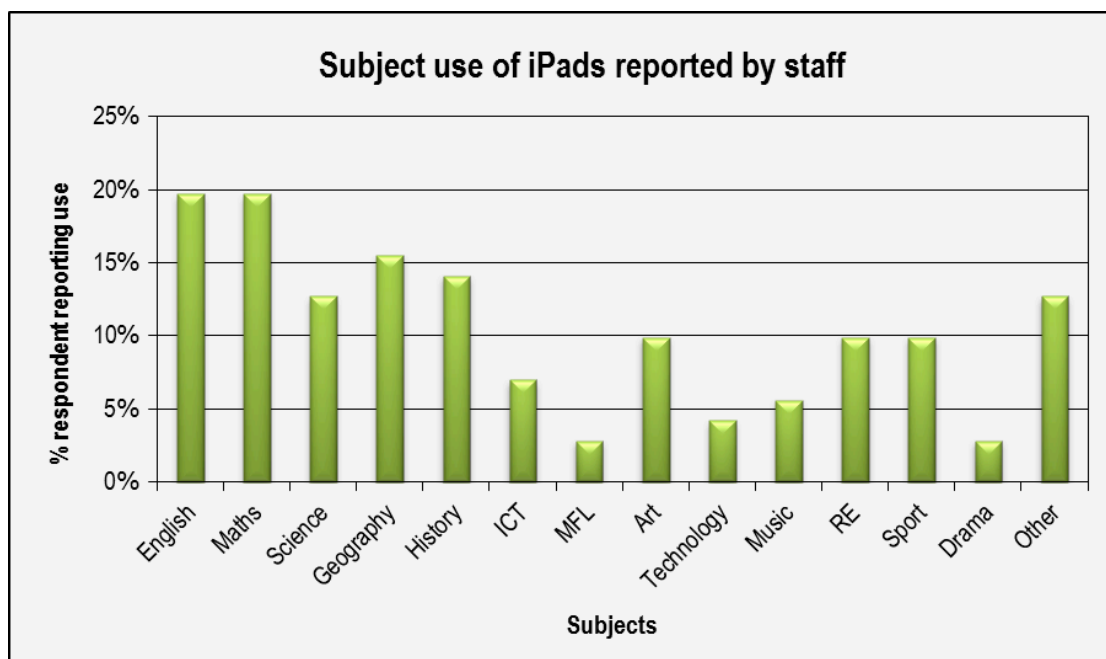

Figure 5.   Subject use (students)

Figure 6.   *Subject use (teachers)*

Staff use, of course, reflects both the number of staff teaching a subject and the allocated teaching time. It is therefore no surprise that those subjects with the greatest allocation of time are also the greatest users of the device. However, it also confirms that all subjects are making at least some use and thus gaining valuable experience in what the iPad can offer.

There are interesting similarities between this data and that obtained by Spack (2011) at his Cologne school. He found particularly high levels of use in Maths, Music and Religion with sciences following, though at no more than 14% of users and with other subjects trailing. However, in the Spack study, a single class set of iPads was shared, whereas the Longfield students largely have personal devices, thus enabling significantly greater routine use.

Interviews with Longfield students highlighted use in Maths, English, History and Music especially. However, there does appear to be a relationship between level of use and the availability of suitable tools and Apps. Thus in Maths use of graphing Apps, including 3D graphing, is important, as is the ability to send work direct to the teacher for email response. In English the teacher sends slide shows created in Prezi, while Pages is a standard tool. GarageBand is, of course, a modern essential for music, as is the Brushes finger painting App in art, the latter enabling rapid experimentation and remarkable quality.

Students identified regular iPad use in many other subject areas within GCSE and 6th form courses. Photography was mentioned especially frequently, as was Business Studies.

The nature of iPad use

Three main uses of the iPads dominate. Unsurprisingly the major use in class, reported by 64% of students and 80% of staff, is researching topics online. This illustrates a significant benefit of personal devices and good network connections in that reference to web resources can be integrated fully into the lesson. Thus historical resources, science videos, online maps, religious viewpoints etc can be referred to instantly and used to extend learning in ways simply not possible otherwise.
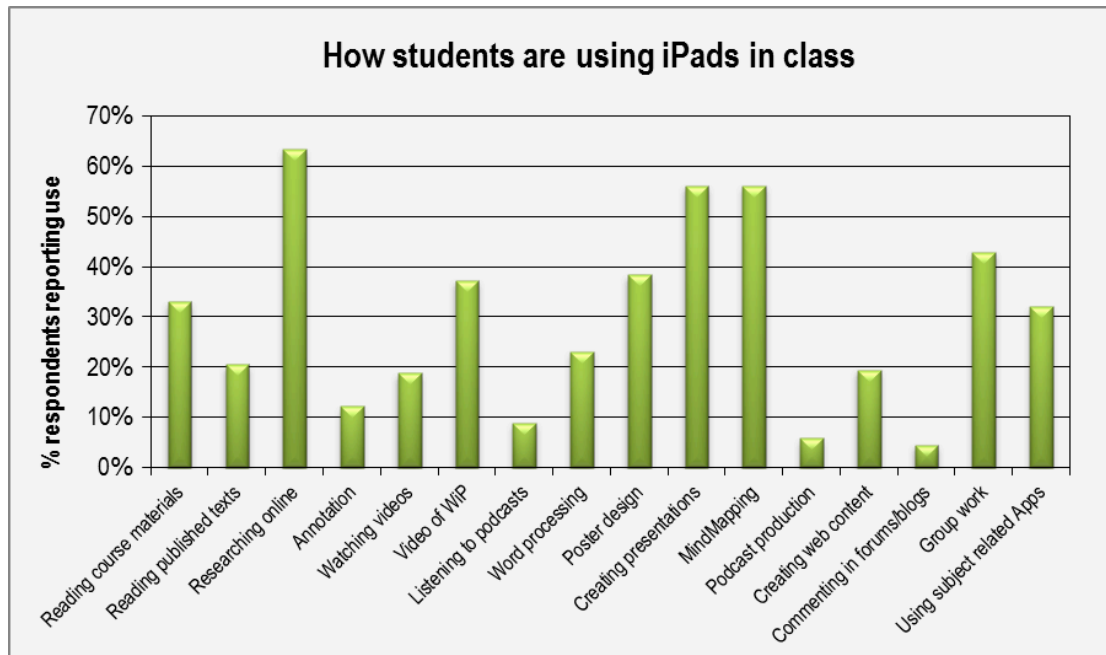
How students are using iPads in class

Figure 7.   *Main uses of iPads (students)*

The other key uses reported were mind mapping using the Popplet App and the creation of presentations. The use of mind mapping (reported by 56% of students and 70% of staff) is particularly important since it supports the development of higher level thinking skills and better analysis of information and connectivity of ideas and events. A lesson observation where the technique was used to reinforce understanding demonstrated that given a free choice most pupils chose to use Popplet rather than pencil and paper, citing speed, the facility for rapid edits and the ability to readily share their mind map as important. Clearly the users know what the device is capable of and are keen to exploit that functionality.
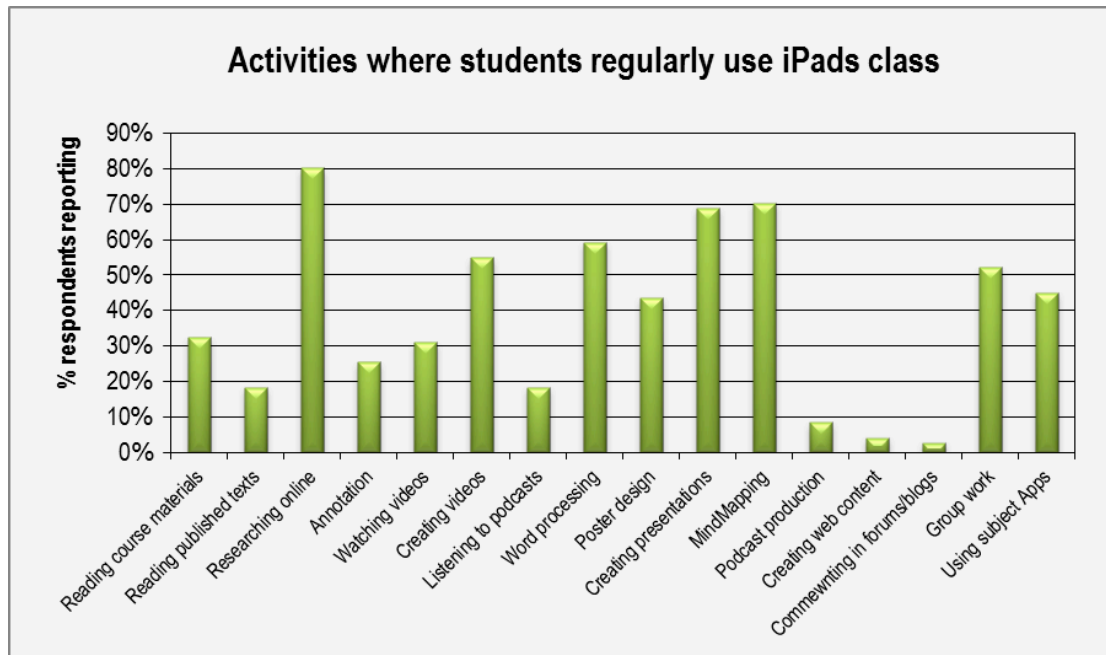
Figure 8. *Main uses of iPads (staff)*

Other major uses are as expected, notably reading teacher provided course materials and notes (reported by 33% of staff and pupils), reading published texts (20% of students and 18% of staff) and poster design (37% of pupils and 44% of staff). The former exploits the eBook reader potential of the iPad while the heavy emphasis on poster design, a perhaps overused technique, is made easier with the iPad through easy editing and ready access to graphics and text information. This has the potential to support more thoughtful and better researched student responses. Overall, many of main uses of the iPads are "traditional" - word processing (23% of pupils and 59% of staff) or watching videos (19% of students and 31% of staff).

The data suggests that many staff feel more comfortable using the devices within familiar contexts while students are potentially more likely to exploit functions and Apps that they feel meet their needs and learning styles. However, some tools are well exploited by both e.g. using the iPad's camera to take video of work in progress and for assessment purposes (37% of students, 55% of staff) and in particular the rapidly developing use of both general and subject specific Apps (32% of students, 45% of staff).

Collaborative working is commonplace (reported by 43% of pupils and 52% of staff) but in observations appears to be a classroom activity involving recording of group work rather than an online activity. Indeed, at the present stage of development some key benefits of the iPad are not yet fully exploited. Thus few students produce podcasts (6%), comment on forums or blogs (5%), though 20% create web content e.g. on the school VLE. The potential is certainly there to exploit e.g. use of video production. For example, as part of an RE lesson the teacher set groups a task to

make a two minute news report regarding religious views of certain controversial individuals.

However, open responses from students offer an insight into the wider uses that are developing. Examples include:

- Maths games and English games
- I-Movies for photography
- Making music (e.g. using GarageBand App)
- Making videos
- Writing stories
- Art

This was expanded considerably when students were asked what they would like to use the iPad for if given the opportunity.

But what would students like to do with their iPads?

A wide range of responses were received but three key issues stand out. In particular, students wish to make much greater use of video resources to help their learning, many of which are hosted on YouTube and therefore inaccessible to them in school. This is not the place for a debate on school web filtering and a good case can be made for blocking YouTube in schools simply because of the huge amount of undesirable material hosted there. However, there also exists an equally large repository of free educational resources that are simply not being exploited. Students are well aware of this and voiced their frustration both in the questionnaires and in face to face interviews. This is an issue for all schools and one requiring wider debate.

The other key requests relate to greater use of iMovie and also use of educational games. Thus students mentioned, *"designing games", "playing interactive games that help me learn", "downloading games that help you",* and *"use games to help work better"*. While 'computer games' is a term with negative connotations for traditionalists (although gaming has been used e.g. in Geography for many years) at least some students appreciate the learning benefits offered by appropriately designed gaming activities.

Overwhelmingly students wanted to make more use of their iPads and indicated a range of activities that they felt should be more common e.g.

