SQA Adapted Digital Question Papers

2008 examination diet

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We are grateful to staff and pupils at all the schools who have been involved in this and previous projects investigating the potential of SQA Adapted Digital Question Papers.

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SQA Adapted Digital Papers 2008

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1. Executive Summary

In 2008, disabled pupils and others with additional support needs anywhere in Scotland were able to use Adapted Digital Question Papers in Intermediate, Standard Grade, Higher and Advanced Higher examinations. This was a culmination of research, development and evaluation work by CALL Scotland, SQA and staff in a small number of schools where the digital papers were piloted. We are proud that SQA are the first examination authority to introduce this type of interactive digital paper for pupils who require Assessment Arrangements.

Adapted digital papers were piloted in 2006 and 2007 with considerable success. In 2006 eight centres made 65 requests on behalf of 34 candidates; this rose to 12 centres, 80 candidates and 200 requests in 2007. Almost all pupils and students who used the papers preferred them to traditional methods of support, such as reader/scribes or transcription of their handwritten. Pupils also preferred the interactive 'question and answer' format of the digital papers to the use of a word processor to answer questions. Staff felt that candidates were more independent and that staffing and accommodation requirements were lower for examinations sat with digital papers than with reader/scribe support. The quality assurance procedures developed by SQA ensured that the digital papers themselves were reliable, and that delivery of papers and communication with Centres was generally effective.

Following these pilots, SQA decided to offer the papers to any candidate who required Assessment Arrangements in 2008 and 46 Centres made 515 requests on behalf of 204 candidates. SQA and CALL had supported the pilot centres, sometimes quite intensively, in 2006 and 2007, and so the uptake by almost four times as many Centres in 2008 was a real test of the practical application of the digital papers, administration procedures and guidance and support resources that have been developed by SQA and CALL. There has been considerable interest in the digital papers in Scotland and beyond and CALL has delivered CPD to over 900 staff over the last two years.

The use of Adapted digital papers in 2008 has been very successful. Centres were asked for feedback and 84% of those who responded felt the papers were acceptable; 89% found delivery mechanisms satisfactory; 79% felt the guidance materials from SQA were adequate.

A simple indicator of effectiveness is whether Centres, having used the papers one year, elect to use them in subsequent years: between 2006 and 2008, the number of candidates in twelve pilot centres using digital papers trebled, and the number of requests increased by 43%. At time of writing in February 2009, SQA has received 1,117 requests for Adapted Digital Papers from 66 Centres on behalf of 362 candidates.

Thousands of candidates in Scotland need help to sit examinations and the most common types of support used (apart from extra time or a separate room) are a reader (16,936 requests in 2008) and/or a scribe (14,811 requests). Analysis of the impact of digital papers to date suggests that there is considerable potential for candidates to work independently with ICT rather than relying on intensive human support: if the uptake of digital papers in centres that used the papers in both 2007 and 2008 can be extended across the whole country we can reduce the number of scribes used in examinations by at least one third, for example from 14,811 to 9,038.

Measuring attainment through examinations is clearly important to everyone involved in Scottish education: candidates, parents, schools, local authorities, employers, colleges and universities and government. Adapted digital papers offer a more independent and efficient Assessment Arrangement than the current widespread reliance on reader/scribes.

The introduction of Adapted Digital Papers is having a wider impact beyond the examinations. Pupils who need a reader and/or scribe during the five weeks or so of the examination diet are also likely to need help during the other thirty-three weeks of the school year; if they benefit from digital examination papers then they are also likely to benefit from digital versions of learning resources such as textbooks. Consequently, Centres that have adopted the papers are creating their own interactive digital prelims, internal assessments and other resources. Centres are being supported in this through related developments: Learning and Teaching Scotland have arranged favourable prices for Scottish schools for *PDFaloud* software, which is used to read out PDF documents (including the SQA digital papers) and for Adobe Acrobat Professional, which is used to create interactive assessments. During the past year the Scottish Government has also funded CALL Scotland to licence a high quality Scottish accent computer voice, which can be used to read out the digital papers, and distribution of a new version of WordTalk, Rod Macaulay's free text reader for Microsoft Word.

