

# **SQA Adapted Examination Papers in Digital Format**

## **Feasibility Study 2005 - 2006**

### **Final Report**

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# SQA Adapted Papers in Digital Format

## *Feasibility Study Final Report*

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## Summary

- Candidates with disabilities or additional support needs can request permission to use one or more Assessment Arrangements in SQA examinations (SQA 2004). The number of students for whom assessment arrangements have been requested has increased by over 300% in the last decade: from 3,094 in 1995, to 9,814 in 2005 (SQA, 2006). In 2005 there were requests for Assessment Arrangements for use in 41,454 examinations. Students may request more than one method of support for the examination (e.g. extra time and also use of a scribe), resulting in 74,720 individual instances.
- The most common type of request is for extra time (33,146 requests), followed by a reader (15,740 requests) and then a scribe (14,505 requests) (SQA 2006). Each examination sat using a scribe or reader requires separate accommodation, a member of staff to read and/or write, and an invigilator, and so there are significant resource costs attached to this type of support. More importantly, the student is not independent when sitting the examination.
- Digital question papers in accessible PDF were successfully trialled in a previous project in 2004-05 (Nisbet, Aitken and Shearer, 2004). Candidates with reading or visual difficulties can click on the text or questions on the digital question paper and the computer will read it out, and answers can be typed into the question and answer papers on screen.
- The aim of the project described in this report was to build on this experience by creating a bank of digital past question papers for schools and students to use for revision and practice. If these proved successful and practical to create and use, SQA undertook to consider offering digital question papers for students in the 2006 diet of examinations.
- The digital question papers were produced in Acrobat PDF because of relatively low production costs for SQA, good functionality and reliability, and low cost for schools. SQA already produce question papers in PDF, and so there is no need to re-design the papers. It is necessary to manually draw 'form fields' into the question and answer papers, and to check that these form fields are accurate and functional. Each paper was also 'speech-enabled' using TextHelp Systems' *PDFAloud Publishing Toolkit*: a process which requires a single mouse click (TextHelp 2006). The PDF papers are reasonably accessible for most candidates: they can be magnified; colours altered; accessed using the keyboard instead of the mouse; and the PDFAloud text-reading software is helpful for candidates with reading and visual difficulties. Cost to schools are relatively low: to use a digital question paper the candidate must have access to a computer with Acrobat Standard (at around £25 per licence) and the free version of the *PDFAloud* text reading software installed.
- A bank of 163 digital past papers across 28 different subject areas was created and used by 73 students in eleven centres in the 2005-06 session. Question papers were requested at all levels: Standard, Intermediate 1 and 2; Higher and Advanced Higher. Feedback from staff suggests that the students found the digital question papers very helpful for independent revision and practice.

- Eight of the centres went on to request 152 digital question papers for use by 34 students in 111 examinations in May 2006, and SQA staff created 57 separate digital question papers across 18 subjects. SQA estimate that the production time to create digital question papers is slightly less than the time to produce large print hard copy papers.
- 31 out of 34 students used the digital question papers in 105 examinations (three students chose to use other arrangements for six examinations).
- SQA analysis reveals no significant difference between the estimated and actual results obtained by the candidates using digital question papers, although the small numbers of candidates involved makes analysis difficult. Digital question papers do not appear to have an impact upon results achieved compared to other types of assessment arrangements.
- Students were asked to complete a questionnaire after each examination. 76 questionnaires were returned in respect of 92 out of 105 examinations.
- Most of the students who opted for the digital question papers chose to use them because of reading, writing or spelling difficulties. A small number of students had physical, visual and other issues.
- 10 students out of 31 used *PDFAloud* text-to-speech software to read 35 out of 105 question papers. The use of text-to-speech to read the question paper varied greatly between different schools: all the candidates at two schools used PDFAloud to read every question paper they sat whereas it was not used at all by any candidates in five schools. In one school, PDFAloud was used to read question papers in 25 examinations, while human readers were used for 27. If this level of use could be extended across other schools in Scotland it would have a significant positive impact upon the ability of thousands of students to demonstrate attainment more independently, and upon staffing and resources in schools.
- In 68 of the 92 examinations, digital question papers were in question and answer format where candidates could type their answers into the question paper on screen. Candidates used this option in 60 cases. Feedback from candidates suggests that digital question and answer papers are easier to use and less confusing than using a word processor or scribe. Again, there is considerable potential for digital question papers to increase candidates' independence and to reduce demands on resources.
- Students were enthusiastic about the digital question papers, with 28 out of 31 stating that they would use them again (3 were not sure) and all students who responded felt that SQA should provide digital question papers alongside other types of adapted question papers. Candidates found typing into the digital papers faster, easier and in some cases less painful than handwriting; more private than using a reader; and less stressful. This is what we would expect given that the students elected to use the digital question papers themselves, after practicing with past papers. Note that digital question papers will not suit every candidate who might require assessment arrangements because a reasonable degree of ICT and keyboarding/text production expertise is required, and because some candidates will feel more comfortable with other types of support.

- Interviews were conducted with staff involved in the pilot. Most staff felt that most students were more confident, independent, motivated and skilled when using digital papers, than with traditional papers and accommodations. All felt that SQA should provide digital adapted question papers in future. Centre staff found the digital question papers to be reliable (average of 4.75 out of 5 for reliability). Some schools had difficulty finding and organising sufficient numbers of accessible computers, and this may be a barrier to increased use of digital question papers in future. Support from local authorities and senior school management is necessary to ensure that satisfactory hardware and software can be made available.
- Overall, staff felt that the demands on resources were lower when using digital question papers compared to traditional assessment arrangements (average of 2.88 compared to 4 (on a scale of 1 to 5) in terms of staffing; 2.25 compared to 3.5 in terms of accommodation; 2.25 compared to 3.5 in terms of invigilation). There are of course increased demands for ICT resources, and for technical support.
- Staff were positive about support and communication from SQA, giving the effectiveness of the information and guidance an average of 4.5 out of 5, and the effectiveness of support 4.875 out of 5.
- Adapted digital question papers appear to offer considerable benefits. The question papers produced by SQA are reliable, relatively inexpensive to produce and staff estimate that demands on accommodation, staff and invigilation are lower than traditional support methods. More importantly, the students who used them in May 2006 found them effective; students using digital question papers are far more independent than those using other types of support such as scribe and reader; and results obtained using digital papers are in line with results achieved using other methods.



## Background

In 2005, 9,814 students requested to use Assessment Arrangements (previously 'special arrangements') in 41,454 Scottish Qualifications Authority examinations (SQA, 2005). The type of arrangement used in examinations varies according to the student's disability or difficulty and the subject and nature of the examination, and may include one or more of the following: extra time; transcription of the paper; word processor or other ICT; reader and/or scribe (SQA 2004).

ICT (such as a word processor) is most commonly used by students requiring assessment arrangements for question papers that require generation of a large amount of text such as English Writing. ICT is not often used to help students read papers, although some schools have scanned papers into a computer using optical character recognition and used text-to-speech software to support students with reading or visual difficulties.

A previous project undertaken in 2004 by the CALL Centre, University of Edinburgh, for SQA, trialled Standard Grade past papers in digital format for students with additional support needs (Nisbet, Aitken & Shearer, 2004). Eight 2003 SQA Standard Grade question papers in Adobe Acrobat PDF were provided by SQA: Biology, English Reading Text, English Reading Questions, English Writing, French Reading Questions, History, Maths 1 and Maths 2.

Adobe PDF was chosen as the preferred format for the question papers because SQA were able to produce PDF papers easily and at very low cost; it is straightforward to insert 'answer boxes' and PDF documents are reasonably accessible.

The project team added 'Form Fields' to enable students to type answers to questions directly on screen, and a text-to-speech facility for reading the paper was added using *PDFAloud* from textHelp systems.

Six schools evaluated the question papers with students who had used or were planning to use established alternative assessment arrangements in SQA examinations. Schools were provided with copies of Adobe Acrobat Standard and PDFAloud, and a CD with the question paper PDFs. Staff and students were asked to complete a questionnaire designed to investigate the ease of use of the digital examinations, and compare them with readers and scribes.

31 students completed evaluation questionnaires with respect to 94 different PDF question papers. Students considered that the digital question papers gave them far greater independence (a mean of 4.79 for the use of text-to-speech and a mean of 4.68 for typing into the PDF, out of 5) than scribes or readers (scribe - 2.06 and reader - 2.00 out of 5). 27 out of 28 students (96%) felt that SQA should provide question papers in PDF for students requiring assessment arrangements. SQA arranged for some of the completed digital question papers to be marked by subject markers. Feedback from the markers, together with comments from school staff, suggests that the digital question papers completed by students on computer did not appear to be different from those produced using other methods. The results indicate that staff and students would welcome the introduction of question papers in PDF for students requiring assessment arrangements. Staff in the schools were positive about the digital question papers and their potential to increase independence. Another significant factor identified by staff was the potential for digital papers to reduce the numbers of readers, scribes, invigilators and separate accommodation required for candidates who require assessment arrangements.

The pilot project therefore suggests that adapted, accessible digital question papers have the potential to significantly increase the independence of candidates with additional

support needs, while also reducing invigilation costs, and easing administration of assessment arrangements. Making question papers available in accessible digital format is also likely to be a positive step towards enhancing SQA services with regard to Accessibility and Disability Discrimination legislation.

## Aims of the Project

Following from the success of the pilot study, SQA and CALL staff, in discussion with school staff who had participated in the pilot, developed a project with the following aims:

- To create a bank of accessible digital past SQA question papers in order that candidates and schools will have a means of developing and practising skills and procedures for using and administering digital question papers for candidates requiring assessment arrangements.
- To develop expertise and procedures in authoring adapted digital question papers within SQA.
- To investigate administration procedures of using adapted digital papers in schools and colleges.
- Depending on the success of the above three points, conduct a small scale 'live' trial using adapted digital question papers in the 2006 examination diet.

## Digital Past Papers for Trial and Revision

### Focus Group

A meeting was held on 7th September 2005 and staff from 18 centres were invited to form a Focus Group for the project. The digital question papers were demonstrated to the group, and the project was outlined. Centres were invited to identify candidates who might benefit from using adapted digital question papers. If Centres, students and SQA were satisfied with all aspects of the process of creating and using the bank of digital past papers, SQA would consider the possibility of providing digital question papers in the 2006 diet of examinations. It was made clear to centres that participation in the project would not commit them or their students to using digital question papers in their 2006 examinations.

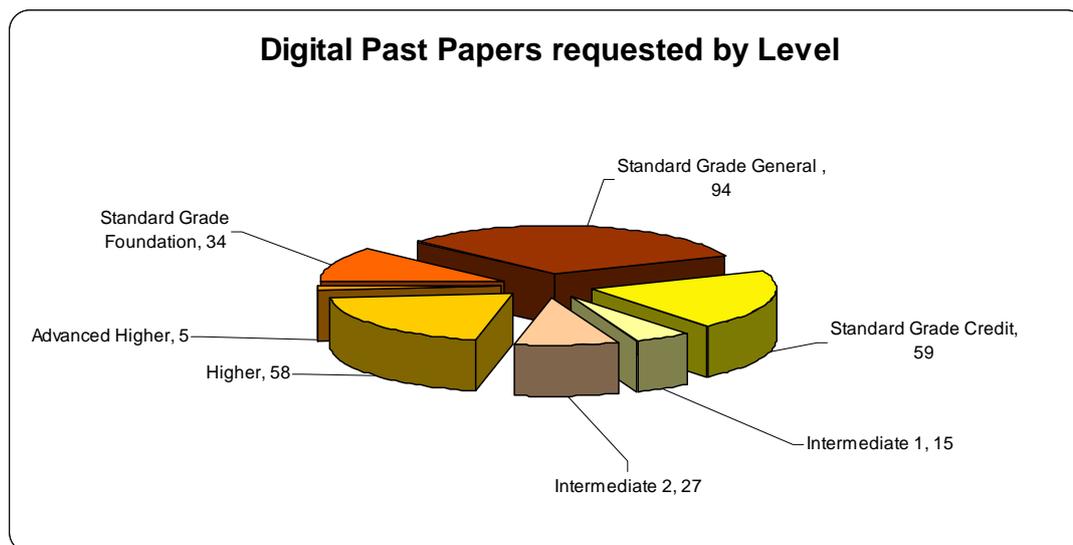
Given that prelims were usually held in December or January, and that the usual SQA deadline for requesting adapted question papers was 31st January 2006, the project team and Focus Group centres effectively had from September to January 2006 to create and trial the past papers and to decide whether to not to use digital question papers in the examinations in May were they to be made available.

### Digital Past Question Papers

Participating centres were asked to identify students who might be interested in using the digital question papers, and the subjects and levels of the digital past papers that they wished to trial by 30th September 2005. Of the 18 Centres who were invited to participate, 11 centres agreed to trial digital past papers for 73 identified students.

A total of 292 individual digital past papers across 28 different subject areas were requested. The large range of subjects that were requested was surprising, although the fact that English was the most popular, with 70 requests, was not. Papers were requested at all Levels: Standard Grade, Intermediate 1 and 2, Higher and Advanced Higher.

<b>Subject</b>	<b>No of digital past papers requested</b>	<b>Subject</b>	<b>No of digital past papers requested</b>
English	70	Product Design	6
Maths	45	Administration	4
Physics	18	Home Economics	4
Computing	16	Information Systems	4
Biology	13	RMPS	4
PE	13	Drama	3
French	12	Economics	3
Geography	12	Media Studies	3
History	12	Accounting	2
Chemistry	10	Art & Design	2
Music	9	Business Management	2
Craft and Design	8	Philosophy	2
German	6	Science	2
Modern Studies	6	Human Biology	1
<b>Total number of Digital Question Papers Requested:</b>			<b>292</b>



The SQA and CALL project team then created the requested bank of past papers. To support this work, the CALL team provided a half day training session for eight SQA desktop publishers, together with documentation (*Appendix 1*).