- Use them more in Art, PE, Maths, English etc.
- Use wikispaces
- Edit photographs and animations
- Write more notes
- Create more presentations
- Make videos/movies

- More online research
- Word games to help spelling
- For staff to set more tasks requiring use of the iPads
- Using the iPads instead of pen and paper
- Write essays and stories using the iPad
- Make more music on the iPad
- Do tests on the iPad
- Use more Apps for Science
- Maths homework
- Designing games
- Use the iPad instead of books
- Access the school VLE

These represent no more than a summary of the main responses but one has to feel for the student who complained that, "*we never use our iPads*". This was the only negative response, most others demonstrating that not only are their iPads well used but that students want much more, to the point where their ideas might usefully form the driver for the next stages of development.

Doing now what could not be done before

This same theme is apparent when students were asked what they could now do to help their learning compared to the pre-iPad era. A key theme to emerge was, once again, the ease of access to resources. Thus, in summary, responses included aspects such as:

- Easy Internet access
- Use of iBooks
- Makes reading interactive
- Translation tools
- Making movies
- Use of educational games
- Use of Apps to support learning
- Mind mapping
- Communication with teachers
- Creating and delivering presentations
- Homework
- Access to texts, mark schemes and past exam papers
- Listening to podcasts e.g. on GCSE Pod
- Annotation of texts
- Drawing etc in art.

Again, there is a clear message that students regard the iPad as a tool that enables them to work more efficiently and thus, by extrapolation, more productively.

Staff were as positive as students in this respect. With the exception of one respondent who stated bluntly, *"Take them away",* the majority were able to identify benefits. Some were glowing in their praise:

Everything! Frees me up from finding a computer room when I want to do something. This means much less stress. Can plan lessons with more variety and better pace as the device can be used for a few minutes and then move on, then again later in the lesson. Makes role play much more productive. Students can better review what they have done, with other students, and allows effective peer evaluation of this work. Allows students to research maps and link with satellite photos in a way it has never possible before. They can easily find places they know to do work which makes it more relevant. I have taken the devices outside onto the field to do things; I could not do this with a desktop! These are just a few."

Another teacher noted that:

"iPads allow instant access to a huge range of resources. Students are able to research a word definition in an instant. They can dip in and out of various literary texts without the need to go to the library or be given photocopied resources or books. Learning is far more varied and interactive. Electronic textbooks can be tailored to the group or even to the individual, so that iPads open the door to a genuinely individualised curriculum."

One noted cost savings amongst other benefits:

"Personalised PowerPoint slides, saves on my photocopying bill, set tasks at home - such as researching video clips, receiving typed work in the lesson, pupils can message my iPad within class if they are needing help."

Others talked about:

"Animations on locations editing and analysing photographs as they are taken. Spontaneous visual research in class discussions."

"Allows more independent learning from students. They can take on board the task and feed it back however they wish as long as they are answering the question or completing the task."

> "Immediate access to information. Videoing experiments and playing back, use of photos easily in coursework and assessments."

Yet others noted personal benefits such as:

- Using their own iPad for registration
- Creating podcasts
- Not having to worry about finding a computer
- Easier lesson planning
- Facilitating target setting
- Sharing resources easily

While benefits to learning were equally clear in comments including amongst others:

- Engaging students
- Immediate research
- Promoting independent learning
- Easier to differentiate
- Enabling students to immediately see the results of their learning.

Comments such as those quoted above show not only the impact that the iPad is having on pedagogical thinking but also that staff increasingly recognise and exploit the benefits brought about by students' access to personal devices that are always available.

Teachers also offered interesting insights into those things that they would like to further develop using the iPads and while some wished to develop innovative practice, this was not always the case despite, the remarkable range of uses so far. In some cases, frustration with the technology was evident e.g. the inability to use education websites such as MyMaths that use Flash (which Apple systems cannot handle), technical issues in connecting iPads to the interactive whiteboards in order to use AppleTV and the potential cost of some useful Apps, e.g. for Science teaching. Indeed, lack of budget for paid-for Apps appears as a potential use limiting issue. However, the Flash issue has now been resolved through use of the Puffin web browser App.

Others were keen to further explore both currently available tools, as well as developing pedagogical practice. The following were commonly mentioned:

- Podcasts and Apps to support literacy
- Blogging
- eBooks
- More subject specific Apps
- Final product performance videos for assessment and peer review
- Self review and peer assessment in general

- Creating eBooks
- Peer teaching
- Creation and use of revision resources
- Use of interactive games
- Linking to voting systems.

Some teachers identified several of the above but bemoaned the lack of time to develop resources, a common issue that also arises in VLE development. It is possible that commercial providers will identify this as a potential market and create materials, though cost may be a limiting factor in the current financial climate.

It is clearly evident, however, that both teachers and pupils not only want to expand the use of the iPads but can articulate many ways in which this can and should be done. The ideas are there and while some are still at the stage of doing traditional things more easily, many others are potentially agents of change.

Use of the iPads beyond the classroom

There is little point in students having personal devices if they are not fully utilised wherever the student happens to be. Clearly the school seeks to exploit this by setting homework and other learning activities that require use of the iPads but has to accept that students will also use them for personal activities. Thus while 71% of students report using their iPad to complete homework tasks 87% use them for playing games and social networking. While the latter use raises the usual e-safety and cyberbullying issues, the majority of reported uses were broadly in the context of learning activities.
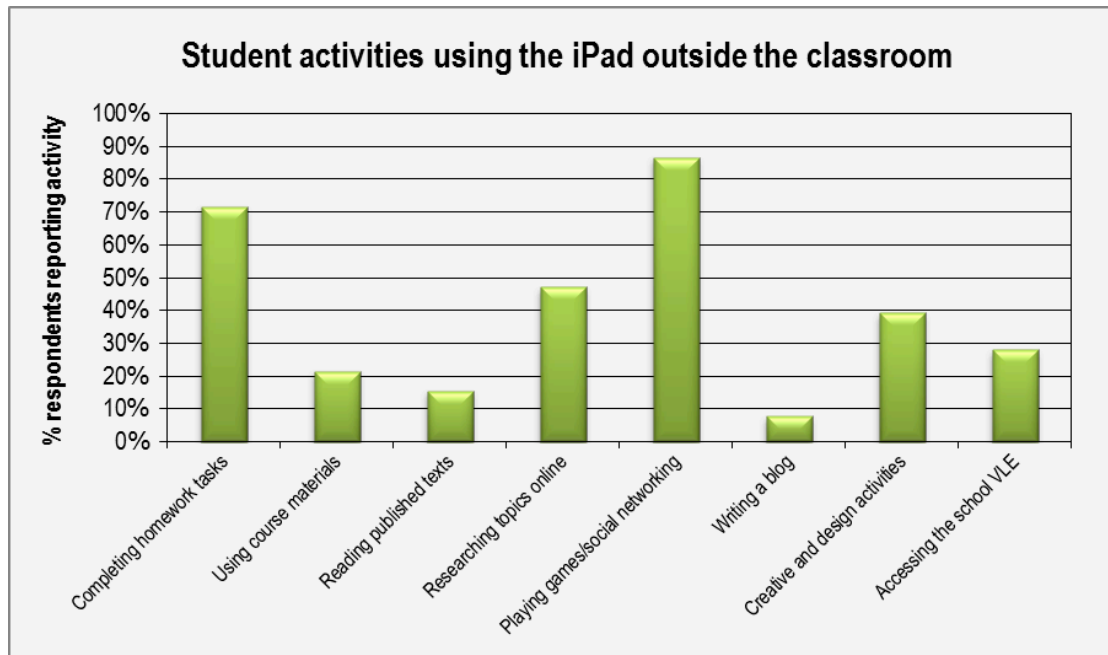
Student activities using the iPad outside the classroom

Figure 9.   *Student use of iPads beyond school*

Thus 47% of students researched topics online, while 39% reported using them for creative and design activities. Other reported uses included making videos, music and taking pictures, with one student complaining that they needed more books on the device. There is therefore strong evidence that most students are using their iPads to support their learning in ways that meet their particular needs.

Some, but not all staff (60 of 71 respondents), set homework and coursework tasks requiring use of the iPad, with 73% of those responding requiring online research and 63% completion of homework tasks with a further 38% requiring students to access course materials and texts.
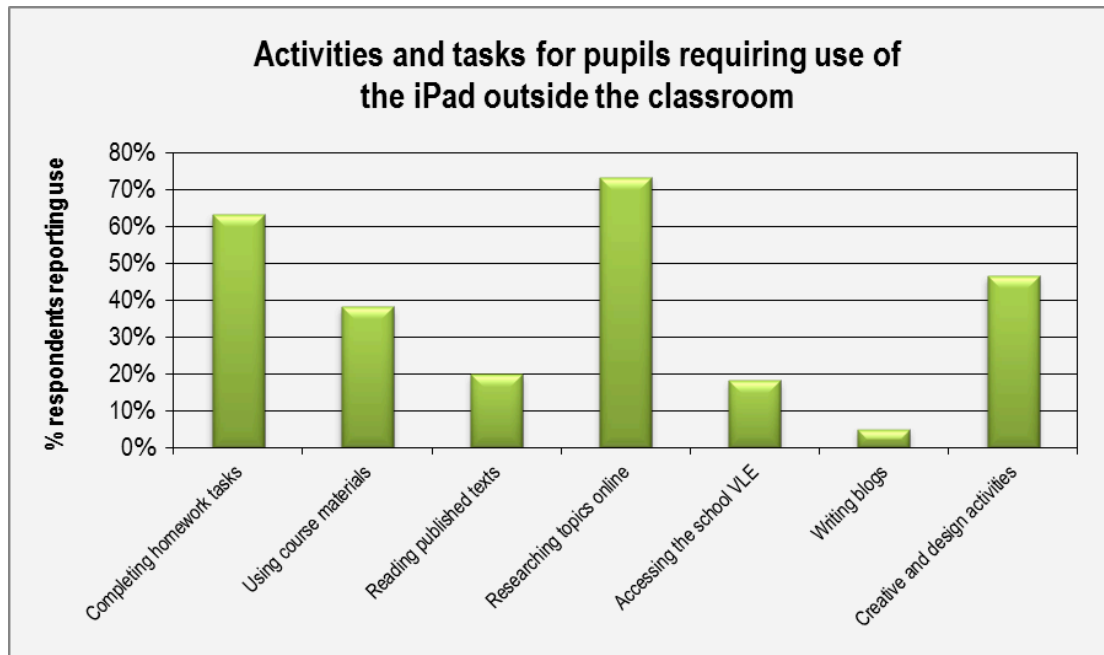
Figure 10.   *Staff requirement for student use of iPads beyond school*

Some innovative use was mentioned e.g. listening to and/or preparing podcasts, making presentations and work on graphs and data handling.

Overall, a significant group of staff are developing the use of the iPads for learning beyond school, albeit largely as a replacement for traditional paper-based activities at this stage with only limited exploitation of the more innovative tools available. However, this reflects the current early stage of development and provides a good basis for further development.

Of more concern is the 15% of staff who appear not to set homework and similar tasks that require use of the iPads, especially as this number is much larger than the 5% who indicate overall antipathy to them. Whilst this may be due to a view that as not all students yet have the devices it would be impractical, there may be other reasons that this study has not been able to identify. However, the school is introducing a new homework policy in June 2012 that emphasises the use of iPads and should serve to address this issue.