The development and introduction of adapted digital papers is stimulating a re-think in how learners are supported in Scottish schools. The potential benefits for Scottish education in terms of teaching and learning and personal development are clear: by providing learning materials in accessible formats, pupils can become more independent and engaged learners, and staff are freed up to support teaching and learning flexibly and efficiently.

2. Background

Adapted Digital Question Papers were first piloted in 2006 and on a larger scale in 2007. Feedback from staff and pupils who took part in the pilot projects was very positive: staff felt that the digital papers offered a more independent means of support for pupils with additional support needs than readers and scribes, that demands on staff and accommodation resources were lower; and that the papers and procedures developed by the SQA Question Paper team were reliable. In almost all cases, pupils who used the papers preferred them to other methods such as readers and scribes.

Following these successful pilots, SQA offered Adapted Digital Papers for any candidate who might benefit from them for the 2008 diet.

In 2008 there were 44,356 requests for Assessment Arrangements on behalf of 12,284 candidates, continuing the increase that has taken place over the past few years (Table 1).

Table 1: Number of candidates and requests for AA, 2006 – 2008

Year	Number of Candidates requesting AA	Number of AA requests
2006	10,650	43,291
2007	11,400	42,194
2008	12,284	44,356

Table 2 gives the number of requests for different categories of disability or difficulty. The majority of candidates (62%) who require Assessment Arrangements are dyslexic or have a specific learning difficulty.

Table 2: Assessment Arrangement Requests for categories of Difficulty, 2008

Difficulty	No. of AA requests	% of total requests
Dyslexia	19,097	43.0%
Other Specific Learning Difficulty	8,404	18.9%
Physical Health Problems	2,653	6.0%
Physical or Motor Impairment	2,556	5.8%
Learning Disability	2,398	5.4%
Autistic Spectrum Condition	2,049	4.6%
Other Moderate Learning Difficulty	1,974	4.5%
Social Emotional Behavioural Difficulty	1,850	4.2%
Visual Impairment	1,495	3.4%
Language or Speech Disorder	700	1.6%
Mental Health Problems	546	1.2%
Hearing Impairment	410	0.9%
Deaf	146	0.3%
Blind	57	0.1%

A centre may request one or more means of support for a candidate (Table 3) so that the 44,356 requests comprised applications for 109,164 specific instances of support. Note that the main cause of the increase compared with 2006 (when there were 79,278 instances) is the identification of Separate Accommodation and Use of a Prompter. Discounting extra time and separate accommodation, the most common types of support requested are for the use of a reader and/or scribe.

One aim of introducing adapted digital papers is to increase candidates' independence and reduce the widespread use of readers and scribes, which are complicated to manage and expensive in terms of staffing and accommodation. Another hope is that fewer adapted hard copy papers (e.g. Enlarged Print) will be required; rather than using large print copies, candidates can magnify the digital paper on screen. The uptake of digital papers in the schools, in comparison to other types of support, is discussed later.

Over the next few years, we hope that the proportion of Assessment Arrangement requests for reader/scribes will decrease as more pupils and schools take up the more independent and cost effective option of using ICT and/or digital papers.

This trend seems to have begun already, to a small degree: between 2006 and 2008 the proportion of requests for use of ICT or digital papers increased from 7.1% (i.e. 3,094 of 43,291 requests) to 11.8% (5,255 of 44,356 requests) while the proportion of requests that included readers and scribes decreased slightly from 38.8% to 38.2% and 34.6% to 33.4% respectively.