### Digital Question Paper Format

Previous projects undertaken by CALL for SQA (Nisbet, Aitken & Shearer, 2004; Nisbet, 2003a, Nisbet 2003b) had investigated and evaluated the most suitable digital format in which to produce SQA adapted papers for use by candidates with additional support needs. Adobe PDF was chosen as the most suitable because:

- Question papers are designed by SQA desktop publishers using Quark XPress and sent to the printers as Acrobat PDF, so there is no cost to SQA to produce PDF versions of papers since they already exist. In contrast, creating papers in another format (such as Microsoft Word; HTML (web format); DAISY (the digital talking book format designed for the visually impaired)) would require the papers to be completely re-designed.
- The PDF standard is generally more stable and reliable than most other formats.
- PDF versions look exactly like the hard copies of the question papers which is helpful for candidates, staff, invigilators and markers.
- PDF digital question papers can be magnified with the foreground and background colours adjusted to suit candidates with visual or perceptual difficulties.
- PDFAloud text-to-speech software, having been evaluated by pupils, was found to be practical and helpful for those with reading and/or visual difficulties. It is also cost-effective as SQA can 'speech-enable' the digital question paper allowing it to be read by the free version of PDFAloud. Centres do not, therefore, have to buy any specialist software to access the question papers thus reducing costs for centres and encouraging the use of digital papers.

- PDF digital question papers can be made interactive through the addition of form fields. These allow candidates to type their answers on screen. (Assistive technologies such as speech recognition software, word prediction programs, and alternative keyboards and mice can all be used to insert text into the answer boxes, and to navigate around the paper.) This interactivity is a key factor in the usability of the digital question papers, and is an advantage of PDF over other digital book formats such as DAISY or Microsoft Reader, which are not interactive. Over half the SQA question papers produced had form fields created.
- Candidates can use the study support tools with which they are familiar (e.g. spellcheckers, highlighters and bookmarks) and which they regularly use for coursework.
- PDF digital question papers are accessible for the majority of candidates with additional support needs, although blind candidates using screen readers may have difficulty with some of the digital question papers. In such cases the original electronic document would need to be redesigned, or the text would have to be saved into a plain text format and further edited (for example, text descriptions would have to replace graphic material).

### **Digital Question Paper Production**

A bank of 163 individual digital past papers from 2003, 2004 and 2005 was produced in Adobe PDF.

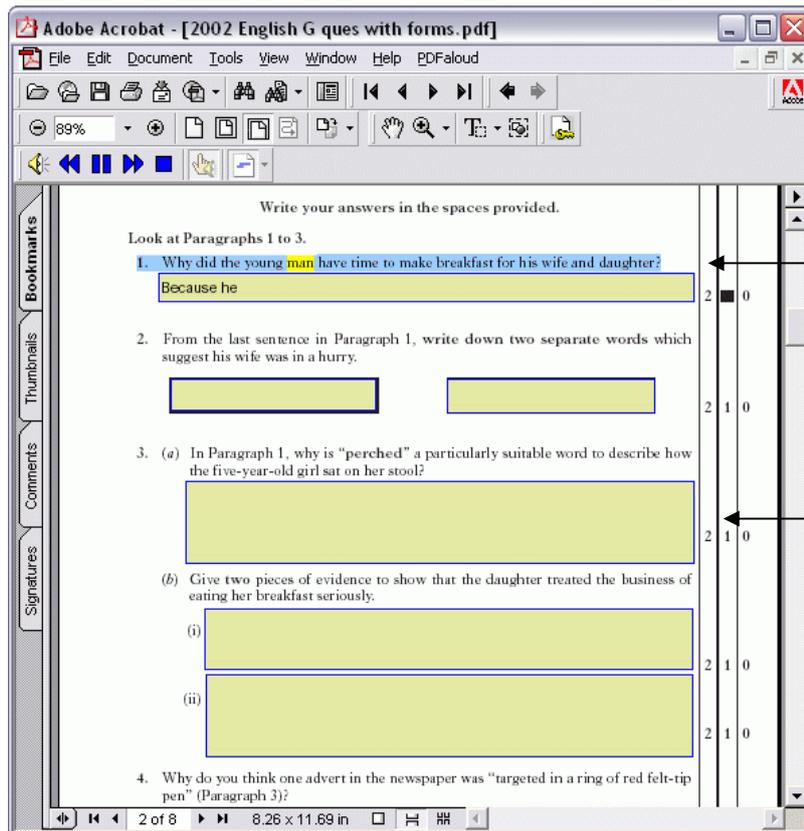
The production process for each paper was as follows:

- Papers in Adobe PDF were retrieved from SQA file stores.
- Those PDF question papers in Question /Answer format had ‘form fields’ for answers added by either SQA or CALL staff (these were drawn in manually on screen using Acrobat Professional).
- The completed question papers were then ‘speech enabled’ using *PDFAloud Stamping Tool* software, so that pupils could click on a word, sentence or paragraph to have it read out by free *PDFAloud* software installed on the computer. Speech-enabling the question paper allowed schools to install and use the free version of the *PDFAloud* software; otherwise centres would have had to purchase the program.

### **Inserting Form Fields for Answers**

Inserting form fields into the PDF required the purchase of Adobe Acrobat Professional. SQA purchasing procedures and network restrictions caused a delay in the software being made available on SQA computers so CALL loaned SQA a set of laptops to use to add the form fields.

Different types of form fields were required for different papers and questions: the most common were text boxes for typed answers and check boxes for multiple-choice style questions.



Click on a sentence to have it read out by PDFAloud. Each word is highlighted as it is read.

'Form fields' are drawn in so that answers can be typed in on screen.

Each form field had to be drawn manually and so this part of the process is the most time-consuming. Just over half of the 163 papers created required form fields to be inserted. The number of form fields added per paper varied between 25 and 178, with an average of 37 form fields per paper. The most time-consuming papers to adapt were Biology because of the large number of pages and form fields and the complexity of the page layout.

### Text-to-speech functionality

For the previous pilot project in 2004-2005, text-to-speech facilities for students with reading difficulties and students with visual impairments was provided using TextHelp Systems' *PDFAloud* software. Following the positive evaluation in the pilot, the team again used this package which was provided free of charge for the trial by TextHelp Systems. The process of adding speech to each question paper took a matter of seconds: the paper is opened in Adobe Professional, the relevant option chosen from the PDFAloud menu, and this then 'speech-enables' the file.

### Quality Assurance

Once complete, each paper had to be checked to ensure that the appropriate types of form fields were in the correct position, and that answers could be typed in correctly. The text reading facilities were verified by opening the paper on a test computer and confirming that speech was available.

### Distribution of Digital Past Papers to Centres

CALL staff visited 10 of the 11 participating centres to install Adobe Standard and PDFAloud software, and to demonstrate the digital past papers to staff. The project budget funded the purchase of Adobe Standard CDs and licences, and schools were provided with the bank of digital past papers on CD.

Adobe Acrobat Standard was provided to schools for this pilot project (at a cost of approximately £25 per licence) because the free Acrobat Reader does not permit answers to be saved once they are typed into the paper on screen, and we took the view that saving answers is important in an examination.

### Feedback from trial of Digital Past Papers

Participating centres were asked to report on the students' use of the digital past papers in order to gather information about:

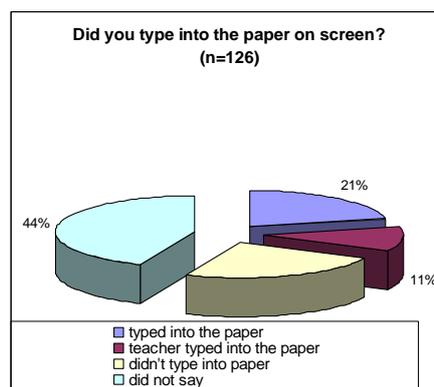
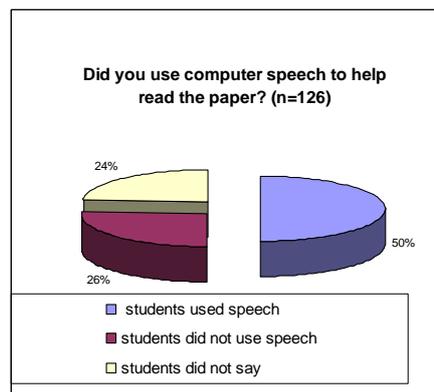
- whether or not the PDFAloud text-to-speech facility was used to read the paper;
- the method used by the student to answer the paper; and
- whether the student would be interested in using digital question papers in the 2006 diet of examinations. This information was used to inform discussions with SQA over whether to offer the option of adapted digital papers in 2006.

The feedback questionnaire is given in *Appendix 2*.

Of the 73 identified students at 11 Centres for whom 292 digital past papers had been requested, feedback forms were received from 41 students at 6 Centres in respect of 126 papers.

Speech-enabling the papers is quick and easy, but there is a cost to SQA for the PDFAloud software, and so it was important to investigate whether candidates would use the text-reading facility. Students reported that they used PDFAloud text reader software to help in reading at least 50% of the papers, demonstrating a demand for this particular feature. (Only 26% of students said they did not use the text-reading, and so the actual use of the speech is likely to be greater than 50%.)

Students reported that they typed directly into the digital paper on screen in 21% of cases; a teacher typed for them in 11%; and for 24% of the past papers tested, the student did not type into the paper on screen. The method of answering was not given for 44% of the papers, and we expect that the majority of those who did not respond definitively to this question did in fact type directly into the paper on screen. Typing answers into the paper on screen was possible for just over half the papers – those which were in question and answer format – and so we surmise that virtually all the students used this option where it was possible.

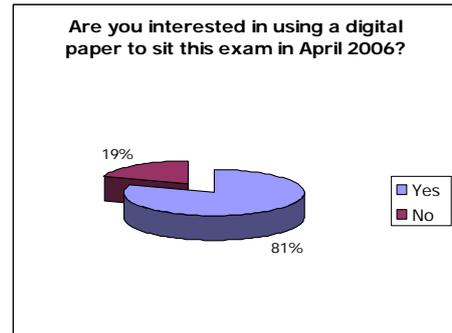
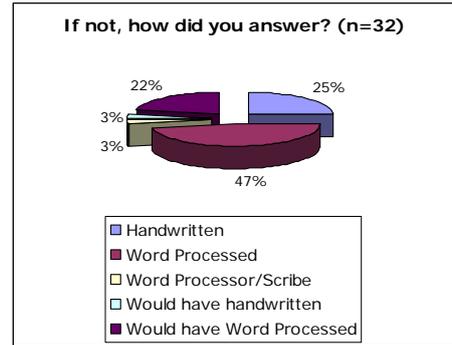


For those papers where students did not type in directly (mainly because it was not possible as the papers were not in Question and Answer format), the majority of students used a word processor.

Having trialled the past papers, in 81% of instances students stated that they would be interested in using the digital method in the examination in 2006.

A second Focus Group meeting was held in January 23<sup>rd</sup> 2006, attended by staff from 12 Centres. Centres provided additional feedback on the trial of the digital past papers. The Group agreed that the trial had been positive and schools were asked to send requests for digital adapted papers for use in the examinations in 2006, to SQA by the end of January 2006.

SQA would then review the requests made, and depending on the number and range of papers, would confirm to schools by mid-March whether the papers would be available in digital form.





## Digital Question Papers ‘for real’

### 2006 Digital Question Papers requested

Eight Centres requested digital question papers on behalf of 34 candidates, for use in 111 separate examinations, compared with 73 students at 11 Centres who asked to trial 292 digital past papers. 47% of the students who trialled the digital past papers therefore requested to use them in an actual examination. This would seem a reasonable uptake given that the digital papers had never before been used in SQA examinations.

Four Centres trialled the past papers but did not request digital papers for 2006. Staff from the schools reported that they and the students decided against using digital papers in examination for a number of reasons: insufficient time or access to computers for practice; lack of suitable and reliable computers in the school; they judged that other assessment arrangements would be more appropriate; and one teacher who had initiated the trial moved to another school. Lack of access to satisfactory computers was the primary reason why there were no requests on behalf of 10 students at one school. Staff in the other schools in the same local authority who participated in the project also complained about difficulties in using school networked computers (and addressed the problem by using standalone machines) and so there does appear to be common and consistent concern over access to reliable computers and technical support in schools in certain local authorities.

Initially there were a small number of requests for digital Maths question papers, but these were gradually withdrawn and none were ultimately used in examinations at any level, despite the fact that Maths papers were the second most popular Past Papers requested previously (see Table 1). Similarly, there were no requests for digital Chemistry, German or Science papers (10, 6 and 2 past papers were requested respectively); 3 Physics papers were requested compared with 18 past papers; and 6 Biology papers were requested compared to 13 past papers. In comparison, for example, there were requests for digital papers for 52 English exams, compared with 76 requests for the past papers.

Therefore, while the number of requests for most subjects was fewer than the number of requests for past papers, the reduction was generally greater for maths and science.

Students who had tested digital Maths and Science past papers and participated in the 2005 pilot project (Nisbet, Aitken & Shearer, 2004) had commented that it was difficult to lay out mathematical working, type mathematical or scientific symbols, or draw diagrams and graphs on screen. Nevertheless, on the basis of previous experience we might have expected some candidates to request digital maths papers in order to read the questions using the PDFAloud text reader software.