The impact of the iPads on student motivation

A significant 69% of students certainly consider themselves to be more motivated now that they have the iPads, with 46% agreeing and 23% strongly agreeing with the statement, "I feel more motivated and can work better than without it". Only 11% disagreed with the statement, possibly including those who later indicated technical problems with their devices.
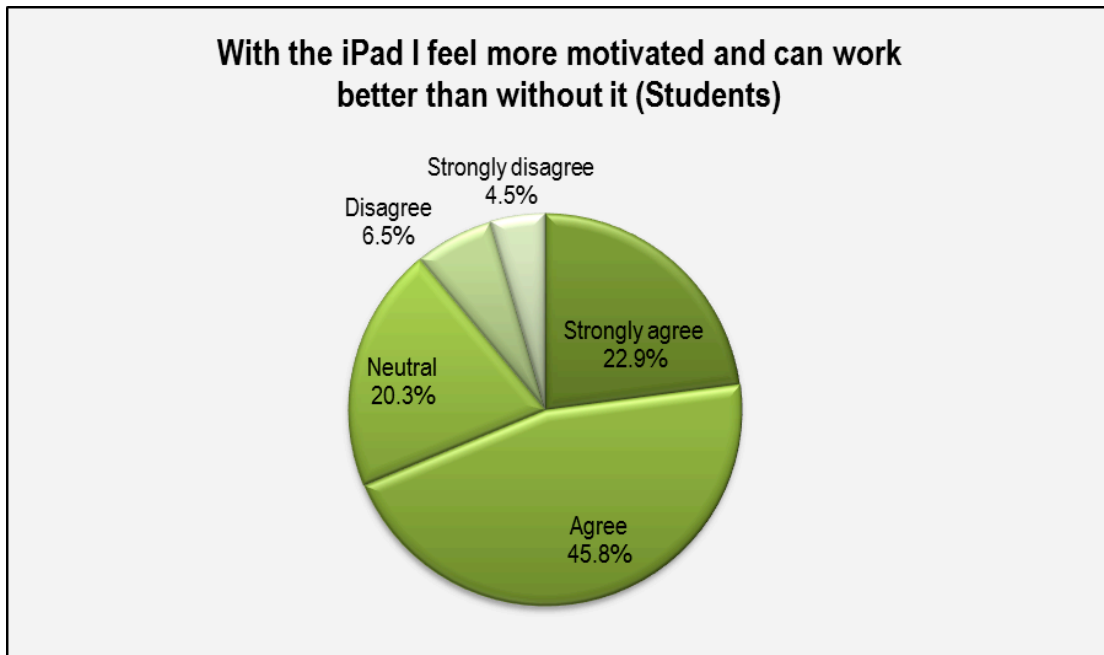
With the iPad I feel more motivated and can work better than without it (Students)

- Strongly disagree 4.5%
- Disagree 6.5%
- Neutral 20.3%
- Strongly agree 22.9%
- Agree 45.8%

Figure 11. *iPads and student motivation (student responses)*

Interestingly, 67% of staff had similar views with 51% agreeing and 16% strongly agreeing that students are more motivated and worked better when using the iPads. Some 14% of staff disagreed, a figure consistent with other staff responses.
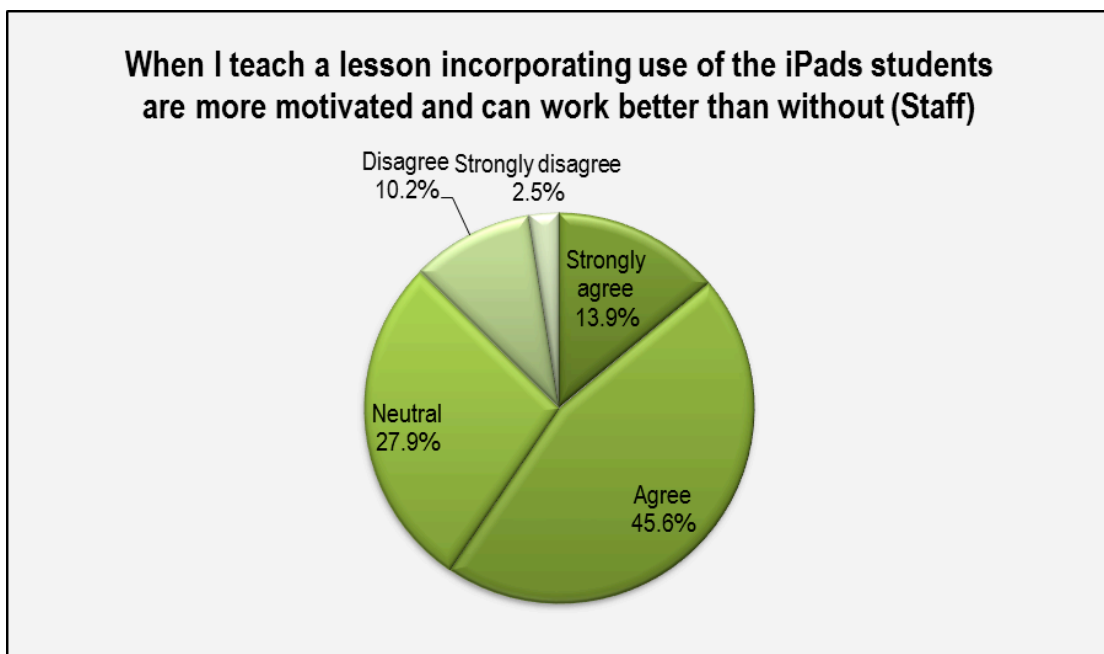

When I teach a lesson incorporating use of the iPads students are more motivated and can work better than without (Staff)

- Disagree 10.2%
- Strongly disagree 2.5%
- Strongly agree 13.9%
- Neutral 27.9%
- Agree 45.6%

Figure 12. *iPads and student motivation (staff responses)*

Rather more staff than pupils currently maintain a neutral position, though this is to be expected at this stage of the implementation. **What is important is that there is a clear consensus from all involved that the iPads are having a positive impact on both motivation and how students work.**

The impact of the iPads on the quality of students work

Some 73% of students report a highly positive impact, with 49% indicating that they agreed and 24% that they strongly agreed that working with the iPad has helped improve the quality of their work. Only some 6% disagree.
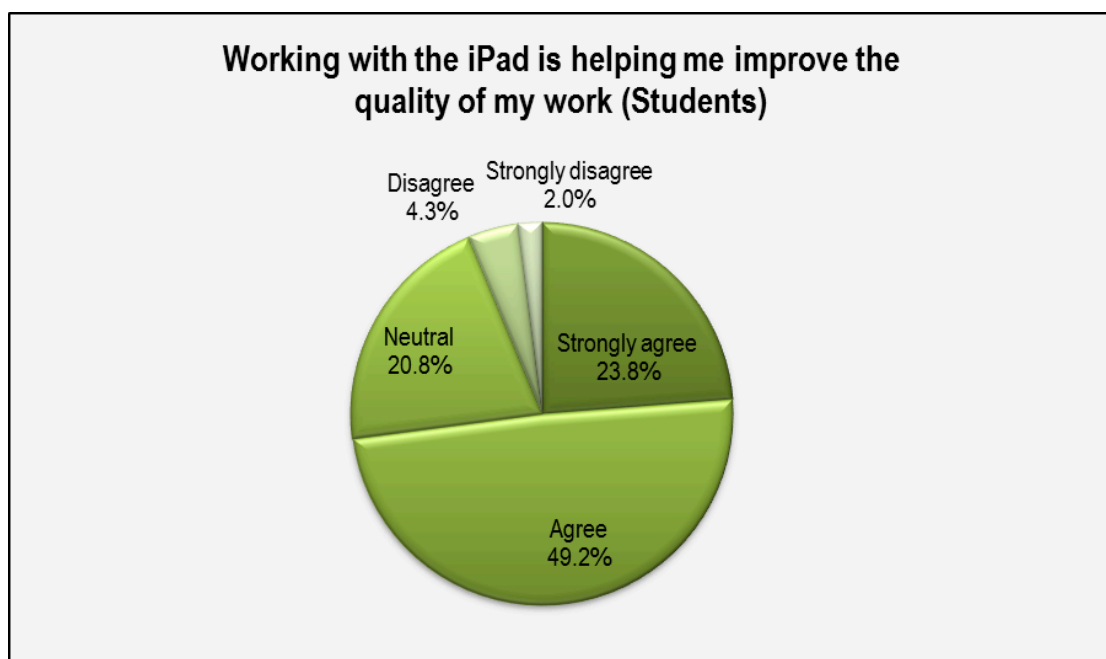

Figure 13. *iPads and student work quality (student responses)*

Staff were rather more reticent on this issue, with 31% remaining neutral. Of the remainder 51% agreed and 16% strongly agreed that work quality was improving. However, after a mere two terms there is not currently sufficient assessment data available to confirm the current subjective view.

The fact that virtually half the staff believe that the quality of work is improving due to the iPads is a very positive indication of the impact of the devices.
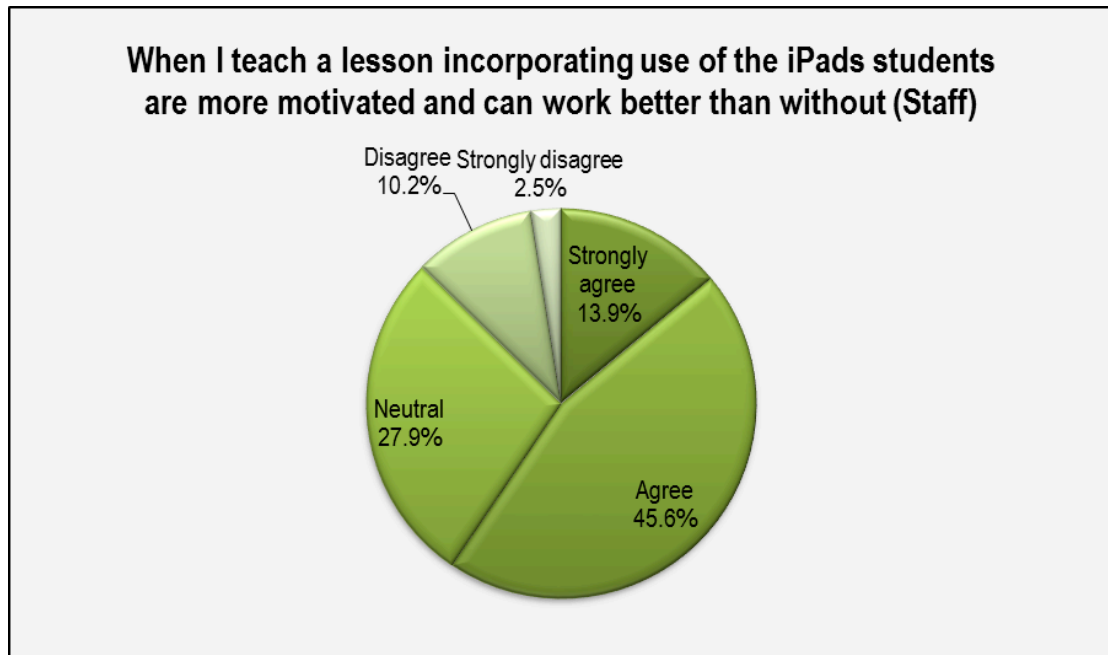
When I teach a lesson incorporating use of the iPads students are more motivated and can work better than without (Staff)

- Disagree 10.2%
- Strongly disagree 2.5%
- Strongly agree 13.9%
- Neutral 27.9%
- Agree 45.6%

Figure 14. *iPads and student work quality (staff responses)*

Again some 14% of staff disagree, reinforcing the view that, as in any school, there are a small group of staff who simply cannot see the benefits of technology.

The impact of iPads on student progress

Again, there is a division of opinion between students and staff, with the former again more positive. Thus a consistent 67% of students agree (44%) or strongly agree (23%) that they are making better progress now that they have iPads, though a quarter remain neutral. Again, under 10% disagree.
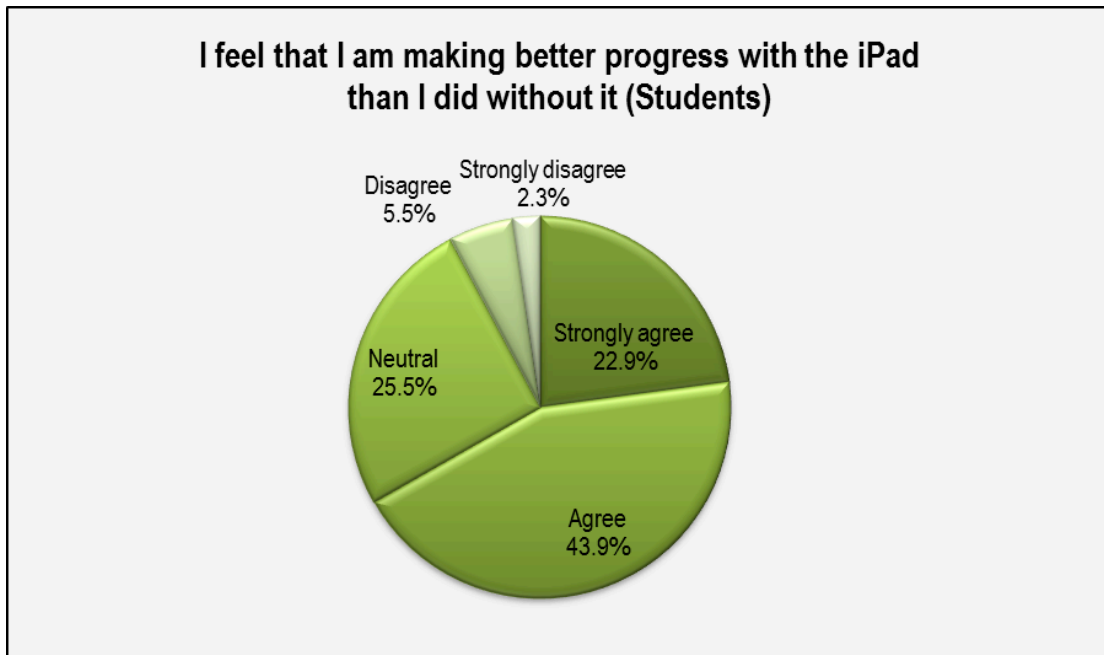
Figure 15. *iPads and student progress (student responses)*