Table 3: Types of support requested, 2006-2008

Support requested	2006	2007	2008
Extra Time	34,716	33,285	34,530
Separate Accommodation	n/a	25,460	25,793
Reader	16,798	16,122	16,936
Scribe	15,046	14,121	14,811
Use of ICT	3,063	3,560	4,741
Prompter	n/a	1,470	1,879
Coloured Paper	1,326	1,468	1,523
Rest Period	n/a	1,077	1,517
Transcription with correction	1,189	1,214	1,215
Enlarged Print Question Papers	876	1064	1056
PA Referral	2,480	996	781
Transcription without correction	678	668	751
Different paper size		n/a	627
Calculator	891	734	556
Digital Question Papers	31	152	514
Different font		n/a	336
Modified Content	n/a	139	202
Adapted Cert	n/a	94	181
Braille	28	32	57
Question Paper signed to candidate	69	83	34
Candidate Signs Responses	56	62	40
Use of tape recorder for responses	**25**	**34**	30
Total	**79,278**	**103,842**	**110,118**

3. Requests for Adapted Digital Papers in 2008

Centres and candidates

Forty-six centres made 515 requests for adapted digital papers, on behalf of 204 candidates (Table 4). This seems a reasonable uptake given that little advertising and publicity was undertaken by SQA or CALL Scotland. (Both organisations deliberately avoided intensive promotion of the papers because of concerns about supporting what could potentially have been a very large number of requests and Centres. There were relatively small numbers of centres, pupils and papers involved in the pilots and it was prudent to increase numbers and scope slowly.)

Table 4: Digital paper requests 2006 - 2008

	2006	2007	2008
Number of centres	8	12	46
Number of candidates	34	80	204
Number of entries	65	200	515

Schools in 23 of the 32 Scottish local authorities requested digital papers, which seems a reasonable spread (Table 5). One independent school and one FE College made requests. Over the next few years we expect the number of centres requesting digital papers to increase from all sectors.

Table 5: Number of requests and requesting centres per local authority, 2008

Authority	Requests	Schools	Authority	Requests	Schools
Edinburgh City	82	3	Stirling	13	1
Aberdeenshire	78	4	Fife	12	1
Argyll and Bute	40	1	Independent	10	1
South Ayrshire	35	2	Clackmannanshire	8	2
Perth and School H	32	1	Dundee City	8	1
Dumfries and Galloway	31	1	Renfrewshire	8	2
Falkirk	27	1	Scottish Borders	6	1
Highland	20	6	FE	5	2
Glasgow City	19	1	Aberdeen City	4	1
Moray	19	1	North Ayrshire	4	2
Shetland Islands	18	1	Angus	3	1
South Lanarkshire	18	4	North Lanarkshire	2	1
Inverclyde	13	1			

Digital paper requests: subjects

Table 6 breaks down the papers requested by subject. English papers accounted for 29% of the digital papers requested, which reflects both the popularity of the subject and also the fact that the digital papers are suited to the content, style of questions and the needs of the candidates. It is interesting that adapted digital papers were

requested for subject areas that are not as well suited to the digital format, such as Maths or Chemistry, where options for pupils to use symbols and equations are limited. Requests are made for these subjects either so that pupils can use text-to-speech to read the papers, and/or some pupils still prefer to answer questions using ICT because it is still preferable to other options.

Table 6: Number of requests for digital papers, by subject, 2008

Subject	Requests	Subject	Requests
English	149	Computing	6
Biology	42	Art and Design	6
Geography	40	German	5
Computing Studies	35	Media Studies	5
Chemistry	33	Science	5
History	25	Social & Vocational Skills	4
Administration	22	Care	4
Physics	22	Information Systems	3
Craft & Design	17	Religious Studies	3
Business Management	15	Classical Studies	3
French	13	Accounting & Finance	3
Drama	10	Music	1
Modern Studies	10	Music: Performing	1
Physical Education	8	Mathematics: Maths 1, 2 and 3	1
Product Design	7	Economics	1
Home Economics	7	Accounting	1
Mathematics	7	Mathematics: Maths 1, 2 and Applications	1
Total number of requests for Digital Question Papers:			**515**

Digital paper requests: levels

The breakdown of the number of requests for different Levels of assessment is given in Figure 1. The majority of requests (67%) were for Standard Grade papers (Foundation, General and Credit) because more pupils sit Standard Grade than any other level; there are more requests for Assessment Arrangements at Standard Grade than at higher levels; and possibly because more Standard Grade papers are question and answer format and so are better suited to the digital format. Table 7 compares the percentage of requests at each level for 2007 and 2008: it is interesting that proportionately fewer requests were made at Standard Grade in 2008 compared with 2007. This may be because pupils who used digital papers for Standard Grade in 2007 went on to use them at the higher levels (Intermediate 2 and Higher) in 2008.