Further investigation is required to explore options for improving the usability and accessibility of digital Maths and Science papers in particular.

### Production of Digital Papers

More than one digital paper was required for some examinations (for example, Standard Grade English Reading has two papers –Reading Text and Reading Questions) and so the total number of individual paper requests received was 152, for use in 111 examinations.

Since the digital papers to be created were subject to the same security regime as all other adapted papers, SQA staff created all the papers in-house. Form fields were added using Adobe Acrobat Professional and SQA purchased the *PDFAloud Publishing Toolkit* from TextHelp Systems to add text-to-speech.

The digital question papers were intended to replicate the appearance of the hard copy papers as far as possible because they are regarded for assessment purposes as a type of adapted paper; candidates may use both hard copy and digital version during the examination; and the completed papers are marked using the same process as all other SQA papers. The addition of form fields for the digital question-and-answer papers was therefore an important feature.

32 (56%) of the 57 papers created were Question and Answer format, to which a total of 2,348 form fields were added (an average of 73 form fields per paper).

The SQA production team estimated that the time taken to create the form fields, speech enable the files and the copy the files to CDs amounted to around 40 hours; approximately 42 minutes per paper produced (57 papers), or 22 minutes per CD (111 CDs). Quality assurance took considerably longer and amounted to around 100 hours for checking the tab order and format of the form fields, checking the speech, rechecking following any amendments and checking the files after they were copied to CD (approximately 105 minutes per paper; 54 minutes per CD).

The digital question paper pilot carried additional risks due to its dependence on technology. It was necessary to ensure that all centres had tested their PCs and relevant software prior to the examinations. SQA contacted each centre to ensure that this had been done, and in some cases assistance was provided by CALL Centre staff. Guidance was provided to centres (*Appendix 3*) on the conduct of the examination and this included contingency arrangements in the event of a technical difficulty occurring. Firstly, SQA provided a back-up CD for each subject being taken at each centre. In the event that it was not possible to use the replacement file or there was some other problem, schools were asked to ensure that alternative arrangements were available, i.e. the arrangements that would have previously been provided for the candidate such as a Reader/Scribe.

The number of digital question papers produced for this pilot was small (152) compared to the total number of Adapted Question Papers requested (1011). The SQA team reported that the production time for digital papers, including the quality checks, was a little less than for the traditional reformatted large print Adapted Question Papers. The packing and despatch of the digital question papers to centres became part of the process of packing and despatching all the Adapted Question Papers and required similar resources.

<b>Table 2: Digital Papers created for 2006 examinations</b>				
<b>Subject</b>	<b>Grade / level</b>	<b>Paper</b>	<b>No of requests for digital 2006 exam papers</b>	<b>No of answer form fields for 2006 papers</b>
Accounting	Higher		1	0
Accounting	Higher	Worksheet for Question 6(a)	1	68
Administration	S G		1	0
Administration	S C		1	61
Art & Design	Higher	Paper 2	2	0
Biology	Int 1		2	72
Biology	Int 2		1	95
Biology	S C		1	118
Biology	S G		2	152
Business Management	S G		1	67
Computing	Higher		2	0
Computing Studies	Int 1		3	183
Computing	S G		1	155

Studies				
Craft & Design	S C		1	63
Craft & Design	S G		1	67
Drama	S F		1	61
Drama	S F/G/C	Stimulus	1	0
Drama	S G		1	46
Economics	S G		1	77
English	Higher	Close Reading Questions	1	0
English	Higher	Close Reading Text	1	0
English	Higher	Critical Essay	1	0
English	Int 1	Close Reading	2	0
English	Int 1	Critical Essay	1	0
English	Int 2	Close Reading	3	0
English	Int 2	Critical Essay	3	0
English	S C	Reading Questions	6	32
English	S C	Reading Text	8	0
English	S F	Reading Questions	12	39
English	S F	Reading Text	10	0
English	S F/G/C	Writing	7	0
English	S G	Reading Questions	19	33
English	S G	Reading Text	17	0
French	S C	Reading	2	26
French	S G	Reading	2	41
Geography	Int 1		1	48
Geography	Int 2		2	0
Geography	Int 2	Worksheet Q2(b)(i)	2	7
Geography	S F		1	80
Geography	S G		2	34
History	S C		2	0
History	Higher	Paper 1	1	0
History	Higher	Paper 2	1	0
History	S G		2	0
Home Economics	S C		1	62
Home Economics	S G		1	58
Human Biology	Higher		1	106
Physical Education	Int 2		3	0
Physical Education	S C		1	80
Physical Education	S F		1	104
Physical Education	S G		2	88
Physics	Higher		1	0
Physics	Int 2		1	0
Physics	S G		1	63
Product Design	Higher		1	0
S and VS	S F		2	82
S and VS	S G		2	80
		<b>57 papers</b>	<b>152 requests</b>	<b>2,348 fields</b>

The production and quality assurance processes developed by the SQA team appear to have been extremely effective. One student noted that the answer boxes for Questions 8b and 9b in the Biology Intermediate 1 paper were ‘muddled up’ and that when he put an answer in the box for one question, it appeared in both. This error occurred because the 8b form field was copied, pasted and not renamed as ‘9b’. An error rate of 1 in 2,348 form fields (0.0004%) is a remarkable achievement.

### **Communication and Liaison with Centres and Invigilators**

SQA created Guidance Documentation for centres and invigilators involved in the pilot (*Appendices 3 and 4*), and CALL produced updated guides for installing software; using the digital question papers; and a simple instruction sheet for candidates (*Appendices 5, 6 and 7*).

Confirmation of the running of the pilot was communicated by SQA to SQA Coordinators at the pilot centres and to the relevant Local Authority Managers. The Learning Support staff at the pilot centres were of course sent confirmation also.

### **Digital Papers used in 2006 Examinations**

Eight Centres requested digital papers for 34 candidates to use in 111 separate examinations.

31 candidates actually used digital papers in 105 (95 %) of the 111 examinations. Centres and candidates were advised to make alternative arrangements should the candidate decide not to use the digital papers, and in the case of the 6 examinations where the digital paper was not used:

- One candidate did not sit the examination (English Standard Grade Reading General Level), leaving after around 10 minutes. The candidate did successfully complete the digital Foundation paper.
- One candidate attempted the digital Art & Design Higher but was disoriented when he found it contained images (the digital past papers he had tried did not contain images of artistic works because they were removed due to copyright restrictions) and so decided he would use the hard copy paper. The same candidate also decided against using the digital Higher Computing question paper, opting instead for a reader. The candidate also said that he had not practiced with the digital question papers 'as much as he should have'.
- One candidate used a word processor for Intermediate 1 English Close Reading because he did not need text reading software and since the paper was not question and answer, he read the hard copy and word processed his answers.
- The reasons for the other two candidates not using digital versions of Higher Accounting and Intermediate 2 Physics are not known.

It is encouraging that the students did use the digital papers in 95% of the examinations. This high uptake reflects the efforts made by candidates, Centre staff and the SQA and CALL teams to prepare for the examinations, and also illustrates the effectiveness of the digital papers themselves. Table 3 summarises the number of candidates and examinations where digital papers were requested and used.

<b>Table 3: Number of candidates, examinations and digital papers requested</b>					
<b>Centre</b>	<b>No. of candidates who requested digital papers</b>	<b>No. of candidates who used digital papers</b>	<b>No. of exams where digital papers were requested</b>	<b>No. of exams where digital papers were used</b>	<b>Digital Papers used</b> Std = Standard Grade F = Foundation level G = General level C = Credit level Int = Intermediate H = Higher
School A	6	6	16	15	English Std Reading F, G, C English Int 1 Close Reading French Std Reading G, C
School B	3	2	9	7	Art & Design H Paper 2 Computing H English H Close Reading & Critical essay English Int 1 Close Reading & Critical essay Physics H
School C	6	6	18	17	Biology Std G Biology Int 1 Computing Studies Std Computing Studies Int 1 English Std Reading F, G, C English Std Writing F,G,C Geography Std F, G History Std G, C Physics Std G
School D	2	2	4	4	English Std Reading F, G, C English Std Writing F,G,C Geography Int. 1
School E	1	1	5	5	Business Management Std English Std Reading G & C Physical Education Std G & C
School F	9	7	30	28	Accounting H Biology Std G, C & Int 2 Craft & Design Std G & C English Std Reading F, G, C English Std Writing F,G,C English Int 2 Close Reading & Critical Essay Drama Std F, G Geography Int 2 History Std G, C Human Biology H Physical Education Int 2 Physics Int 2 Product Design H
School G	4	4	11	11	English Std Reading F, G, C Economics Std G Home Economics Std G, C
School H	3	3	18	18	Biology Int. 1 English Std Reading F, G English Std Writing F,G,C English Int. 1 Close Reading & Critical Essay History H Paper 1 & 2 Home Economics Std G, C Physical Education Std F, G, Int. 2 Social and Vocational Skills F, G
<b>Totals</b>	<b>34</b>	<b>31</b>	<b>111</b>	<b>105</b>	

Table 4 gives a breakdown of the different types of assessment arrangements, including digital papers, used across the schools (data provided by SQA). School A in Glasgow educates students with physical difficulties, and every candidate used assessment arrangements in an examination (note that 45 candidates requested assessments but only 44 candidates actually sat examinations). The other seven schools are mainstream secondaries and the use of assessment arrangements varied quite widely between schools, from 29% at School B (which has specialist provision for students with dyslexia) to 2.6% at School G.

The type of arrangements requested also varies: for example, 16% of requests from School B and 10% from School H were for coloured Question Papers, in comparison to the other four mainstream secondaries who did not request any coloured papers at all. Most candidates requested more than one arrangement, so the number of arrangements requested was greater than the number of examinations sat. The most common request was for extra time (a total of 1430 requests), followed by a reader (260), ICT in the form of word processor (255), scribe (233), coloured paper (115) and then digital papers (105).

<b>Table 4: 2006 Assessment Arrangements requested by participating schools</b>								
	School A	School B	School C	School D	School E	School F	School G	School H
Total number of candidates	44	381	442	231	418	435	526	545
Total number of examinations taken	109	1981	2093	1293	2139	2255	2591	2384
Number of candidates who requested assessment arrangements	45	113	38	11	66	27	77	14
Number of requests for assessment arrangements	117	510	104	29	360	137	270	60
% of candidates who requested assessment arrangements	102.3%	29.7%	8.6%	4.8%	15.8%	6.2%	14.6%	2.6%
<b>Assessment Arrangement requested</b>								
Braille paper	0	0	0	0	0	0	0	0
Calculator	0	19	4	2	10	2	9	0
Candidate Signs Responses	0	0	0	0	0	0	0	0
Coloured Paper	7	80	0	0	0	0	28	0
Enlarged Print	12	11	0	0	10	0	0	0
Extra Time	114	449	87	29	359	136	212	44
PA Referral	0	0	0	0	0	0	29	0
Question Paper signed to candidate	0	0	6	0	0	0	0	0
Reader	6	97	18	11	63	27	14	24
Scribe	46	30	20	14	64	19	11	29
Transcription with correction	0	7	11	4	0	1	0	4
Transcription without correction	1	1	3	0	0	0	0	12
Use of ICT	32	95	27	4	8	32	51	6
Use of tape recorder for responses	1	0	0	0	0	0	0	0
Digital Papers	15	7	17	4	5	25	11	8
Digital papers as % of total requests for assessment arrangements	12.8%	1.4%	16.3%	13.8%	1.4%	20.4%	4.1%	30.0%

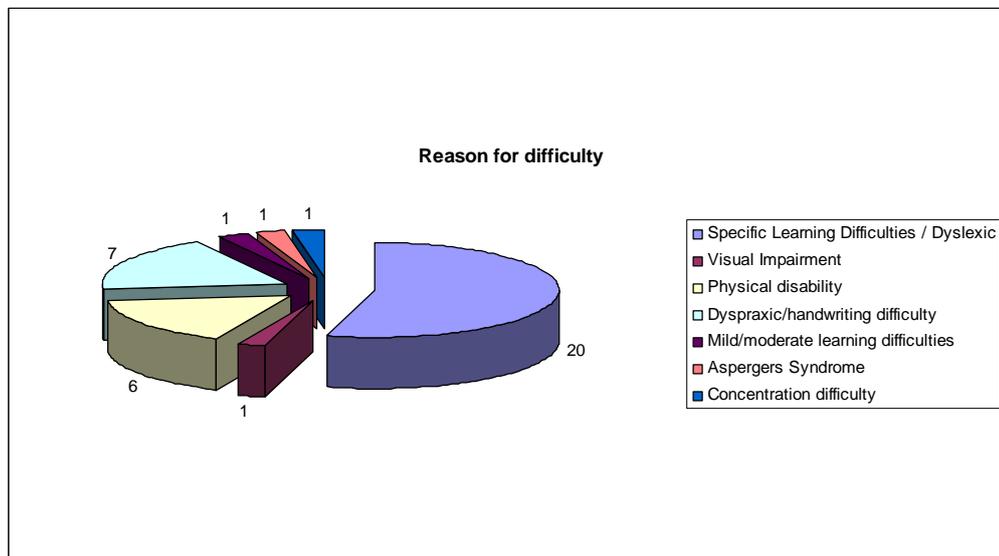
## Feedback from Students

An evaluation questionnaire (*Appendix 8*) was designed for students to complete after each examination. SQA printed personalised copies of the questionnaire with the details of the student and the examination and delivered them together with the CD with the digital paper for the examination to schools. The project team recognised that this would place a burden upon both staff and students, but it was important to try and obtain feedback about every examination sat by every candidate, in order to collect both student and subject-specific data.