The views of staff are rather less positive, though 28% agree and 11% strongly agree that the iPads have resulted in improved student progress and a larger 18% disagreeing. Some 42% remain neutral.
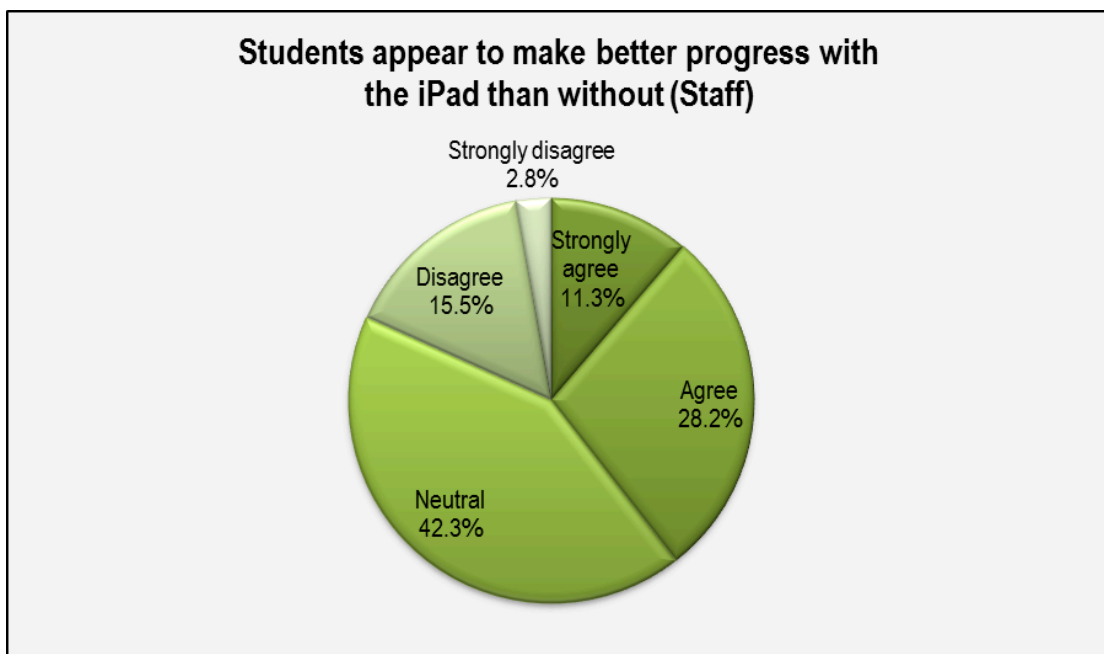

Figure 16. *iPads and student progress (staff responses)*

The impact of iPads on student achievement

As with progress, so with achievement, where the disparity of opinions between staff and students is similarly marked - indeed more so as the positive response from staff in particular is much lower. Thus some 61% of students agree (42%) or strongly agree (19%) that their achievement has risen, while 28% remain neutral. Unfortunately, the reasons for this perception were not investigated so it is unclear as to whether it is due to assessment data and commentary returned to students or simply a 'feel good' factor engendered by the facility to produce work digitally.
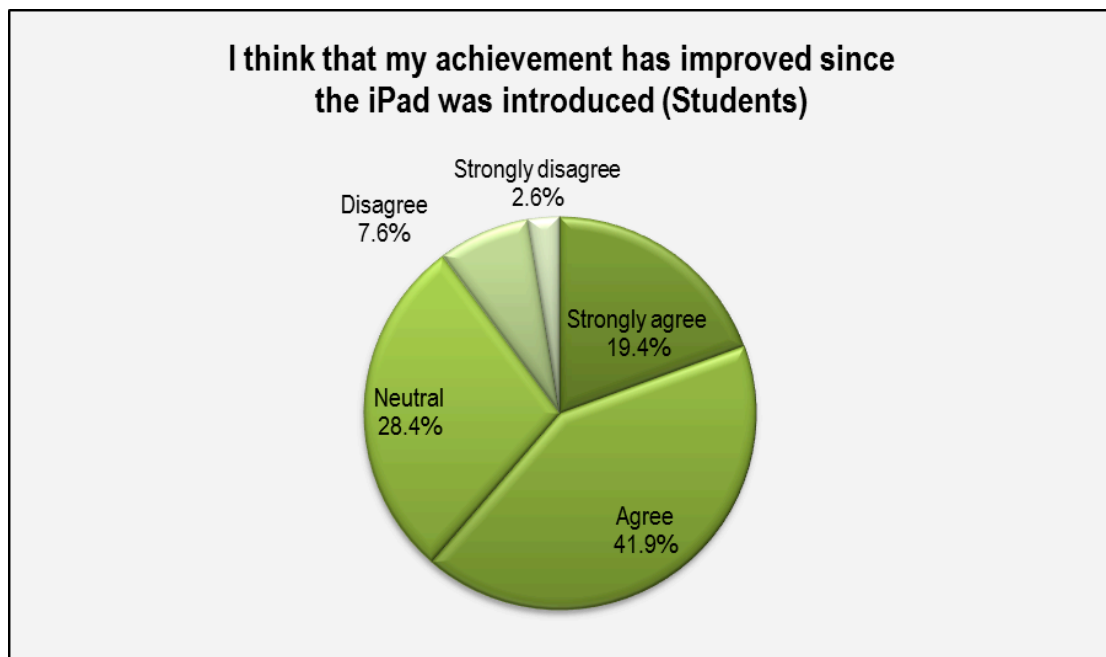

Figure 17. *iPads and student achievement (student responses)*

The majority of staff, almost 58%, remained neutral on this question, indicating again that there is currently insufficient assessment data available to confirm or otherwise any impact from the use of the iPads. Indeed, in a new school building with new working methods, it may be difficult to define any one individual factor influencing achievement in the short term.
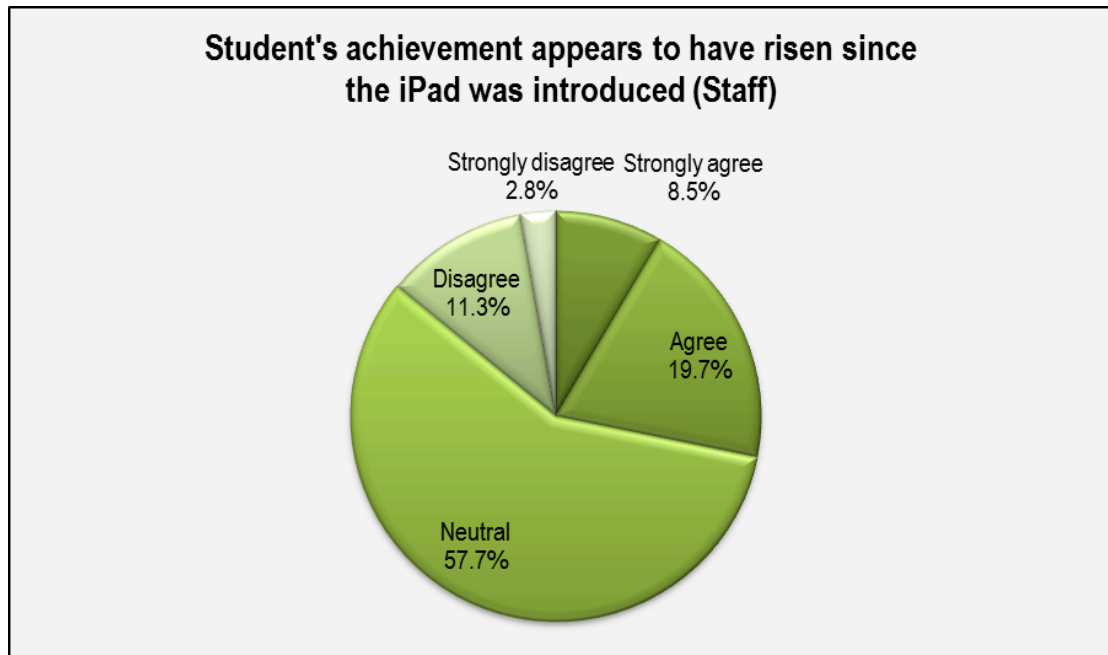
Figure 18. *iPads and student achievement (staff responses)*

Despite this, some 28% of staff took the view that achievement has risen, with over 8% agreeing strongly. Thus in some classes at least, it can be considered that the use of the iPads is certainly having a positive impact on achievement. The challenge for the school will lie in identifying the pedagogical practices in those lessons that are enabling this improvement.

The impact of iPads on working effectiveness

Unsurprisingly, a significant 73% of students consider that they work more effectively now that they can (usually) make routine use of the iPads. Thus 48% agreed and 25% strongly agreed that this is the case. Only 19% remain neutral and the same small cohort of 8% disagree. Given responses elsewhere regarding e.g. the benefits of immediate online research and the benefits of many Apps, such a positive response is to be expected.
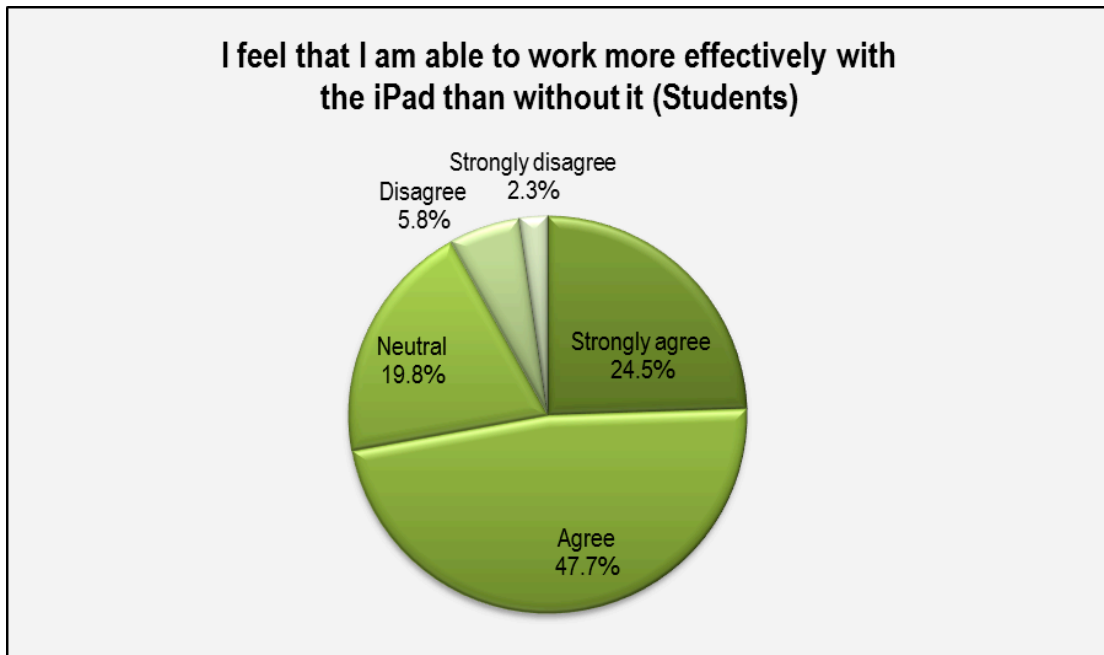
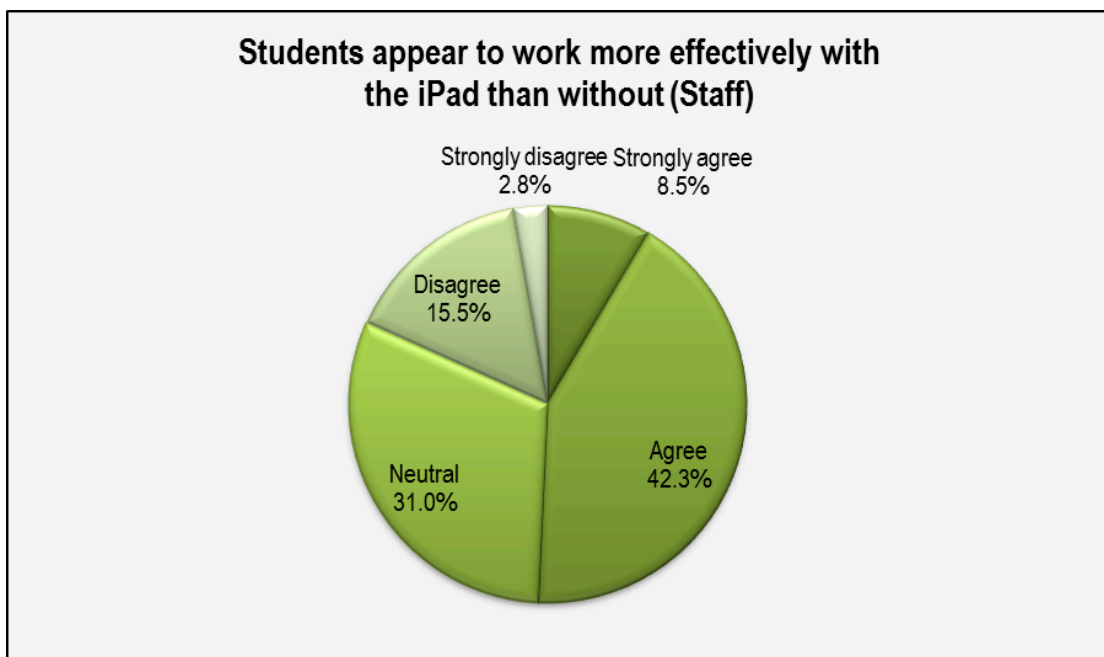**Figure 19.** iPads and effective working (student responses)

Figure 20. *iPads and effective working (student responses)*

Staff again take a more reserved attitude, though 42% agree and 9% strongly agree that students are indeed working more effectively, with 31% remaining neutral. A rather higher proportion than with other questions, 18%, disagree, though whether this is due to e.g. technical issues or the nature of a particular subject is not recorded. Again, this is an area requiring further research and analysis at school level.

The iPad and collaboration

Both students and staff were asked whether the availability of the iPads enabled a greater level of collaborative work than had previously been the case e.g. through sharing resources and ideas online and through group working in class where the devices enabled such activities as the rapid creation of group videos.

Students clearly believed that the iPads supported collaboration, with which 47% agreeing and 18% strongly agreeing with the question. Again a consistent group, 10% disagreed. As has already been noted, a proportion of the respondents reported technical and other issues with their iPads and others will not have been placed in learning situations where the teacher uses collaborative techniques or where these are not an appropriate methodology.
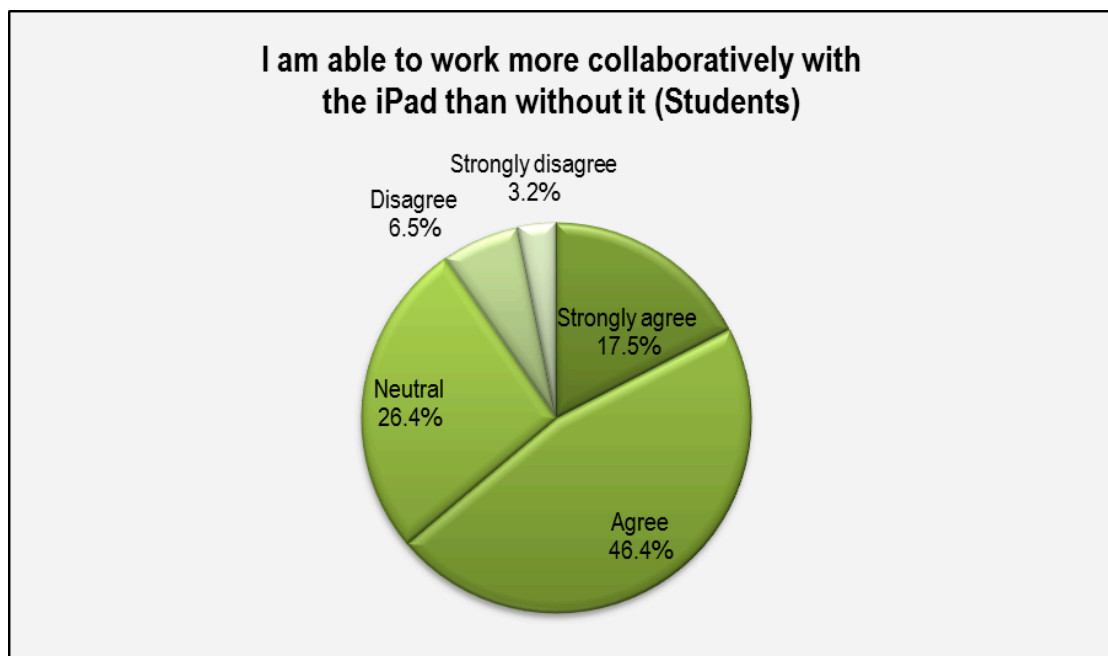

I am able to work more collaboratively with the iPad than without it (Students)

- Strongly disagree 3.2%
- Disagree 6.5%
- Strongly agree 17.5%
- Neutral 26.4%
- Agree 46.4%

Figure 21. *iPads and collaborative working (students)*

Staff were slightly less confident in their responses but even so 56% overall agreed (39%) or strongly agreed (17%) that students did work more collaboratively with iPads that they did without. Again, a consistent 14% disagreed while about one quarter remain neutral.
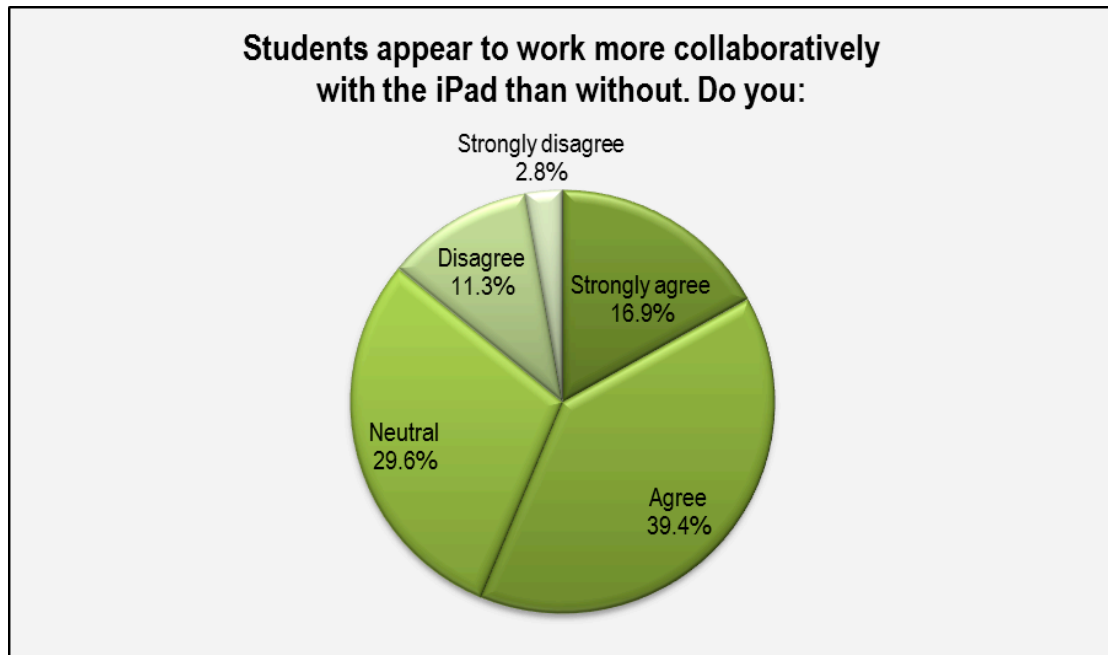
Figure 22. *iPads and collaborative working (staff)*

Again though, a majority of staff do recognise and exploit the potential of the iPad and are evolving their pedagogical approaches accordingly. It will therefore be important for future development that the school is able to identify the best practice in the school and to disseminate this as part of their already well structured programme of continuing professional development.

Does the use of Apps aid learning?

A range of iPad Apps were installed when the devices were introduced with others added since. It is therefore not surprising that these are well used, with student use higher than for staff. This is while 74% of students reported use of Apps in their classes and only 66% of staff did so, suggesting that students make use of some Apps regardless. The relatively brief classroom observations and interviews suggest that students understand the benefits of e.g. keeping notes using Pages or mind mapping with Popplet and prefer to work on the iPad rather than in an exercise book.

Interestingly, slightly more than one third of staff (34%) had not used Apps in their lessons, with some claiming that there were no subject appropriate Apps or that they could not afford to purchase those that were. All iPads have Pages and Keynotes installed. These are Apps that have uses across the curriculum, so a lack of use by some teachers perhaps indicates either an unwillingness to explore their potential or a limited awareness of how to exploit them in the classroom. It also sits uneasily with the indications in earlier responses of the benefits offered by the devices. However, the reason may be more prosaic in that Pages etc are not regarded as Apps but as what, on a traditional computer, would be seen as 'office'

tools and that these are used anyway. It is possible that non-App users are actually referring to non-use of subject specific Apps only.
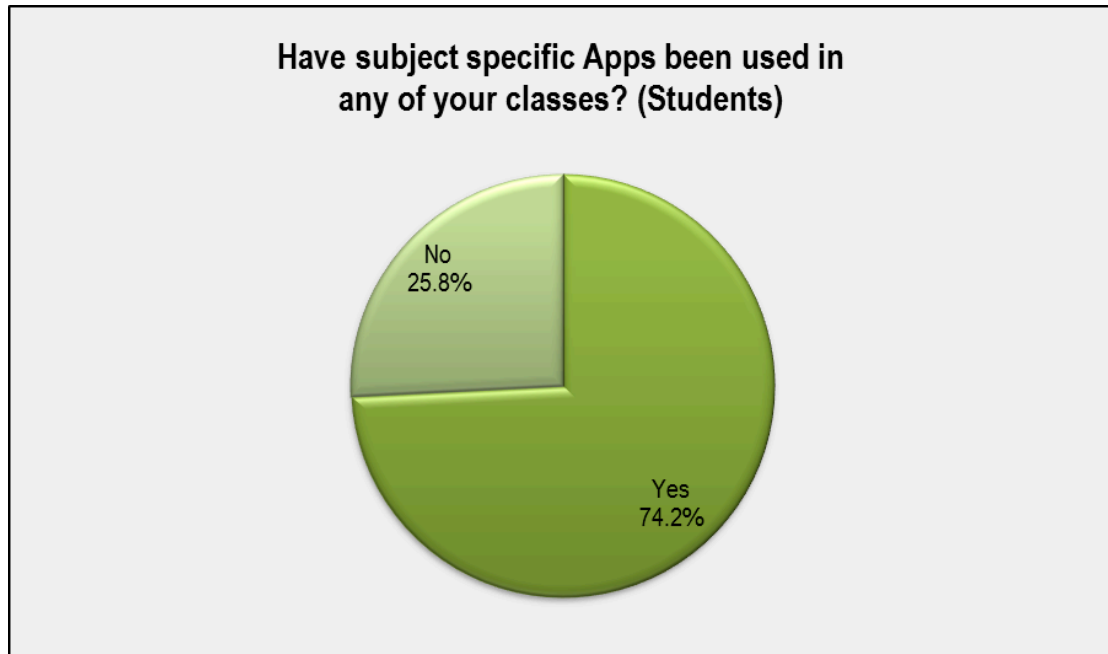