We were pleased with the response from staff and candidates: 76 evaluation forms were received from 31 students in respect of 92 out of 105 (83%) examinations where digital papers were used (some evaluation forms referred to more than one examination).

### Reasons for using Digital Papers

The chart below shows the underlying difficulty for the students requesting the use of digital papers. Note that some students had additional support needs as a result of more than one difficulty.



Students were asked to give the reasons why they chose to use digital papers for the examination in preference to other types of assessment arrangement. This question was left open, and the reasons given have been categorised and grouped by the project team:

Table 5: Reason for using digital papers	Number of times the reason was given
Speed	21
Easier in general	20
Poor handwriting	19
Easier than writing or using the paper copy	8
Better than word processor	8
Prolonged writing causes pain	8
Poor spelling/punctuation	8
Easier to read	7
Better than using scribe / avoids need for scribe	7
Avoids need for reader	7
Understand information better	6
Usually use similar tech/have assistance	6

Makes it easier to work with scribe	3
Dyslexia	2
Curiosity	2
More comfortable	2
Do better work on computer	1
Doesn't like writing	1
Independence	1

Some of the comments and reasons given by students are given below.

Why did you want to use a digital paper for this exam?

Bad hand writing

To help me along with spelling  
and writing

As I feel I work best on a computer and do better  
work.

most people have trouble reading my handwriting  
also I'm a faster at typing than writing

Because I have horrible hand writing

I understand information easier on a pc  
I can type faster than I write

because my writing is too bad  
and I get a reader

It would allow me to choose to reread and read any part of the exam quickly without requiring a reader at the time.

because my handwriting IS VERY bad.

because its easier to use than a assistant reading and scribing

To help with my reading problem  
Also I am faster at typing than writing

Because it's easier to read than a paper copy. It's easier for me to describe my answers directly rather than using a scribe.

Typing into the paper is much easier than writing. Prolonged writing is difficult and causes a lot of pain.

Writing for long periods is painful. My writing is illegible - even to myself! It avoids the need for a scribe. I don't like using a scribe.

It is easier and quicker. It is preferable to see the question when typing in an answer, rather than typing into a blank document using a Word Processor.

The majority of students therefore elected to use digital papers because of difficulties with reading, handwriting or spelling.

The responses above demonstrate the difficulties faced by these candidates and gives reasons why digital question papers were chosen. For example, candidates with reading difficulties might choose digital question papers because they can be viewed magnified or with better colour contrast, or because the candidate can listen to the text or questions using text-to-speech software. Candidates with writing difficulties chose to use digital question papers because keyboarding was faster, easier, or produced more legible results, or because keyboarding and spellchecking produces more accurate text.

Later sections of this report attempt to analyse whether the digital papers, incorporating text-to-speech software to support reading, and keyboarding either directly into the digital question paper, or with a word processor, met these hopes and expectations of the students.

Several candidates used a combination of other support methods in addition to the digital question paper, including:

- reading the digital paper and handwriting responses (for example in Science where drawing was required);

- reading the digital paper and word processing answers (for example in papers that were not in question and answer format);
- dictating to a scribe who then typed answers into the digital paper.

It is important that centres and candidates have the flexibility to be able to use the digital question papers alongside other assessment arrangements. This is necessary to provide the most appropriate method of support to meet the needs of the candidate and the assessment criteria of a particular examination.

### Preparation and practice

Students were asked:

- whether they had used a digital question paper for the prelim;
- the number of digital past papers with which they had practiced before sitting the examination.

16 out of 31 students said they had used a digital question paper for their prelims. There is considerable variation across centres, departments within centres and across local authorities with regard to the nature of the assessments used for prelims. Some schools create their own prelim question papers from scratch, some base the prelim papers on several past SQA papers and some use materials from various educational publishers. Consequently, digital prelims developed by centre staff also varied in terms of format and style: some schools created Microsoft Word versions (with text-to-speech provided by specialist software, or *WordTalk*, the free text reader available from CALL); while others experimented with adding form fields to PDF documents.

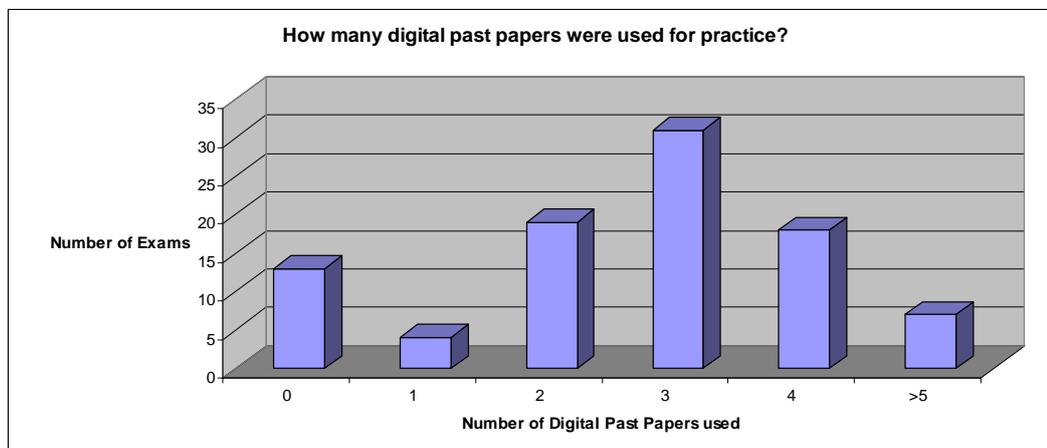
There was no particular pattern to the prelims that were made available in digital form in terms of subjects or levels: digital prelims were used or not used across the entire range of subjects.

The use of digital prelim papers did vary between centres. For example, all candidates at School C reported that they used digital prelims for all of their examinations, while there were no candidates at School E or School F who used digital prelims. As mentioned above, this reflects different practices and timescales used by different schools and departments. There did not appear to be any correlation between the candidate's view of the digital paper in the examination or the mark achieved, and the use or otherwise of digital prelims. In part, this may reflect the fact that a wide range of formats and technologies had been used for digital prelims, and so practice with a prelim in Microsoft Word format, for example, may not have much benefit when sitting an examination in PDF.

School	Number of students who used Digital Papers	Number of students who used Digital Prelims
School A	6	3
School B	2	2
School C	6	6
School D	2	2
School E	1	0
School F	7	0
School G	4	1
School H	3	2
<b>Total</b>	<b>31</b>	<b>16</b>

Students were asked to say how many digital past papers that they had used for revision and practice.

26 students out of 31 had practiced with digital past papers, using an average of 3 digital past papers prior to sitting the examination. Five students, who sat 13 examinations using digital papers, said that they had not practiced with digital past papers at all.



The lack of practice by the five students who did not use digital question papers for practice did not seem to adversely affect their experience in the actual examination, as all five made positive comments about the papers and stated that they would wish to use them again. One teacher wrote that: *G. is a bright student with a very positive, happy-go-lucky approach to his studies! He did not work through an entire paper digitally prior to today, but did have - and took- the opportunity to familiarise himself with how it would work. He loved it!*

However, we suggest that this does *not* indicate that practice with digital papers is unnecessary. Firstly, the students who used the digital papers chose to do so, and we would therefore assume that they were reasonably confident and competent in their use, with or without practice. Secondly, only those students who used the digital papers completed evaluation forms, and so there is no record of the amount of practice undertaken by the 3 students who did not use the digital papers in the actual examination. Of those three students, one student commented that he felt he did not have sufficient practice with the digital papers. In one instance, a student commented that he forgot how to access the spellcheck function in the digital paper.

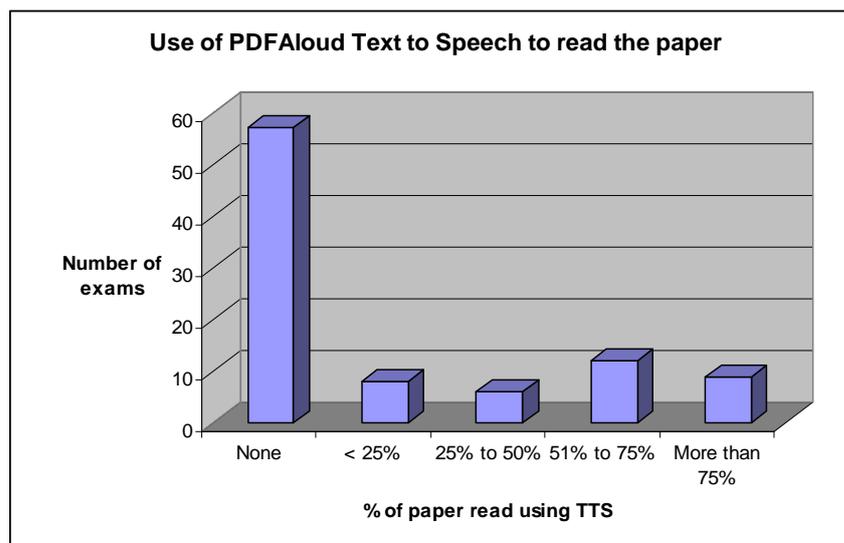
Six candidates suggested that practice with digital past papers was important, when asked what advice they would give to other students who might be interested in using digital papers.

Practice and experience in using digital past papers is therefore likely to have some impact upon the success or otherwise in the examination, and is necessary, but a more important factor is probably the student's basic level of ICT competence.

### **PDFAloud text-to-speech software**

Students were asked to estimate how much of the digital papers they had read using support from the PDFAloud text reader software: none; less than 25%; 25% to 50%; 50% to 75%; more than 75%.

Text to Speech (TTS) was used to support reading in 35 out of 92 exams (36%), by 10 out of 31 students.



Of the 10 students who reported that they used PDFAloud, 9 employed it for all of the examinations that they sat using the digital papers, illustrating that text-to-speech is not only helpful for reading papers with greater text content such as English. PDFAloud was used to read papers in Art & Design, Biology, Computing Studies, Craft and Design, Drama, English, Geography, History, Human Biology, Physics and Product Design.

Use of text-to-speech to support reading did seem to vary between schools, with all candidates at School B and School F using the software in all the papers sat. In contrast, none of the candidates at Schools A, D, E or H used PDFAloud for any papers. At School C, one candidate did use PDFAloud to a small degree (reading less than 25% of 3 out of 6 papers), while the other 5 candidates did not use PDFAloud at all.

School	Number of exams where...					Total no. of papers read with TTS	% of papers read with TTS
	TTS was not used	< 25% read with TTS	25 – 50% read with TTS	51 – 75% read with TTS	> 75% read with TTS		
School A	15					0	0%
School B				2	5	7	100%
School C	14	3				3	18%
School D	4					0	0%
School E	5					0	0%
School F		5	6	10	4	25	100%
School G	11					0	0%
School H	8					0	0%
<b>Total</b>	<b>57</b>	<b>8</b>	<b>6</b>	<b>12</b>	<b>9</b>	<b>35</b>	

Review of the evaluation forms completed by students shows that the main reason why these candidates did not use PDFAloud is that they did not have reading difficulties:

- The six candidates at School A all had problems with writing rather than reading.
- At School D, one student had mild/moderate learning and concentration difficulties and the other was dyspraxic, and both used the digital papers because of their poor handwriting.

- Similarly, the pupils at School C, School E and School G who did not use the speech identified handwriting or spelling problems as the main reason for using digital papers.
- At School H, the three pupils did have reading difficulties, but chose to use a human reader and scribe who typed their answers into the digital paper on screen.

The fact that all pupils at School B and School F used the text-to-speech in every examination, and to such an extent (students reporting that they read over half of 21 out of 32 papers with speech support), is of interest given that it was less popular in the other schools.

Table 8 compares requests for different types of arrangement to support reading the question papers across the schools who took part in the project.

<b>Table 8: Arrangements to support reading</b>								
	<b>School A</b>	<b>School B</b>	<b>School C</b>	<b>School D</b>	<b>School E</b>	<b>School F</b>	<b>School G</b>	<b>School H</b>
<b>Number of requests for:</b>								
Coloured Paper	7	80	0	0	0	0	28	0
Enlarged Print	12	11	0	0	10	0	0	0
Reader	6	97	18	11	63	27	14	24
Number of examinations where TTS was used:	0	7	3	0	0	25	0	0
<b>Total number of examinations where support was requested for reading</b>	<b>25</b>	<b>195</b>	<b>21</b>	<b>11</b>	<b>73</b>	<b>52</b>	<b>42</b>	<b>24</b>
<b>TTS as % of requests to support reading</b>	<b>0 %</b>	<b>3.8%</b>	<b>14.3%</b>	<b>0 %</b>	<b>0 %</b>	<b>48.1%</b>	<b>0 %</b>	<b>0 %</b>

Of the 35 papers that were read using PDFAloud, 25 (71%) of these instances were at School F. While there were more pupils at School F who used more digital papers than at any other school, the percentage of papers read using speech support is still greater. The most striking comparison is the use of text to speech and a human reader: School F pupils used text to speech to read question papers in almost as many examinations as they used a reader, whereas in the other schools the use of readers greatly outnumbered the use of text to speech. The underlying reasons for this were discussed at a Focus Group meeting held on 29<sup>th</sup> September 2006 and several factors were identified. Pupils at School F have access to the free *WordTalk* text reading software on all computers in the school, so they (and staff) may be more familiar with using text-to-speech for coursework and therefore feel more confident about using it in an examination. However, such software is also used routinely in most of the other schools and so other factors may be also relevant. Staff felt that familiarity with the software was important and some suggested that a key problem was the lack of laptop computers available for personal use by pupils, and therefore a lack of opportunity to practice. Another factor may have been accommodation and technical support. At School F, a small room was designated and fitted out with 5 PCs for the digital papers and therefore pupils had an opportunity to practice. Other schools were using machines in the library, support base or ICT suites and access for practice and revision may not have been as easy. Lastly, staff and students may also be been reluctant to choose digital papers for students with *both* writing and reading difficulties, compared to students with handwriting and/or spelling difficulties only, because it is arguably more challenging to use ICT to both read the paper and record answers than it is to just use the paper to type answers.