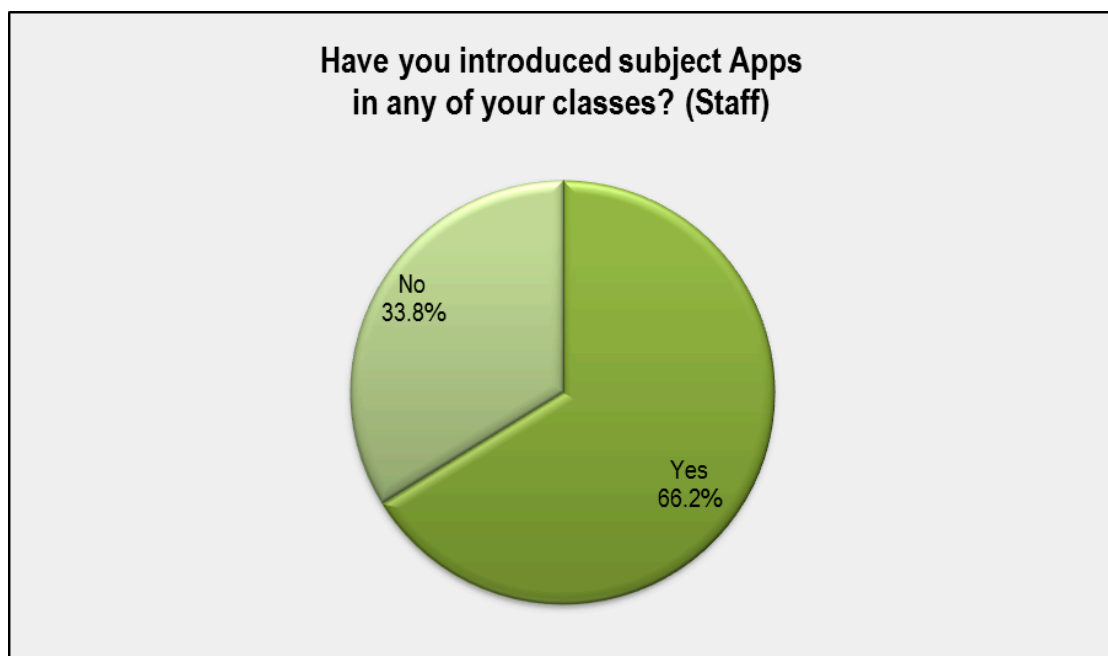*Figure 23.* Student use of Apps in class (students)

Figure 24. *U*se of Apps in class (staff)

A wide range of Apps were indicated to be in use covering several subjects, but particularly those noted earlier, Maths, Science and English. Those mentioned by both staff and students include:

- Pages
- Keynote
- iMovie
- Popplet
- GarageBand
- Wordz
- Froggy Jump
- Calculator
- Dice
- Fractions
- Quick Graph
- Number Cruncher
- Wordventure
- Accelerated Reader
- Jumbline2
- Numbers
- iBooks
- Show Me
- Freddy Fractions
- Maths Party
- Quakes
- Traffic Lights
- Creative Book Builder
- Easy Recorder
- Brushes
- . . . and many more.

The potential is certainly recognised, though it might be prudent for the school to review and evaluate these resources in order to identify those that offer the greatest value with regard to learning.

The students certainly consider that Apps are a valuable part of their lessons with 51% indicating agreement and 25% strong agreement with the idea that Apps had helped their learning. Only 6% disagreed, though this rises slightly to 8% if those who skipped the question are considered as negative responses. The positive response is, however, overwhelming.
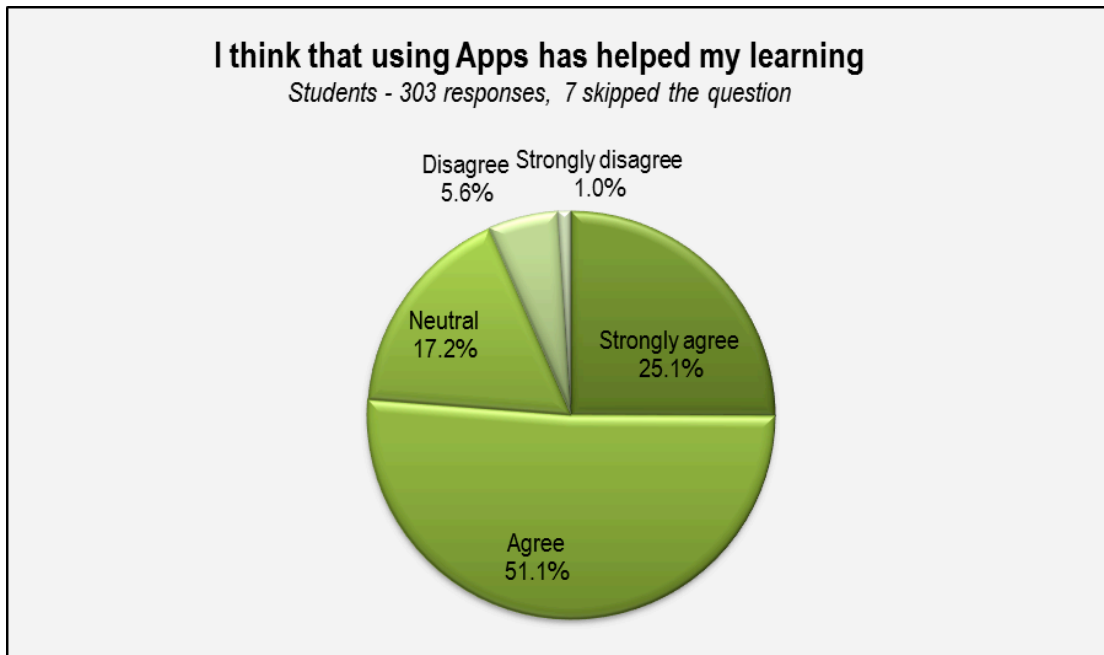
Figure 25. The value of Apps in helping learning (students)
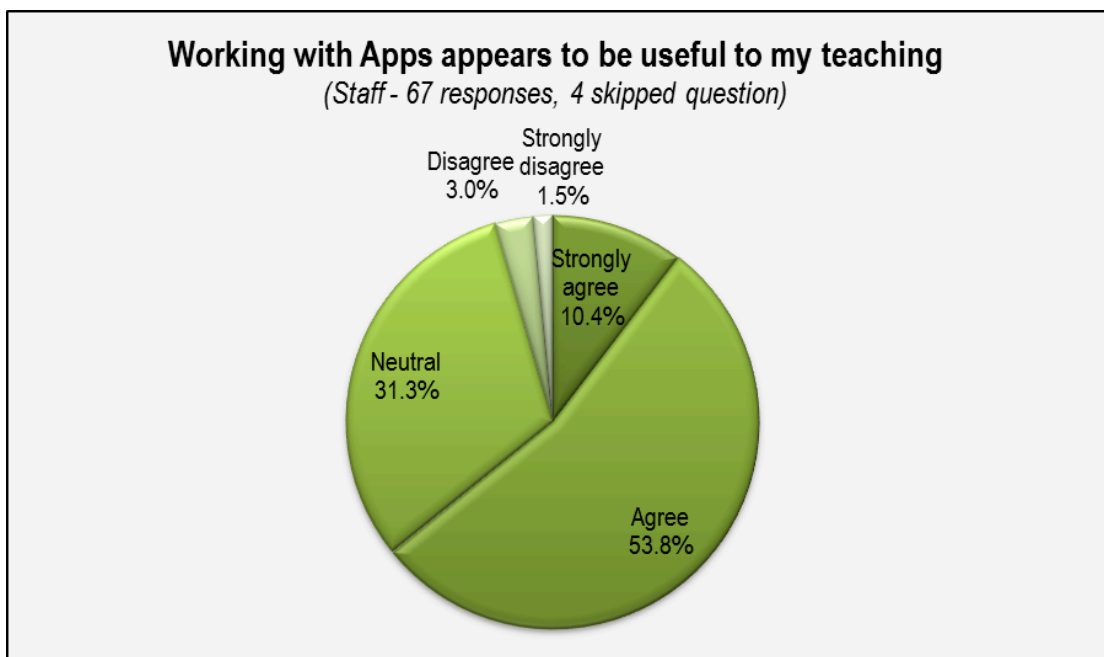
Figure 26. *The value of Apps in helping teaching (staff)*

Staff, similarly, appear to recognise the value of Apps in their teaching with 54% agreeing and 10% strongly agreeing with the contention that use of Apps appears useful to their teaching. A further 31% remain neutral on the matter again indicating that around one third of staff respondents to all questions are still taking the line the 'the jury is still out'. However, while not as strongly positive as the students the value of Apps is recognised though the open responses indicate that whilst there is

considerable innovation in some classes this is not universal. Thus there remains a need for ongoing professional development and sharing of best practice. This is well understood by the senior management team.

How happy are staff and students using the iPads in learning and teaching?

This is perhaps an awkward question but one that provides a valuable summary of feelings and attitudes towards the introduction of these devices. This is, after all, something of a radical experiment, as Longfield is one of a very small number of UK schools to implement a school-wide programme of this nature.

A highly significant 90% of students indicated that they happy using iPads in their learning, with 48% agreeing and 42% strongly agreeing with the statement. This represents an overwhelming endorsement of the device and its use by the students. It may be surmised that this majority included all iPad owners and that the small number who disagreed were those without their own devices or who had technical issues.
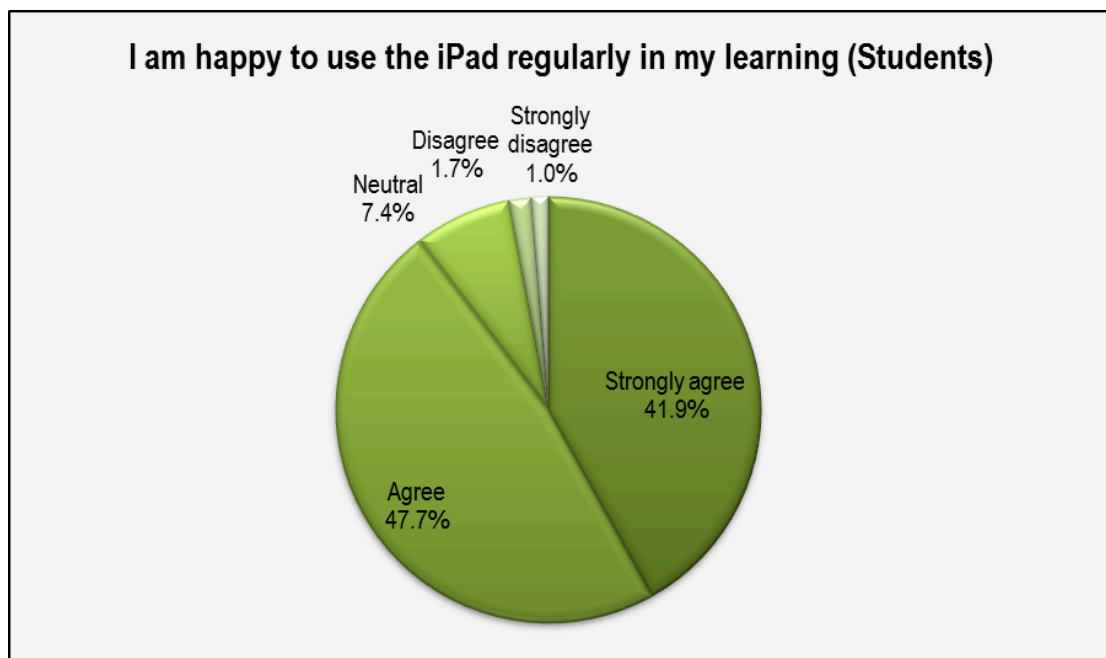
Figure 27.   *Willingness to use iPads regularly for learning (students).*

The student view was confirmed by staff, with 77% happy to regularly use the iPad in their teaching. A significant 55% agreed and a further 23% strongly agreed with the statement. Only 6% disagreed while 17% remained neutral on the matter. The proportion of staff happy to develop the use of the iPad is unusually high, though as studies cited earlier confirm, it does seem to be a common finding. A number of reasons may be postulated, most importantly the fact that the device is (almost) always available, thus it becomes ubiquitous and can be used at will, unlike older

laptop and desktop technologies that require considerable planning and preparation if they are to be used in a lesson. Other reasons concern the type and use of Apps, immediacy of research and ease of collaboration.