The fact that digital papers and text reading were successfully used almost as often as human readers at School F is noteworthy because it may indicate the potential for uptake of this type of adapted paper. In 2005 SQA received 15,740 requests for readers for examinations: if the experience at School F can be replicated then students could use digital papers with text-to-speech in 7,555 of these 15,740 examinations, significantly reducing the number of readers, invigilators and separate rooms required, while greatly increasing the independence of these candidates.

### **Student comments on Text To Speech**

There were only three comments by students specifically concerning the PDFAloud text to speech facility:

- One student said '*The voice was a bit mumbling*', although despite this she used the text reader successfully to read 5 papers, and commented that it was 'not as stressful, it's easier to sit the exam'.
- Another advised to '*Ensure you have the speech setting at what you are comfortable at.*'
- A student at School H said that he preferred the teacher's voice (to the computer voice), and therefore used a reader for the examinations, as did the other two students at School H.

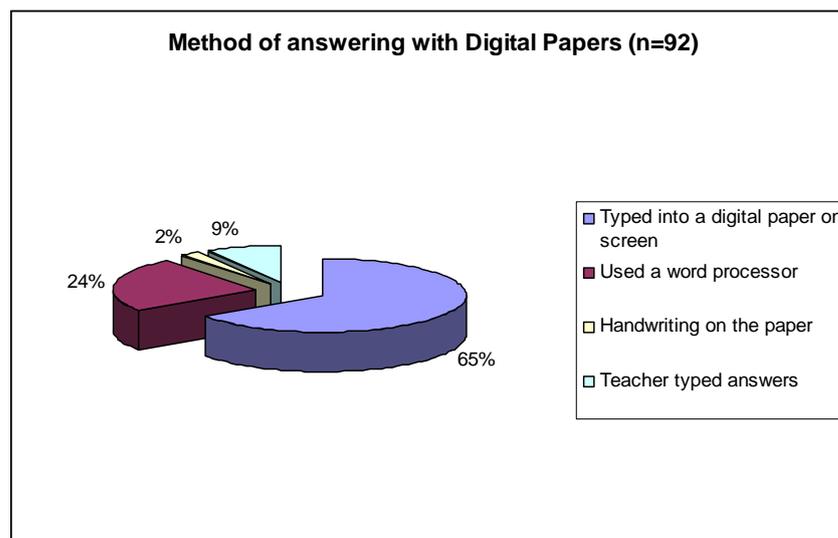
There is little evidence that the quality of the computerised voice was unsatisfactory for use in examinations. Staff at School B reported that one invigilator thought the text to speech software was faulty because it was talking so quickly, and asked the candidate to stop the examination so that it could be checked. In fact, the student had become so used to the voice that he had increased the speed to a level at which it was unintelligible to the invigilator (through the student's headphones).

Nevertheless, previous work (Nisbet, Aitken & Shearer, 2004) did suggest that voice quality may be an issue and so it is possible that students would be more comfortable, but not necessarily any more efficient or accurate, with better voices. One member of staff did note that pronunciation of technical terms in Biology was unclear and other staff noted that the pronunciation of material with equations and mathematical terms in Higher papers was difficult to make out. Staff suggested that the potential of higher quality voices and of inserting digital recordings of human speech into the digital paper should be explored.

### **Writing and answering**

Students were asked to record how they answered the paper, and offered the following options:

- typed into the digital paper on screen;
- handwriting on the paper;
- scribe;
- other.



As noted previously, 68 of the 92 examinations papers were in a Question and Answer format where candidates could type directly into the paper on screen. In 60 instances this facility was used; candidates used a word processor for 3; handwriting for 1 paper; and for 4 papers, a teacher typed the answers. Students therefore used the option of typing on screen in 88% of instances where this was possible.

Table 9 gives the different arrangements used to support writing across the six project schools. Across all the schools, the most common method was the use of ICT/word processor (40% of all requests for writing support), followed by scribe (36.5%) and then the digital papers (16.5%). Again, the methods used to support students varied between schools: for example 70% of candidates at School G using ICT/word processor and 15% used a scribe, whereas 10% at School E used ICT/word processor and 83% used a scribe. The potential uptake of digital papers to support writing is hard to estimate firstly because only just over half the papers are in question and answer format where it is possible to type answers in on screen. Candidates with writing/spelling difficulties only are likely to continue using a word processor for these question-only papers because there is little advantage in using a digital paper.

In 2005 there were 14,505 requests for use of a scribe, 1,920 requests for transcription of the paper, and 2,388 requests to use ICT across Scotland. If the percentage of candidates using digital papers in the pilot (16.5%) is extended across Scotland it would mean that there would be 3,104 requests for digital papers. If the uptake at School F (35%) was replicated there would be 6,584 requests for digital papers.

Achieving these levels of uptake will be challenging because the use of ICT in examinations nationally (11% of requests to support writing) is far less than in those schools who took part in the project (40% of requests). The schools who participated in the project are therefore making greater use of ICT already than the national average.

We would suggest that SQA, national, local authority and school policies should be put in place to have as many students as possible using digital papers and/or word processor in examinations rather than scribes or transcription of the paper because the latter are less independent and demand considerable staff resources.

Table 9: Arrangements to support writing								
	School A	School B	School C	School D	School E	School F	School G	School H
<b>Number of requests for:</b>								
Scribe	46	30	20	14	64	19	11	29
Transcription with correction	0	7	11	4	0	1	0	4
Transcription without correction	1	1	3	0	0	0	0	12
Use of ICT (word processor)	32	95	27	4	8	32	51	6
Tape recorder for responses	1	0	0	0	0	0	0	0
Number of digital papers used:	15	7	17	4	5	28	11	18
<b>Total number of papers where support was requested for writing</b>	<b>95</b>	<b>140</b>	<b>78</b>	<b>26</b>	<b>77</b>	<b>80</b>	<b>73</b>	<b>69</b>
<b>% of writing requests</b>								
<b>Digital papers as % of requests to support writing</b>	<b>15.8%</b>	<b>5.0%</b>	<b>21.8%</b>	<b>15.4%</b>	<b>6.5%</b>	<b>35.0%</b>	<b>15.1%</b>	<b>26.1%</b>

### Assistance from staff

An important aspect of digital papers is independence for candidates sitting the examination: students in the pilot study (Nisbet, Aitken, Shearer, 2004) felt that they were considerably more independent with digital papers than with a scribe or reader, and a major potential advantage of digital papers for schools and SQA is the prospect of a reduction in staffing.

We therefore asked students to say whether they had required help with the digital paper, or not. Only students at School H noted that they needed help (in the form of a member of staff to read the paper and/or type answers) for 8 papers

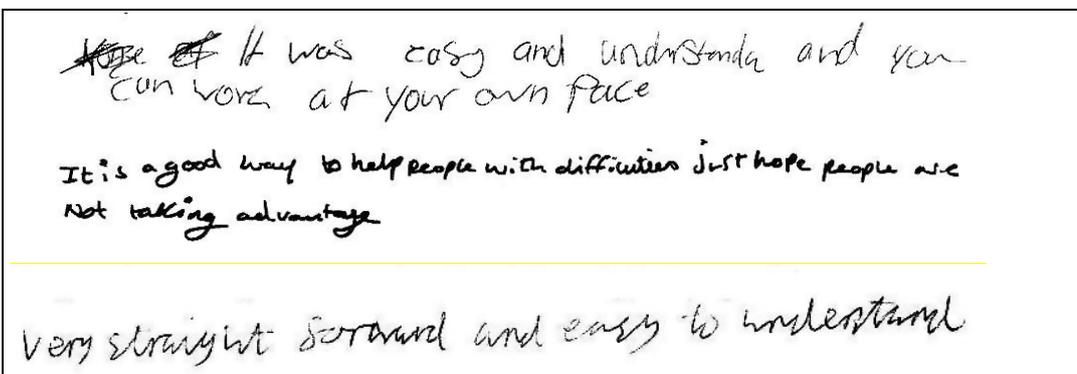
### Comments from Students

Students were asked three open questions to gather their personal opinions about the digital papers:

- “Do you have any comments about the digital papers?”
- “Do you have any advice for other pupils who might use digital papers?”
- “How well do you think you did in this exam?”

### Comments on the Digital Papers

Students were generally very positive even when giving feedback about difficulties they had faced, or aspects of the papers that were unsatisfactory. The most common comments were that they found it easier, faster and less stressful to type into the paper on screen, compared to handwriting on the traditional paper.



Much easier than trying to write!

Prefer it to using a scribe. Easier to give answers.

Easy to do. You can see both the questions and the text at the same time.

Enjoyed using it!

#### Suggestions for improvement

Two students commented that they would like dual screens in order that they could see two papers, or different parts of the same paper, at the same time. One student suggested that it would be helpful to be able to draw graphs and lines. (Acrobat Standard does have basic drawing tools; perhaps the student was unaware of this, or did not find them helpful or easy to use.) Another student noted that text typed into form fields sometimes shrunk (see below). This was because Adobe Acrobat form fields are a fixed size and if too many lines of text are typed in to fit the box, the text can either be set to reduce in size so that all the answer can be seen, or the box can convert to a scrolling field. The former was used because with a scrolling field only the visible section of the answer can be seen when the paper is printed out.

I would prefer to have split screens so that I could see questions and tables together instead of having to refer to another page.

Typing into the paper occasionally produced very small sized print on screen.

#### Advice to other students

The most common suggestions given were to practice and revise using the papers, and practice typing.

#### Self-assessment

One student thought she had not performed well in one exam: *“Bad. I think I failed didn't understand some of it.”* Of the other 75 comments given, 44 (58%) were neutral (*“OK”, “fine”, “alright”, “Quite well”*) and 31 (41%) were positive (*“Good”, “Well”, ““Hopefully passed! Felt that exam was easier than anticipated.”*)

#### Would students use digital papers again?

Students were asked whether they would use a digital paper again for exams in the future. 28 (90%) out of 31 students said that they would use digital papers again and 3 did not know. There were no students who did not wish to use the digital papers again.

#### Should SQA provide digital papers for examinations?

30 students responded to this question and all wished SQA to provide digital papers for examinations, because, for example: *“They are easier to use.”; “it is much easier to use than a reader”; “It is easier you can see what you've written if your writing is bad.”; “It would be easier for markers to read it.”; “provides equal chances for people with problems”; “Not as stressful, its easier to sit the exam. Its fairer.”; “It helps pupils get more answers right as they will understand questions better.”*

One student felt that the papers should only be provided *“to certain people”,* that *“there should be a choice”* because *“not everyone is used to typing on a computer”.*

It give equal opportunities for people who would be marks due to bad handwriting

It allows quick access to reading tools and speeds up the process for the pupil

because it's good, it's not a nervous experience.  
Compared to the hall.

It is easier to understand  
Don't feel as stressed or rushed.

It helps you to understand the paper better

It allows an people to have an equal chance if they do not have bad handwriting or something else.

Not everyone is used to typing on a computer  
Maybe a choice whether you want to do one or not

It's easier and less stressful than having to write it yourself.

Papers are simpler to use. You do not have to fiddle about with different papers. By switching windows, you can see both the question and the text at the same time.

Digital paper is easier to use. It is easier to type answers in rather than write them in.

It saves time. It is simpler to use. You don't have to fiddle with lots of paper. You can see the text and the questions at the same time.

It makes it easier for many pupils to do their papers this way.

Because it is much easier to use than a reader

## Analysis of Student Attainment

The following analysis was undertaken and written by SQA personnel and considers:

- The relationship between actual result and teacher estimate for each entry using a Digital Question paper.
- The relationship between actual result and teacher estimate for all entries for the candidates involved in the pilot, whether using a Digital Question paper or not.

The major issue with this analysis is the lack of data. There are very few candidates involved and they take a wide range of qualifications. So for each qualification, the fact there may only be one candidate from a centre using a digital paper makes meaningful analysis difficult. Bearing these issues in mind the following results are presented.

### Data

The data for this pilot involved 31 candidates at eight centres sitting Digital Question Papers - 12 candidates for National Courses only, 19 at Standard grade only and two candidates sat both a National Course and a Standard Grade. These papers were taken in eleven different subjects at National Course levels - Intermediate 1, Intermediate2 or Higher, and thirteen subjects at Standard Grade level.

The total entries<sup>1</sup> for the candidates involved comprised a total of 121 at Standard Grade and 49 for National Courses. Each candidate took up to five National Courses and/or up to eight Standard Grades.

<b>Table 10: Total Number of Entries for candidates who sat a digital paper</b>			
<b>National Courses</b>		<b>Standard Grade</b>	
Total courses	No of entries	Total courses	No of entries
1	0	1	1
2	2	2	1
3	5	3	1
4	2	4	2
5	5	5	5
		6	2
		7	2
		8	7

The total entries using Digital Question papers were 38 at Standard Grade and 25 for National Courses. Candidates took up to a maximum of four National Courses or four Standard Grades using a digital paper.

<b>Table 11: Total Entries using a Digital Question paper</b>			
<b>National Courses</b>		<b>Standard Grade</b>	
Total courses	No of entries	Total courses	No of entries
1	10	1	9
2	0	2	8
3	1	3	3
4	3	4	1

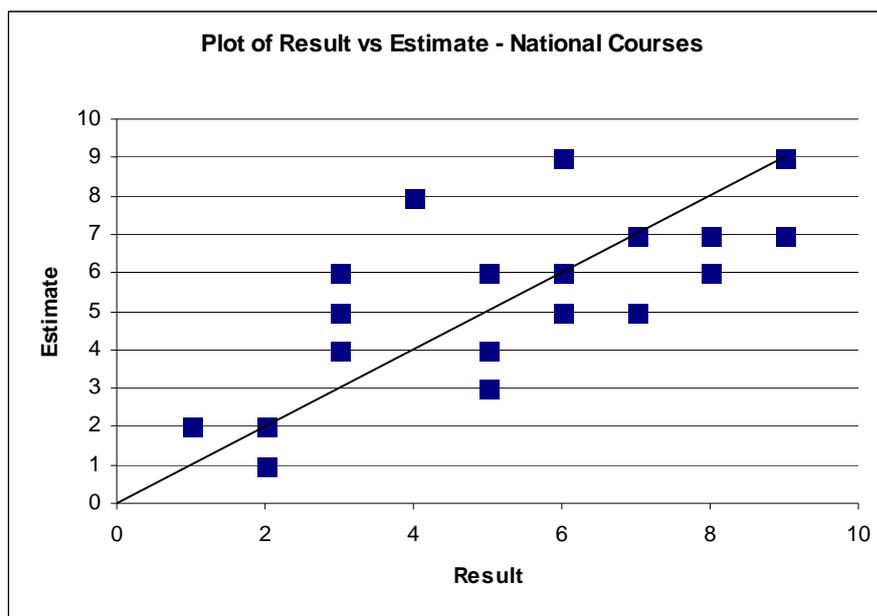
<sup>1</sup> Entries, examinations and papers are all different. A candidate who is entered for Standard Grade English, for example, will usually sit three separate examinations – two Reading examinations at either Foundation and General, or General and Credit, and one Writing examination which covers Foundation, General and Credit. These involve a total of five question papers – two Reading Text, two Reading Questions, and one Writing paper.

### Digital Papers' Results and Estimates

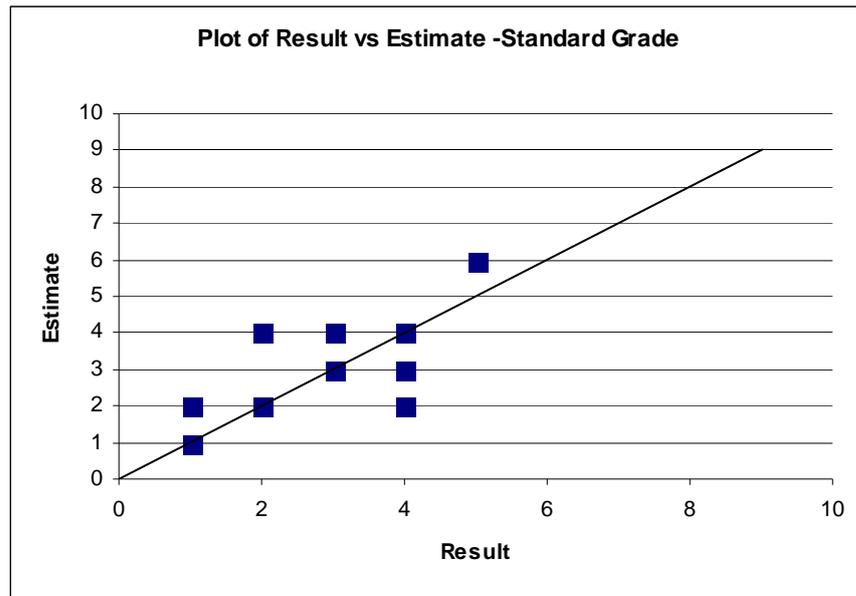
Table 12 looks at the relationship between the teachers' estimate and the actual result gained for each candidate's entries where Digital Papers were used. In all but 3 National Courses entries (88%), candidates gained within two bands of their estimate and at Standard Grade all entries gained a result within two levels of their estimate.

Table 12: Differences between result and estimate by Qualification type				
National Courses			Standard Grade	
Difference between result and estimate	No of entries		Difference between result and estimate	No of entries
Same band	8		Same level	23
±1 band	9		±1 level	12
±2 band	5		±2 level	3
±3 band	2		±3 level	0
±4 band	1		±4 level	0
Total entries	25		Total	38

The following graphs show the results and estimates for each entry where a digital paper was used, for National Courses and Standard Grade separately.



The lower value results represent higher attainment— candidates achieving bands 1 or 2 are awarded an 'A'; 3 to 4 a 'B'; 5 to 6 a 'C'; 7 a 'D', and bands 8 or 9 are unclassified.



Again, the lower value results for Standard represent higher attainment, from bands 1 to band 7.

### The Use and Non-use of Digital Papers

Tables 13a and b analyse the complete performance of these 31 candidates in all their entries, with respect to whether they used a digital paper or not. In each case the average result is 0.1 better than the estimate. Note that there is very little data as some of the results and estimates were not valid.

Table 13a: Average result and estimate by type of question paper – National Courses			
National Courses	No of candidate entries	Average result	Average estimate
With Digital Paper	25	4.5	4.6
Without Digital Paper*	20	4.3	4.4

\* seven entries with no estimate or result

The following graphs are similar to the ones above but they include results and estimates from the entries using Digital Question papers and those not for the same candidates.

It can be seen from the graphs that there is variation in the relationship between result and estimate whether a digital paper was used or not: The largest difference between result and estimate being as much as four bands for entries where a digital paper was used and three bands when a digital paper was not used. However, mostly the results are within two bands of estimates with no discernible difference where digital papers have been used.

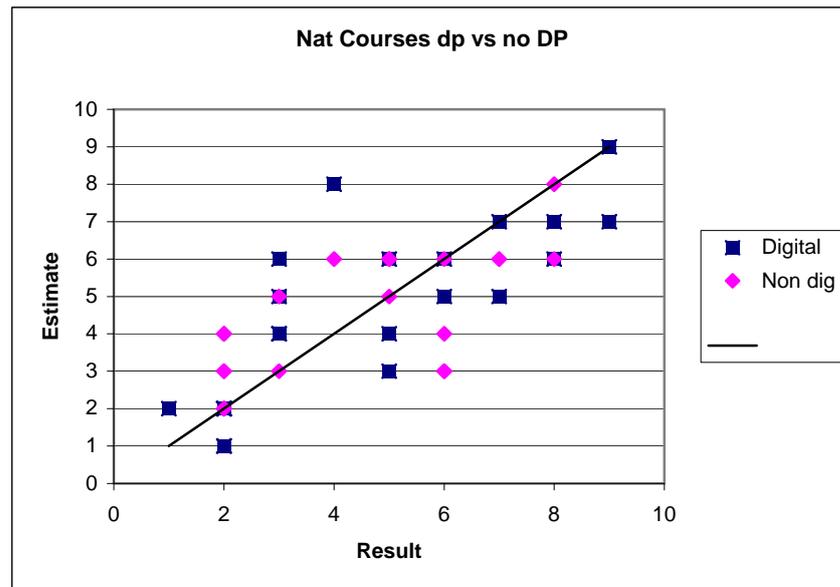
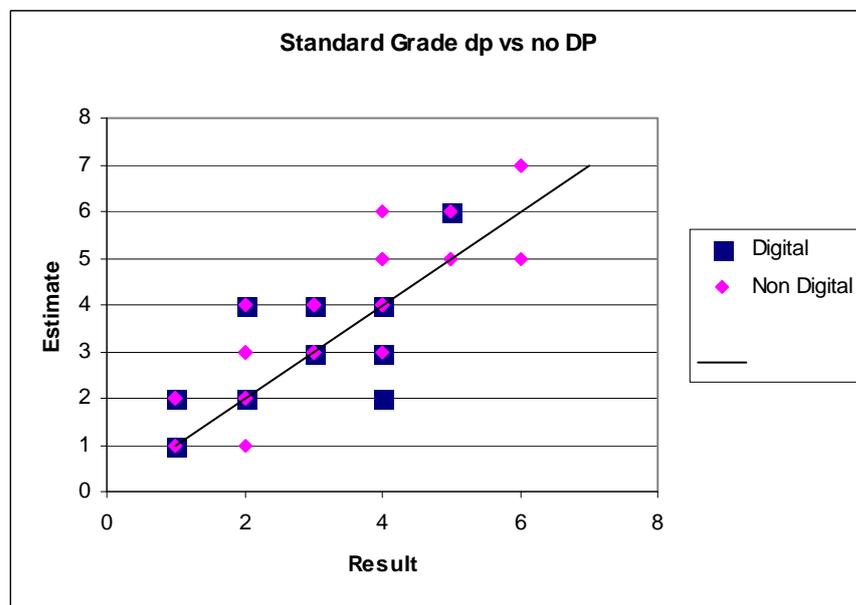


Table 13b: Average result and estimate by type of question paper – Standard Grade Courses			
Standard Grade	No of entries	Average result	Average estimate
With Digital Paper	38	2.9	3.1
Without Digital Paper	83	2.9	3.4

The average result is again slightly better than the average estimate irrespective of paper type. The improvement is more noticeable when the ‘non Digital’ papers was used.



The result and estimate relationship is closer at Standard Grade with all results being within two bands of the estimate for all paper types.

## **Conclusions**

The small scale of this study makes it difficult to make meaningful comparisons. However there is no evidence to say whether candidates using Digital Question papers are unduly affected by their use.

Candidates' results from digital papers are similar to their teachers' estimates – more noticeable at Standard Grade than at National Course level, but this is due to only three entries.

When comparing estimates with results, there appears to be little difference between entries using digital papers and the other entries sat by the same candidates.

The differences between result and estimate for the candidates using digital papers are not, in general, much different from the average difference for the other candidates in the centre sitting the same course.

## Feedback from Staff and Centres

### Method

Telephone or face to face interviews were carried out by the project team, with one or more staff who had been involved in administering the digital papers in the eight Centres. In some cases Centre staff completed the questionnaires themselves, while in others the comments made were recorded by the project team: comments written or recorded verbatim from Centre staff are in italics.

### Question 1: Staff views on students' use of digital papers

#### Questions:

Please give your general impressions about your students' abilities when using the digital papers (if there was variation between different students or subjects please give an overall rating and then give more details below):

	Very low				Very high
Confidence with digital papers	1	2	3	4	5
Independence with digital papers	1	2	3	4	5
Motivation with digital papers	1	2	3	4	5
Expertise with digital papers	1	2	3	4	5

For comparison, please give your general impressions about your students' abilities when using traditional printed format:

	Very low				Very high
Confidence with traditional papers	1	2	3	4	5
Independence with traditional papers	1	2	3	4	5
Motivation with traditional papers	1	2	3	4	5
Expertise with traditional papers	1	2	3	4	5

Do you have any particular comments about individual students who used the digital papers?

Do you have any particular comments about particular subjects in digital format?

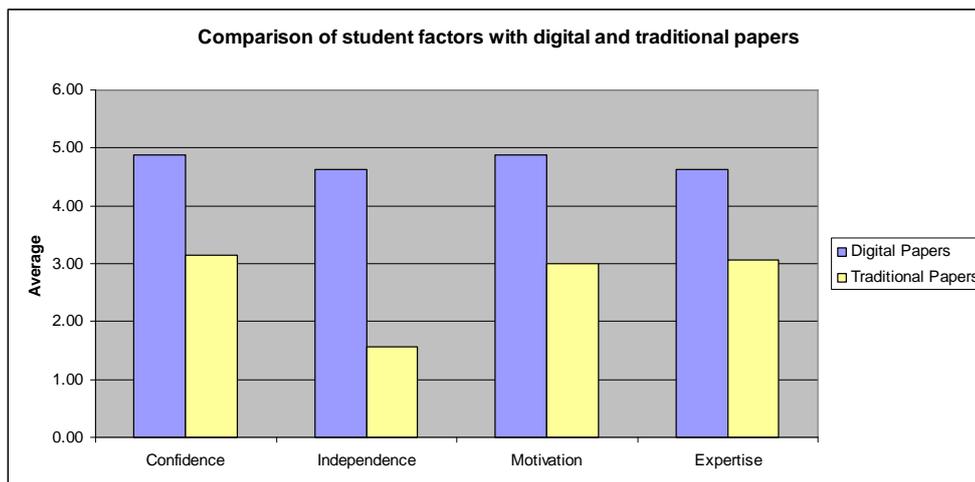
#### Responses:

Most staff felt that most students were more confident, independent, motivated and skilled when using digital papers, than with traditional papers and accommodations. One teacher commented that parents as well as pupils were positive about the papers. The most striking comparison is in terms of independence, with staff giving an average of 4.63 out of 5 for digital papers compared to only 1.57 for traditional papers.