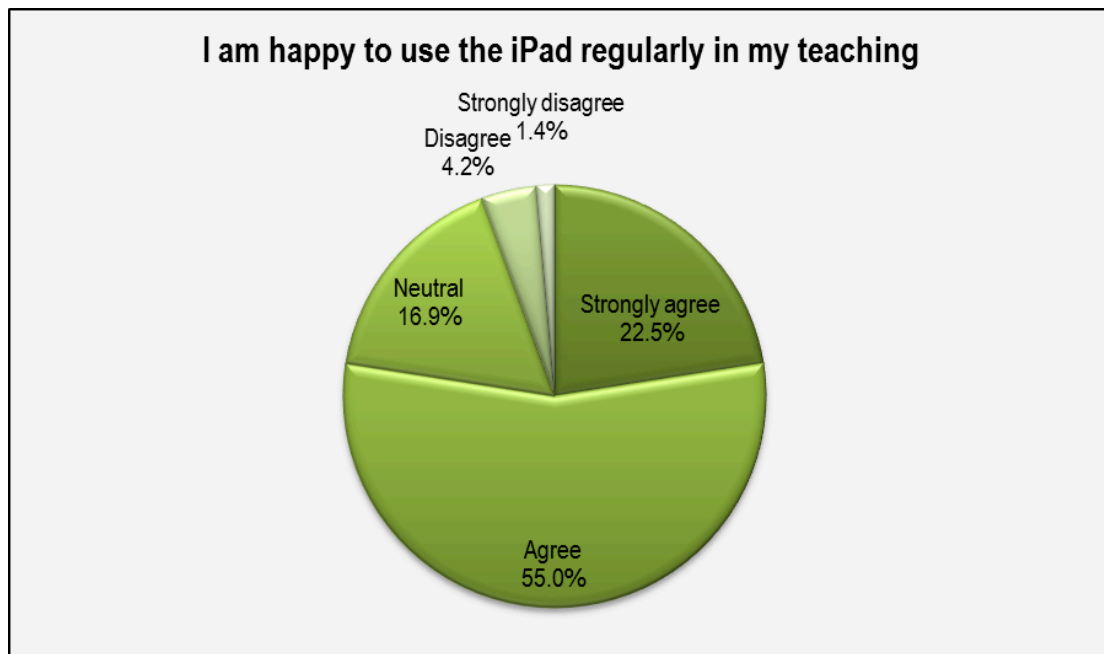*Figure 28.* *Willingness to use iPads regularly for teaching (staff).*

This leads to a consideration of whether the iPad has impacted on the way in which teachers now teach. Again a majority of the staff, some 63% consider that it has and many offer valuable insights into why this is so. Typical responses include:

- More student centred approach, more group work activities, more student led plenaries and activities

- I just use it as another tool. My teaching approach has not changed but clearly using the iPads is new.

- The iPad is intuitive and a pleasure to use. This means that I am more enthusiastic about researching and planning lessons. I have greater scope to introduce English students to a broad range of literature without spending hours creating and photocopying resources (This is particularly true of A Level teaching). I have started to create electronic textbooks which aim to focus individual students on the GCSE tasks they need to complete. This sort of tailored curriculum was simply impossible before the introduction of the iPad.

- The instant access to new information means that students can gain info from a variety of resources not just a textbook or worksheet.

- My teaching is now very focused during practical sessions on students who struggle to concentrate while others are able to continue with the work because they have the task and video tutorials in front of them.

- Allows me to set tasks and the students to just get on with it, they have all the visual tools and resources in front of them. Plus they can email me work so I don't have to lug bits of work home.
- I think it makes for more relevant lessons. Students engage in the material more and can work independently more effectively.
- Easier to work with students who experienced difficulty when grasping certain concepts.

Other teachers expressed some reservations but were clearly aware of the value of the iPads. Interestingly, there were no overtly negative comments although the anonymous nature of the survey enabled such responses. The example comments below indicate that teachers are reflecting both on the role of the iPad and its impact on their teaching and they are thus identifying practical and policy, rather than pedagogical, issues.

- It has made me think differently about how I deliver my lessons, ultimately though students still need key drawing skills which they do not need the iPad for.
- I still find myself doing activities that the iPad can be incorporated into rather than centralising all work to be done on the iPad. I am not sure what the policy is on the use of iPads over exercise books are and whether it is acceptable to have all work on the iPad and none in the books. How is all the work on the iPad meant to be marked.
- Because I still need basic resources available for those without iPads.
- It has made resourcing slightly easier (i.e. not having to have whiteboards and pens and A3 paper) but not changed much in my style of teaching.

A majority of staff further confirmed that they found the iPad easy to integrate into their work in a classroom context, with 62% overall in agreement (Agree 52%, strongly agree 10%) with a further 23% remaining neutral at this time. However, some 16% were in disagreement and although reasons were not sought, it can be surmised from other comments to include a supposed lack of appropriate Apps and perhaps antipathy towards technology in general.

I have found the iPad easy to integrate into my work in a classroom context (Staff)

- Strongly disagree 2.8%
- Strongly agree 9.9%
- Disagree 12.7%
- Neutral 22.5%
- Agree 52.1%

Figure 29. *Ease of integration of iPads in classroom contexts (staff)*

There are messages here, both for Longfield and for other schools following a personal device strategy. In particular, regular,ongoing CPD and dissemination of experiences and practice are crucial aspects of the change management process. **This is well understood by Longfield, where the implementation strategy has been exemplary.**

But is the iPad easy to use?

There is no doubt that it is, for both students and staff. Some 87% of students and over 86% of staff agreed or strongly agreed that both the interface and applications were easy to use.
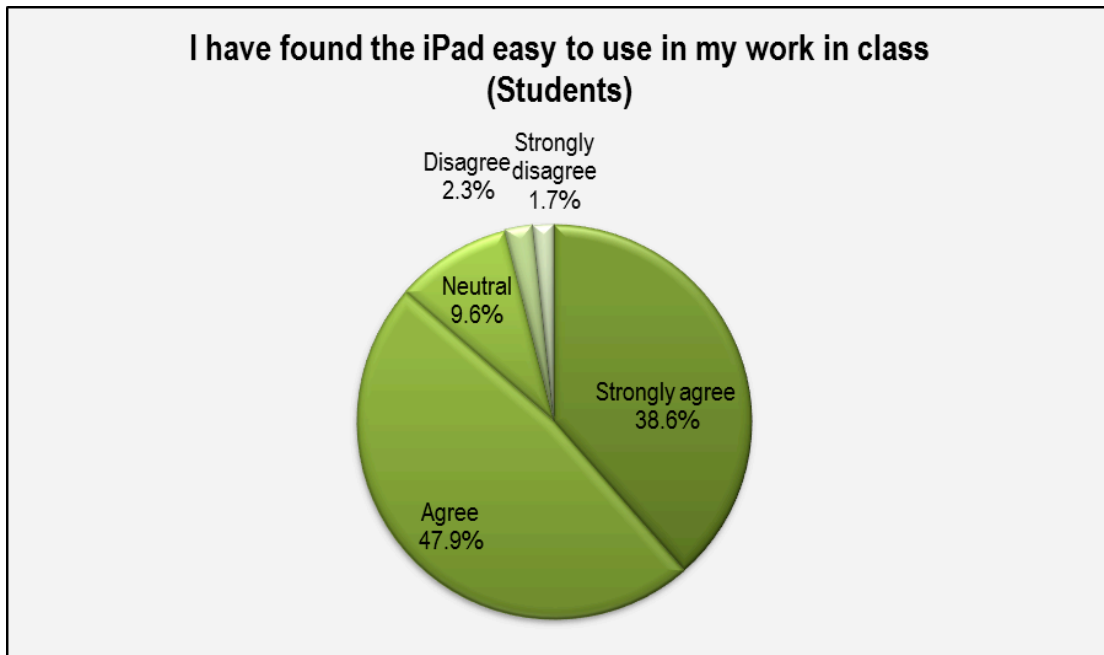
Figure 30. iPad ease of use (students)
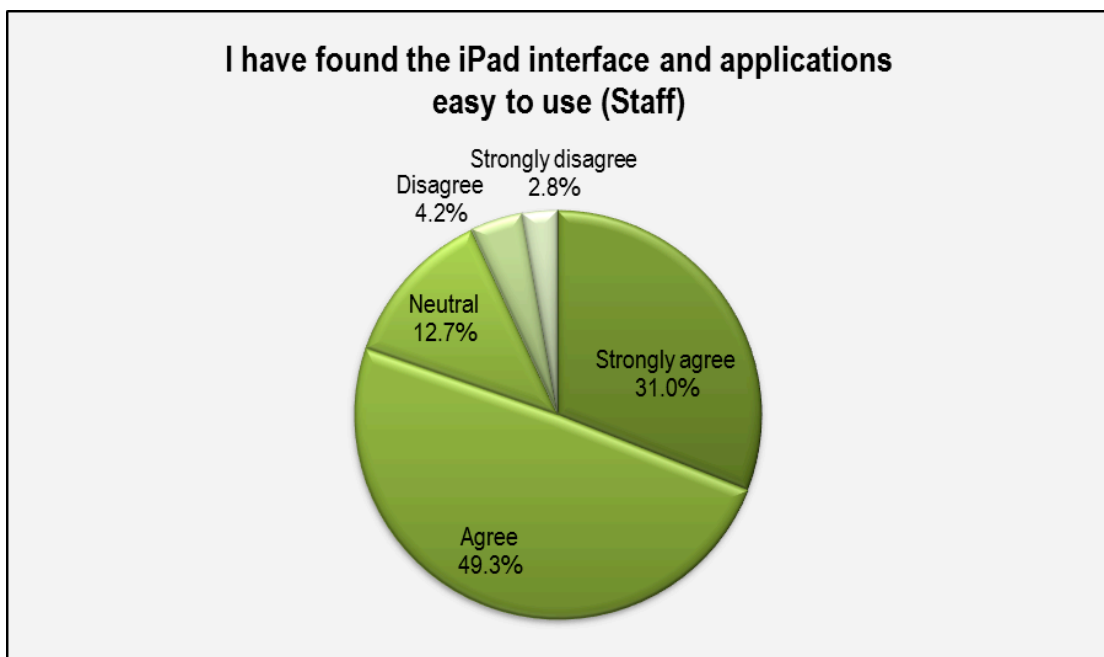
Figure 31. *iPad ease of use (staff)*

A very small proportion of the respondents found difficulty with the device, that figure being in line with the proportion of negative responses found throughout the study. Problems in using the device itself are therefore no barrier to its use in class by most people. It should be noted that this study has a focus entirely on the use of the Apple iPad and that this response may not necessarily apply to other table devices and operating systems.

Technical issues

With all computer and network technologies there are technical issues that arise from time to time. While good infrastructure planning and use of good quality equipment can minimise these, a school is a tough environment for any piece of kit – some users could easily push military grade devices to their limit! Thus some technical issues are to be expected, particularly as a completely new installation beds in, and it is therefore no surprise that some were reported.

About one third of students agreed that they had technical issues in school, with a similar proportion disagreeing and the same remaining neutral. Staff responses offered a very similar picture evenly spread between those having problems and those not, though in this case only 20% remained neutral on the issue.
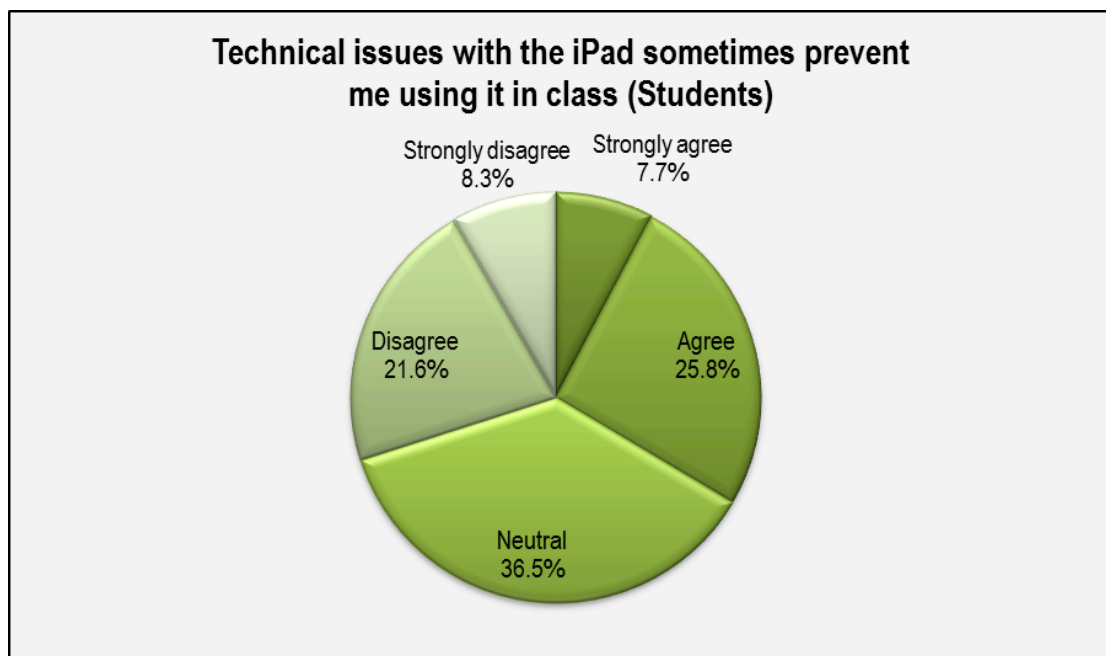