**Table 14a: Question 1 - Summary of Staff views of Students' use of Digital Papers**

Student factors using Digital Papers	Average	School A	School B	School C	School D	School E	School F	School G	School H
Confidence	4.88	5	5	4	5	5	5	5	5
Independence	4.63	5	5	4	5	5	5	3	5
Motivation	4.88	5	5	4	5	5	5	5	5
Expertise	4.63	5	5	3	5	5	4	5	5

Student factors using Traditional Papers	Average	School A	School B	School C	School D	School E	School F	School G	School H
Confidence	3.14	3	3	2	3	5	3		3
Independence	1.57	1	2	2	1	3	1		1
Motivation	3.00	4	5	1	3	3	2		3
Expertise	3.07	3	3	2	3	4	3.5		3



These results are not unexpected given that staff had identified students who were likely to benefit from digital papers, and that students should have received instruction and practice in using the papers, but nonetheless are still highly satisfactory. Staff were asked to give general ratings across all the students and subject papers, and to expand on any individual variations, but staff at School G did not feel it was possible to give an overall score because of variations between students.

Comments from staff suggested that the majority of students found the digital papers motivating and easy to use, for example: *pupils who actually used digital papers were even more expert than anticipated - their concentration was total and their expertise in using the papers was commented on by invigilators and other candidates making conventional use of computers in exams.* (PT SfL, School B)

Staff at School A, a school for students with physical difficulties, noted that the candidates are very skilled in using ICT and use it in normal classroom practice so to have to use traditional papers in the exam can disadvantage them.

In School H, the teacher used the computer to scribe (i.e. type answers) for the two candidates, and noted that this was helpful because the candidates could see their answers more easily than using handwriting.

Motivation was greater for one candidate because he was more confident that the marker could read the answers, and staff at two schools commented on an improvement in concentration. One teacher noted that the digital papers allowed a more inclusive approach to the assessment situation because candidates did not need to be segregated in the examination from their peers.

There were a few exceptions to the overall positive reaction; one candidate decided that the benefits were not enough to justify using the method and one withdrew due to a lack of confidence with the technology. One staff member felt the timescales to which the

project team and schools were working meant that there was not enough time for staff and students to practice and prepare. One student failed to find the spellcheck facility in one paper.

Staff at three schools said that the candidates found the combined question and answer papers, where answers could be typed in on-screen, to be easier to complete than those presented in the form of a PDF question paper with answers typed into a separate word processor document, because the latter required switching between different windows or applications. The presentation formats varied between subjects and also levels: for example, the Administration Standard Grade General paper had form fields for answers, whereas the Credit paper had none, so candidates had to write their answers on a separate Word Document. One teacher noted that this difference between levels caused one pupil to withdraw from using the digital paper, who later felt they would have benefited from using the digital format.

Options for adding form fields for answers to question-only papers are probably limited given that this would probably require the paper to be re-designed at the layout stage. A strength of the approach used in this particular project is that the digital papers did not require any re-design – only the addition of form fields for answers, where the paper was question and answer. However, given the advantages of the combined question and answer interactive format, we suggest that SQA should consider how more digital papers might be presented in this way.

One alternative to adapting question-only papers by inserting answer boxes is that answer booklets could be provided in either PDF format (with form fields for answers) or as Microsoft Word templates. Some schools provided candidates with suitable templates and it would be helpful if such templates could be made available for all schools and subjects.

The comments from staff regarding issues on particular subjects were generally positive. Staff at two schools expressed concerns about Maths and Science. These papers may require formulae with scientific or mathematical notation, which cannot be produced easily on screen using Adobe Standard. Similarly, some papers require graphs to be produced which are difficult to draw on screen using the Adobe Standard drawing tools. One teacher expressed some concern over the pronunciation of words by the PDFAloud text reader, because she felt that correct pronunciation was vital to the meaning.

The issues regarding maths and science papers were highlighted in the previous pilot project and despite these, staff and pupils still chose to use the digital papers for science and found them effective. Therefore, there is likely to be a small demand for maths and science papers in the digital format. We recommend that further work is carried out to determine what options, if any, exist for producing maths and science papers where formulae and graphic work can be produced more easily on screen.



in a relatively short timeframe. The fact that the papers were reliable is also clearly extremely important and relevant for any future implementation on a wider scale. SQA staff produced and checked:

- 57 different digital papers (for 18 different subjects, across 6 different levels from Standard Grade Foundation to Higher);
- 111 individual CDs (one per paper per candidate).

	School A	School B	School C	School D	School E	School F	School G	School H
Reliability of digital papers (1 = very low; 5 = very high)	5	4	4	5	5	5	5	5

Of the 57 different digital papers produced, 32 were Question and Answer format to which the SQA team added form fields for candidates to type in answers. A total of 2348 form fields were added: an average of 73 per paper, ranging from 7 fields for a worksheet for the Geography Intermediate 2 paper, to 183 fields for the Computing Intermediate 1 paper.

Centre staff made a number of comments and suggestions about digital question papers:

- The time that was required to install individual papers from CDs for each candidate: with even only a handful of candidates, this was time-consuming and staff-intensive. There is therefore an argument in favour of making papers available to schools from a single location on the school network (or, potentially, from a secure area on the SQA web site.)
- Poor pronunciation of scientific or technical terms by the PDFAloud text reader. The latest PDFAloud authoring tool has a facility for adjusting pronunciation of individual words, which, although time consuming, may be worth considering.
- The digital question papers required Adobe Acrobat Standard 6 and some schools had other versions of Acrobat installed: if the candidate double-clicked on the paper, then sometimes it would open in the wrong version, which might not have PDFAloud text reading, or may prevent answers from being saved. Although the schools and candidates had instructions and documentation noting this, it may be necessary to make guidance clearer.
- Similarly, one school initially followed a set of instructions for printing that were written for an earlier version of Acrobat, which did not function correctly for the later version used in the pilot. This was quickly rectified but indicates the importance of checking documentation for staff and candidates.
- One teacher felt that there should be better instructions for using the spellchecker.

These comments should be considered when updating guidance and documentation, and designing training and CPD for schools who may be using digital papers in the future.

**Question 4: Reliability of computers**

Table 17: Question 4 – Reliability of Computers								
	School A	School B	School C	School D	School E	School F	School G	School H
Reliability of computers (1 = very low; 5 = very high)	5	4	5	5	5	5	5	5

General reliability seemed high, and from comments made in response to this and the following question, this was due in the main to the efforts of Centre Support for Learning and technical/computing staff. These issues are discussed in greater detail in the next section.

Only one school experienced a significant difficulty with the computers used for the pilot, when the whole school network crashed on the day of the Higher History exam, and the pupil transferred to a back-up stand alone laptop.

**Question 5: Arrangements for administering digital papers****Questions:**

Please describe the arrangements you made to administer the digital papers:

(e.g. type / age of computer; how many computers in how many rooms; installation of software and papers; printing and saving; whether your computers were networked or standalone; staff required to install / administer; security; invigilation; etc)

Please rate the demands on resources required (staffing, accommodation etc) for using digital papers, compared with your traditional forms of support (e.g. readers, scribes, adapted papers etc):

	Very low Demands				Very high Demands			
Staffing for digital papers	1	2	3	4	5			
Staffing for usual support	1	2	3	4	5			
Accommodation for digital papers	1	2	3	4	5			
Accommodation for usual support	1	2	3	4	5			
Invigilation for digital papers	1	2	3	4	5			
Invigilation for usual support	1	2	3	4	5			

**Responses:**

Staff were asked to describe the arrangements made to administer the digital papers, and to compare the demands on staffing, accommodation and invigilation with traditional methods of support such as the use of readers or scribes.

Table 18a: Question 5 – Summary of arrangements for each school	
School	Arrangements
School A	The six candidates used 'quite old' networked machines located across different subject classrooms. Where possible more than one candidate was accommodated in one room. Staff noted that it took a teacher 'a full day to create Off-network Login' to allow access to printing. Software and paper installation and support was provided by teaching staff.
School B	A total of 16 standalone machines for candidates using word processing for examinations as well as the 3 candidates using digital papers were set up in a large room by school Computing staff. Acrobat Std and TextHelp Read and Write Gold was installed on six machines specifically for candidates using the digital papers. (School B is in an authority which has a licence for Read and Write Gold; a software package that includes the PDFAloud text reader.)

	<p>Support for Learning and Computing staff installed papers and provided support. Teachers noted that 'no technician help was provided'. Candidates were issued with memory sticks for the exam diet and papers and 'back up' folders were put on the desktop so candidates could save a copy there. Memory sticks were collected by invigilators at the end of each paper. A classroom assistant was designated to print scripts from the memory sticks at the end of each exam as determined by the chief invigilator. Computing staff helped in cases where the paper was not saved on the memory sticks - no papers were 'lost'.</p> <p>For papers which were not question and answer format, a Word template with candidate's name, SCN, Centre number etc was set up in advance for each candidate.</p>
School C	<p>3 networked PCs with new larger screens were located in one room for the 3 candidates using digital papers. The software was installed by the school technician who was also available during exams if required. Each PC had a dedicated printer: one printer in the same room and the other two next door. There were no problems with either saving or printing. The Chief Invigilator was very interested in the pilot and personally ensured arrangements were in place each day. The Invigilator allocated to the digital exams was specially chosen for their IT knowledge. Several members of staff were involved as this was the first time of using this format of exam. In future, less staff need to be involved. Difficulty was encountered in arranging the PCs so that, where there was more than one candidate doing the exam, candidates could not see each other's work (especially with the new bigger size screens). For security, different profiles and passwords were set up for the exam material.</p>
School D	<p>The 2 candidates used a standalone 'good' laptop set up in a separate room with printer attached. The system was set up and software and papers installed by an ICT classroom assistant and Support for Learning staff invigilator were present. A backup laptop was available. No staff were present during the exams but the invigilator had instructions and a phone number to call for technical support if necessary.</p>
School E	<p>The candidate used a stand-alone laptop and direct printer for security, located in the library. The candidate logged on as the PT SfL, not his own login. Software was installed by CALL staff with assistance of the ICT Coordinator. The papers were installed by the PT Support for learning in the hour prior to the exam. Papers were printed direct to the SfL inkjet printer after each exam. Staff noted that this took too long between the General and Credit PE papers.</p>
School F	<p>9 candidates used digital papers. 5 new computers were set up in one room with the relevant software by the school ICT Technician the week before the exams. The technician created special user accounts to allow access to printers and folders for back up of exam files, and to give access to the speech controls in PDF and WordTalk. Internet access and access to the network was forbidden. Staff noted that 'having the machines networked to allow printing was important' and that 'The quality and enthusiasm of the Technician is an absolutely vital component'. The technician was present at the start of the exams; as they progressed he was not needed but still available 'on call'.</p> <p>Staff commented that it was time consuming to load the papers on several machines and suggested that it would be more efficient if the paper could be made available on a shared folder (ideally password-protected and/or time-locked) on the network, preferably before the day of the exam.</p> <p>Staff also suggested that Word Document Templates for answer sheets would be very useful for the exams without the form fields.</p> <p>Staff were concerned about security of the digital papers because of the need for staff (rather than invigilators) to load the papers on to the computers, and because many staff had access to the school safe where the digital paper CDs were stored.</p>
School G	<p>Five 3 year old standalone desktop computers were set up by the school AV technician, for the 4 candidates, in a room borrowed from the Business Studies department for the exams. Support for Learning staff with assistance from CALL installed the software and the digital papers. Each candidate saved their papers to a floppy disc, and the papers were then printed on a laser printer connected to one of the computers in the room. A single printer shared in this way was insufficient because of the time it took to print a completed paper.</p>
School H	<p>Two networked computers were located at opposite ends of the Library for use by 3 candidates. This meant that the Library was out of use on the days of the exams and that two invigilators were required because the candidates were, in effect, in two separate rooms. The school network administrator installed the software and digital papers and was available at all times. Both candidates used the PDFAloud text reader software to read the papers, and dictated answers to staff who typed their answers into the interactive papers.</p>

### *Accommodation*

Schools used a range of types of accommodation for the digital papers, ranging from subject classrooms, other rooms, and the school library. None of the Centres used school ICT suites because this would have interfered with timetabled classes. Although all Centres reported that accommodation demands were lower than when using traditional methods of accommodation, it is clear that finding suitable accommodation did present a challenge and if the number of candidates increased, this would be exacerbated.

From the comments given by staff, it would seem that the most efficient accommodation (for installation of software and digital papers, technical support and invigilation, and printing papers) involves the use of a single room for the duration of the examination diet, with suitable hardware (see below). The size of the room will limit the number of candidates and computers that can be accommodated: as staff at School C pointed out, it is important that candidates cannot see other candidates' screens. In addition, given 'turnaround' time (for printing papers for example), use of digital papers on a large scale in a school may require several rooms so that one examination can start while another is finishing.

### *ICT resources*

Centres used a mixture of standalone and networked laptop and desktop computers. Standalone computers had the disadvantage of requiring completed papers to be saved and transferred to another computer for printing (unless dedicated printers were available for each computer). It appeared that networked machines, preferably with a high ratio of printers to computers, provided a more efficient approach. Networked computers required the Adobe Acrobat and PDFAloud software and digital papers to be installed, and suitable user profiles to be set up (to provide access to printing and adjustments to settings, such as the PDFAloud voices, but restrict access to the internet or general school network).

Time for printing completed papers at the end of the examination was an issue in centres with shared, slow printers. Centres should therefore be advised to use fast laser printers.

Good quality network systems and technical support was essential in schools that used networked computers, and those schools with high quality support from technical staff appeared able to administer the examinations smoothly and efficiently. While Computing or Support for Learning staff in Centres which did not have on-site or readily available technical support coped admirably with setting up computers, installing software, and providing technical support during examinations, the impression given was that this was time-consuming and made smooth administration more difficult.

This has implications for local authority as well as school ICT support policies: staff in School B and School G (in a local authority where provision of ICT and technical support is contracted out), for example, were very critical of both their networked computers and the quality and availability of technical support, and felt they had no option than to use machines that belonged to the Support for Learning department, and to carry out technical functions themselves. In contrast, staff in other schools where ICT support was provided by education authority personnel seemed to be able to rely on high quality and readily available on-site technical support.

### *Installing digital papers*

Each digital paper for each candidate was supplied on a separate CD, and the paper had to be loaded on to the computer up to one hour before the start of the exam. With even a relatively small number of candidates (such as four), copying, opening and checking the papers was time-consuming and several staff suggested that it would be more efficient if the papers could be copied once to a network folder, and then opened on each machine.

### *Invigilation and security*

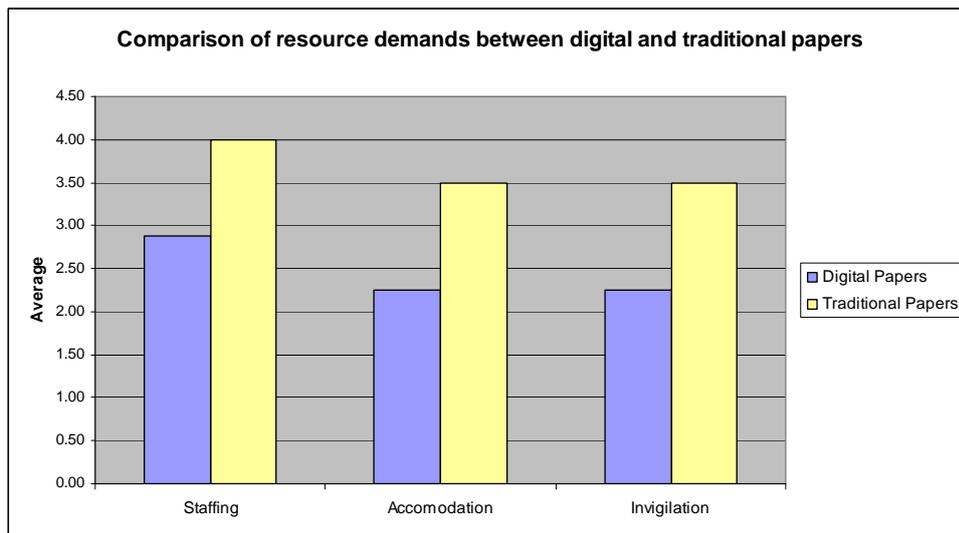
Centres did not report any particular difficulties with regards to invigilation of the digital papers. In the main, Centres were happy with security arrangements although one teacher thought that it would be safer if the papers could be either time-locked or password

protected. This might also offer possibilities for more efficient distribution of papers via school intranets, or even direct from a secure SQA web site.

*Demands on resources*

Staff were asked to compare resource demands using digital papers, with traditional methods of support (see table below, where 1 = very low demands; 5 = very high demands).

Table 18b: Question 5 – Summary of Demands on Resources									
Demands on Resources:	Average	School A	School B	School C	School D	School E	School F	School G	School H
Staffing for digital papers	2.88	4	2	3	2	3	2	4	3
Staffing for usual support	4.00	4	5	4	4	4	5	3	3
Accommodation for digital papers	2.25	2	2	2	3	1	1	4	3
Accommodation for usual support	3.50	4	5	4	3	1	5	3	3
Invigilation for digital papers	2.25	2	2	2	3	1	1	4	3
Invigilation for usual support	3.50	4	5	4	3	1	5	3	3



Centre staff generally felt that the demands on staff, accommodation and invigilation were less compared with established forms of accommodation (such as readers, scribes, adapted papers, etc) in assessments.

**Question 6: SQA Communication: How effective was communication by/with SQA for the administration of Digital Papers**

This question was designed to uncover issues around guidance and support required by Centres in order for them to administer digital papers effectively and efficiently. Centre staff were generally very positive with the support and information provided by SQA and CALL.

There were some specific comments about the documentation provided to Centres: two teachers asked for clearer guidance on the version of Adobe Acrobat that was to be used, and how to open papers. One teacher noted that it was necessary for SQA to check each form field to ensure that answers could be made correctly.

Table 19: Question 6 – Effectiveness of Communication by/with SQA									
Communication by/with SQA (1 = very low; 5 = very high)	Average	School A	School B	School C	School D	School E	School F	School G	School H
Effectiveness of information/guidance	4.5	5	5	3	5	5	5	5	3
Effectiveness of support	4.875	5	5	4	5	5	5	5	5

Staff at three Centres felt that invigilators would have benefited from training and/or more guidance. Another teacher thought that the role of the Centre SQA Coordinator and the Support for Learning department should be clarified, given that the Coordinator may not be familiar with the individual students or the technological requirements. Some staff felt that the procedure after the examination (completing the evaluation form, collating completed papers and CDs) was onerous. This of course only applied to this pilot trial and would not occur in the future.

**Question 7: Advice for Centres who might use Digital Papers**

**Question:**

Have you any advice for other centres who might be using digital papers in the future?  
(e.g. which students might benefit and for which papers; accommodation; staff and resource costs; staff and student training/preparation; delivery of the papers on CD; installation of software and papers; basic access to suitable computers; technical reliability; printing and saving; networking; security; invigilation; etc)

**Responses:**

By posing this question, we hoped to elicit details and advice that could be incorporated into guidance documents and procedures for Centres who might use digital papers in future years.

- Staff noted that good planning, preparation and training is needed for staff, students and invigilators. Teachers noted that this applied to senior management, technical colleagues, and subject teachers, in addition to the

Support for Learning staff who are most likely to be leading the administration of the digital papers.

- Candidates need practice with past papers (and therefore digital past papers would have to be made available) to develop satisfactory keyboarding, IT skills and confidence.
- Adequate staff resources are required: technical support to set up computers, install software, load and check papers, and provide support during exams. If dedicated technical support is not available on site then Computing / LS time must be allocated, although in our opinion such technical support should be undertaken by technicians, not teachers. It is clear that those Support for Learning or other teaching staff who are involved in administering digital papers must be timetabled to do so: *'Don't be acting as Reader/Scribe for another candidate if you're loading/printing digital papers for the same exam!'*
- Sufficient staff need to be involved and trained to administer the papers in case of absence.
- A budget for purchase of Adobe Standard licences is required.
- Several staff commented that it is important to use good quality, recent and reliable computers: *'schools need to have the best possible machines available for exam candidates'*. Screens, keyboards and mice should be cleaned before use. Machines must be positioned in comfortable, ergonomic positions, especially if candidates have any visual or physical accessing difficulties. Laptop computers present particular issues: guidance from the Health and Safety executive, and good practice, suggest that laptops should be placed on stands to raise the height of the screen, and that external keyboards and mice should be used.
- One teacher suggested that candidates should use the same computer for each exam where possible.
- Experience and comments suggest that it is more efficient to use networked computers and printers, but only if the network computers are flexible and good technical support is available. If restrictive network software or poor technical support prevent the installation and configuration of the Adobe Standard and PDFAloud software (even although such restrictions are likely to be illegal under Disability Discrimination legislation) it may be necessary to use standalone computers.
- It is advisable to set up password protected user profiles for the examinations, which allow printing and adjustment to settings in PDFAloud, but which restrict access to the internet or to work folders on the computer or school network.
- Fast laser printers, with one networked printer shared between only two or three candidates enables papers to be printed quickly at the end of the examination.

- If printers are not networked staff thought that USB memory sticks were easier to manage (provided that network software permits them to be used) than floppy discs, for transferring completed papers to another computer for printing.
- Computers to be used for digital papers should be set up and accommodated for the duration of the examination period.
- Staff noted that it was important to obtain support and backing from colleagues and senior management (particularly where negotiations may be involved with subject departments over accommodation and hardware).
- Similarly, it is important to involve parents.
- Several staff felt that it was important to develop the use of technology for NABs, prelims and other assessments. NABs and 5-14 Assessments are currently made available by SQA in Adobe PDF, and so they could be made accessible with *PDFAloud* or *Read and Write* speech technology, and form fields for answers could be added in order for pupils to type their answers. Such adaptation could be undertaken by individual schools but it would be more efficient if SQA performed this function. Alternatively, given that NABs and 5-14 assessments are designed in Microsoft Word format, SQA could make the original Word versions available, either for all pupils, or only for those who have a recognised difficulty with the paper format. The advantage of using Microsoft Word is that there is no need to add form fields – the assessments are already interactive; and that schools do not need to purchase specialist text reading software – they can use the free *WordTalk* utility available from the CALL Centre web site. The main disadvantage is that the experience would differ from that of using the Adobe PDF digital papers. On balance, we suggest that the advantages of making assessments available in Word outweigh the disadvantages and following discussion with SQA staff, staff can now request both NABs and 5-14 assessments in Microsoft Word format.
- Several staff also felt it was important to develop the use of technology more generally across the school to access learning materials and record work.

**Question 8: Advantages and disadvantages of digital papers compared to traditional Alternative Assessment Arrangements**

**Question:**

Have you any other comments in particular that compare the pros and cons of both digital and traditional print formats with alternative assessment arrangements for exams? (e.g. which students might benefit and for which papers)

**Responses:**

<b>Table 20: Question 8 – Summary of Advantages and disadvantages of Digital Papers by School</b>	
<b>School</b>	<b>Advantages and disadvantages of Digital Papers</b>
School A	Very, very positive impression, makes exams more accessible particularly for pupils with physical difficulties.
School B	<i>It would be difficult to identify exactly which pupils would benefit most from using digital papers - until all have been given lots of training and practice. Senior pupils who did not proceed with digital papers this year agree that they should persevere for next year, as Universities will not provide readers/scribes, but might offer digital papers. It should be made available to all pupils who would otherwise use readers/scribes.</i>
School C	Pupils must be technically confident and comfortable working with IT. The format is particularly suitable for pupils who do not like working with a scribe. It gives a measure of independence to these pupils. The format is particularly good for English Writing, or any essay style exam, where candidates may continually want to reread and rewrite responses.
School D	Think we need to encourage companies such as Leckie and Leckie to produce past papers in this format - pupils are disadvantaged unless they get materials in an electronic format which they can access. There are now some revision CDs in some subjects - needs read back facility - possibly using flash. If publishers were aware of the demand then may produce it - SQA may have power to do this. If we make exam papers accessible then we need to encourage publishers to make their revision aids also accessible - needs whole campaign to encourage education publishers to produce accessible stuff. Hope that this is the start of something! Reader and scribe not available outside of school - better to be independent.
School E	<i>For a student with a scribe but not using digital papers it would be good for the scribe to use the digital one. I did the word processing for another student for whom I was reading/scribing. It was faster, he could see much more easily how his answer was shaping up and it was much easier to add bits later. (Also much easier to read!!)</i>
School F	I think it is an extremely positive step forward. They all felt good about it. Being able to write on the actual paper was very helpful.
School G	Pupils who definitely use a word processor in an exam would benefit. Most of the students who used the digital papers seemed to prefer them. The main disadvantages are the need for ICT resources, accommodation and technical support. A dedicated room available to the Support for Learning department, with networked PCs is required, because ICT suites are used by classes during exams.
School H	Certainly felt that digital exams provided a better alternative to reader and scribe. While on this occasion, scribes and therefore separate rooms were required, feeling that in future years candidates who used the voice as well as the speech technology could be accommodated in one room with only one invigilator and no readers and scribes. Therefore reduction in resource demands.

**Question 9: Other comments****Question:**

Any other comments?

**Responses:**

<b>Table 21: Question 9 – Summary of Responses to requests for ‘Other Comments’</b>	
<b>School</b>	<b>Other comments</b>
School B	<i>There are some equipment issues. Those pupils who have PCs at home could take the Past Papers home and practice with them often - those who rely on using school machines are at a clear disadvantage in this, especially since they cannot be guaranteed unlimited access to suitable machines. Best case scenario would be the provision of PC laptops with the right software installed to all suitable candidates to ensure that all had the opportunity to practice - this would avoid discrimination issues. Setting up computers in separate room for exam purposes was a huge job - 2 staff, 5 hours each to set up and install software. Would be good if all staff were trained in use of software and became confident in using it.</i>
School C	Learning support with School C definitely supports the use of digital QPs in future. This includes relevant management within the centre. For future, an early go-ahead with the availability of digital papers would be good for preparation of pupils.
School D	For those who are quite dyslexic and perhaps not as confident with spelling [digital papers] may not be suitable - would depend on the degree of dyslexia. Those with dyspraxic and physical difficulties find it better. Behaviour of one has improved really well since using laptop for work - better presentation, better motivation. Working with current S4 to put materials into digital format to get them started earlier in using this format.
School E	<i>Definitely a way forward - provided technology can cope! Booking of a computer suite might be required - implications for rest of school. There is a need for more practice for pupils and staff!</i>
School F	We would like to do it again next year - please :). Staff at School F felt that the Times New Roman font used for the printed and digital papers was poor and that a sans-serif font should be used instead.

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## Appendices

- Appendix 1: Digital Exams Authoring and Testing*
- Appendix 2: Digital Past Papers Feedback Questionnaire*
- Appendix 3: SQA Guidance for Centres*
- Appendix 4: SQA Guidance for Invigilators*
- Appendix 5: Digital Exams Installation & Setup*
- Appendix 6: Digital Exams User Guide*
- Appendix 7: Digital Papers Quick Guide*
- Appendix 8: Digital Papers Student Evaluation*