Figure 32.   *Technical issues (Students)*

Technical issues with the iPad sometimes prevent me using it in class (Staff)

Strongly disagree
7.0%

Strongly agree
12.7%

Disagree
26.8%
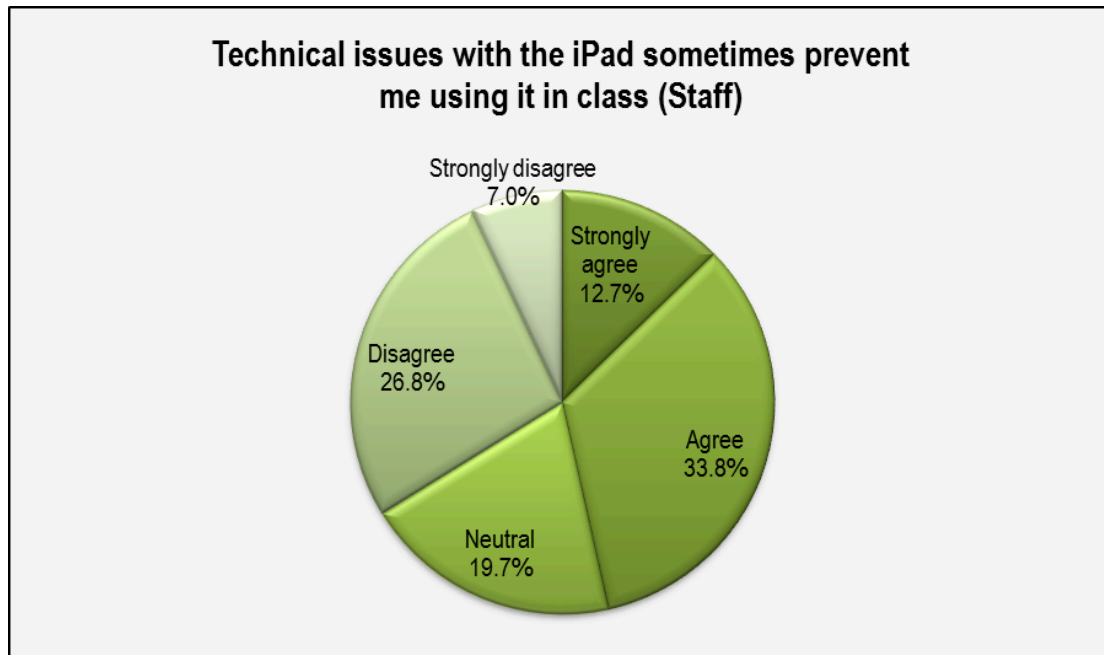
Agree
33.8%

Neutral
19.7%

Figure 33. *Technical issues (Staff)*

However, it is when the reasons are analysed that the picture becomes clear. Of particular note are the lack of problems with the iPads themselves, though some students had received faulty devices e.g. buttons and sound not working but within the expected failure rate for what is essentially a consumer device. Other complaints include Apps crashing, not doing what the user wanted, or freezing in use and for some the inability to update or download Apps. However, many of these may be due to user error, either through naivety or malicious intent.

One student user interviewed was quite scathing of those having problems, claiming to be aware of many who had tried, for example, to 'jailbreak' the machine with not unexpected consequences. The same student noted also that some of his peers just could not be bothered to maintain the systems or to use the support that the school had put in place. Others praised the iLeaders (tech savvy students) system for the quality of support it provided to others - it is clearly a strength and the school is doing well in ensuring that students can update and maintain their iPads effectively. This is, however, a normal school with normal students and all that that entails.

The main student complaints related to occasional poor network access and to the blocking of Internet sites. Further investigation of the network issues with technical staff indicated that these were well understood and that appropriate upgrading and provision of further access points was in progress. Once again, the high quality of project monitoring by the school is highlighted as well as the speed with which issues can be dealt with, offering a useful lesson to others planning similar developments.

Restrictions on web access due to school filtering policies result in student complaints in all schools. However, schools have a duty of care and this requires

them to filter Internet access to an acceptable standard, typically that set by the erstwhile BECTA some years ago. The critical thing is not the filtering but whether it is flexible enough to take account of the needs of learning, especially for older students and for advanced courses. However, despite the frequency of this complaint in the questionnaire returns, when interviewed, students at all levels consider the filtering a mere nuisance rather than a serious restriction on their activities. Others noted that there were many Apps available to access proxy servers and thus avoid the school filtering altogether – an ongoing battle for network technicians in many schools.

Staff reported a different set of problems. The inability of Apple devices to access Flash based websites is a particular issue, given that many education sites are created using Flash. With the implementation of HTML5 this problem will fade over time and is something that Apple users must currently live with, though the Puffin web browser App appears to resolve the issue and has recently been installed at Longfield. Adobe Flash Media Server 4, a recently announced method of streaming content to an iPad, provides another solution.

However, the key issue for many staff has been problems in connecting the iPad to class projectors. Technically, this should not be an issue provided that the appropriate adaptors have been made available and the iPads configured. Since the ability to project the iPad screen for demonstration purposes is an essential for many staff, ensuring a simple solution is important and an area that requires further development and possible staff training.

Other complaints are those common to any technology, including the humble exercise book – students leaving the device at home, losing work and sometimes Apps or not actually having the expected Apps installed. Also, despite the long battery life of an iPad some students still forget to charge them or run down the battery playing games in the lunch break.

There are few, if any, surprises regarding technical issues. Most are to be expected and the school is evolving ways to deal with it as they develop experience. Valuable lessons are being learned but leading edge innovative development has never been the most comfortable place!

The Parent Perspective

The number of parent questionnaires returned (23) means that the data thus acquired is not statistically significant. Indeed, the nature of many of these responses suggests that the population is likely to be unrepresentative and thus the data presented below should be considered with caution. The fact that the overwhelming majority of parents have not responded could be taken as acceptance of the value of the iPad project.

As stated, only 23 parents responded, of which 19 (82%) had one or more children in Years 7 to 10.These respondents were the least positive of all the study groups and suggest a possible gulf in viewpoint between parents and students. Thus only 35% of parents considered their child more motivated and able to work better with the iPad than without, with 30% disagreeing and 35% remaining neutral. However, the age of the students must be a consideration - teenagers are no more likely to appear motivated about school just because they have an iPad than they would without.

The survey group were more positive when asked whether the iPad could improve the overall quality of their child's work with a positive response of 43%, though 35% were still negative. Similarly, when asked about impact on their child's progress only 34% were positive with 26% disagreeing. However, with regard to improvements in achievement since the introduction of the iPads the response is very negative with 43% indicating disagreement and only 17% supporting the contention that achievement has risen. But such an answer is very subjective, since the project is only two terms old and only limited assessment data would have been reported.

With regard to whether students work more effectively with the iPads than without, one third agree and one third disagree though a more positive response was elicited with regard to collaborative working, where 43% agreed that their child now worked more collaboratively, though 30% still disagreed. Comments from parents suggested that they were largely unaware of the widespread use of the iPads in class, while several complained that their children used the device for too much games playing. There were, however, positive comments as well, e.g.:

- He uses it a lot in English and History but is increasing his use of it in science. It has been very useful for revision during exams.
- Easy access to internet and emailing homework.

There were also, perhaps legitimate concerns:

- My child's hand writing has deteriorated since using the iPad, but he keeps better notes on the iPad than in his book, however he can't use it in his exam and his teachers are concerned as am I.

In the last quote above there is potentially greater learning being achieved by the pupil but this is at odds with a highly traditional examination system.There is one area in which parents do agree fully with staff and students and that is in regard to the ease of use of the device. Over 91% agree that the iPad is easy to use, with only one respondent in disagreement. A further very positive aspect is the ease of connection of the iPad to home broadband services, where 78% agreed that this was easy. The negative responses were, it seems, from homes that had wired broadband connections rather than Wi-Fi. Few other technical issues were reported – faulty systems being the main issue. There did however seem to be some concern at how the school dealt with technical problems, though whether these were justified or simply a perception cannot be discerned. Given the technical support systems put in

place by the school, any such issues are as likely to be the result of students not reporting problems in accordance with procedures.

A final question to parents concerned value for money and how the iPad scheme might be improved. In the event, only 21% (5 respondents) considered the scheme to be value for money, with 48% (11 respondents) disagreeing of which 6 were in strong disagreement. This is disappointing but needs to be considered in the context of the current financial climate. The scheme requires parents to lease a costly machine for a prolonged period of time and indeed may have to do so for more than one child. That so many have done so is remarkable even if, as one respondent noted, they felt bullied into it. Others noted that the price could be lower, though may not have fully understood the insurance and maintenance value provided within the leasing scheme, though concerns over an upgrade path may be legitimate given the rapid model changes. One respondent demanded that the school should, *"Make them free".*

There is further work to be done then, at least with some parents, to ensure that they understand the obvious educational value of iPads and their ilk. Indeed this view was expressed by some e.g.:

- More feedback to parents what and when they are using them in school so we can see how much they are helping in lessons etc.
- would like to see a demonstration of it being used in a lesson

This, then, will be a key issue now that experience had been gained and the benefits identified. The educational value, and thus the value for money, must be clearly demonstrated and there is now more than sufficient evidence, not only from this study but from the wider literature to provide such a demonstration. It is therefore incumbent on schools to go forth and make the case. At Longfield this dialogue will take the form of a discussion with their parents Council as part of the school's review of the iPads project after the first year.

DISCUSSION

The evidence from this study clearly confirms the views of Melhuish, Gliksman, Spang and others that the use of iPad and similar tablet devices in schools is beneficial to both learning and teaching.

Such devices cannot be dismissed as mere toys or distractions and while they bring with them technical and management issues, these are far outweighed by increased student motivation, progress and collaboration. Students using them regularly indicate that their iPads have become an indispensible tool, facilitating research, communication with teachers and, as in art, saving considerable time so enabling greater achievement.

Teachers too, though perhaps with the same inbuilt cynicism that many have for any new technology, are very positive about the value of the iPads and articulate many of the benefits, not only for learning but for themselves. In the context of a restructured school in brand new buildings, to enable almost all students and all staff to have a new tablet device, one not designed for such a situation, and to integrate it into learning and teaching, as has happened at Longfield, would be considered brave by many. Yet the project proved to be extremely successful. While the technology has been an integral part of that success, a key factor has been the quality of the initial and ongoing project management, without which the outcome may have been very different. Sound change management principles have been applied and other schools intending to implement similar projects should learn from the experience of Longfield Academy.

In a presentation to schools and industry in March 2012, the Principal, Anne Davis, set out nine lessons that the school had learned from the project up to that point and it is useful to repeat these here:

- Develop a clear vision and strategy for your 1:1 scheme
- Define your learning culture
- Define and create your user experience and support model
- Work with a traffic light and reporting system
- Evaluate your existing position
- Know how many staff and students already own, in this case, an iOS device
- Get everyone involved –don't let a perception grow that it is a 'done deal', even if it is!
- Get devices in teachers and learners hand as soon as possible
- Record and share your experiences

She went on to advise that the above should be developed into a robust structural framework appropriate to the individual school. However, there is nothing new in

these principles; they simply represent the good management of school improvement and development.

Given that the case is made for one to one devices, it is useful to briefly consider whether a straightforward 'Bring Your Own Device' (BYOD) approach might work as well. Such an approach involves students bringing in all manner of devices from Android Smartphone's to iPads, along with a raft of technical and management issues and their associated resource costs. A scheme such as that at Longfield, fully managed by the school and using tried and tested technical standards based on one operating system clearly works. Technical problems are minimised, students and staff use the same tools and Apps while work can be planned and taught, knowing that most pupils will be able to undertake the activities. To be accepted, the kit must just work as expected when needed. The approach at Longfield based on the iPad and other Apple kit does just that – it works.

CONCLUSION

The implementation of a one to one scheme using the iPad has been very successful. The devices have been well received by students and by staff and are increasingly well-used in the curriculum as their attributes and limitations are learned. There has been a significant and very positive impact on learning and teaching which, in time, should be reflected in achievement and attainment, thanks to both pedagogical changes and new ways of learning engendered by "any time anywhere" access to information and learning tools.

Progress in the implementation of the scheme has been outstanding. By sharing such strategies widely, other schools can adopt similar processes.

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