Table 7: Percentage of requests at different Levels

	2007	2008
Standard Grade	79%	67%
Int 1	6%	9%

Int 2	5%	10%
Higher	10%	13%
Advanced Higher	0.4%	0.2%

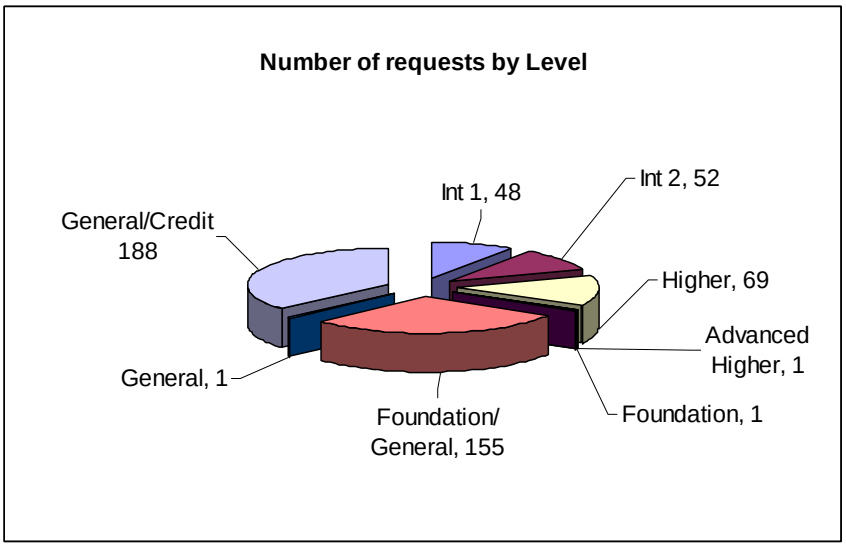

Figure 1: Number of requests for Adapted Digital papers, by Level

Uptake in Centres requesting Adapted Digital papers

Table 8 shows that the average number of candidates for whom digital papers were requested was 4.27 in 2008: similar to 2006, and a reduction from 2007. This reduction in the average number of candidates per centre was because most of the 34 centres using the papers for the first time requested a small number of papers for a small number of candidates: 6.74 requests on behalf of 2.65 candidates on average. In comparison, the centres that had previously used the papers in 2007 on average made 23.83 requests on behalf of 9.5 candidates. The number of candidates for whom requests were made in 2008 ranged from 19 at School H, to only 1 at twenty-two Centres (48% of the total) that were using the papers for the first time. It is therefore likely that 2009 will see a large increase in the number of candidates and requests, even if the number of centres requesting digital papers remains static. (If all 46 centres request the above average of 23.83 papers for 9.5 candidates, SQA will receive 1,096 requests for 437 candidates in 2009.[1])

Table 8: Digital paper requests 2006 – 2008			
	2006	**2007**	**2008**
Number of centres	8	12	46
Number of candidates	34	80	204
Number of entries	65	200	515
Average number of candidates / centre	4.25	6.67	4.27

[1] At time of writing this report in February 2009, SQA had received 1,117 requests from 66 Centres on behalf of 362 candidates.

Table 9 demonstrates that the number of candidates and requests increased in almost all centres that have used digital papers over the three years from 2006 to 2008. The number of requests in 2006 is not given in Table 9 because Centres requested specific papers that year; in 2007 and 2008 requests were made for examination entries. The number of candidates using the papers has trebled from the first pilot in 2006 to 2008, and the number of requests increased by 43% between 2007 and 2008.

Table 9: Digital paper requests per Centre, 2006 – 2008

Centres that used digital papers in 2007	Number of candidates				Number of requests for ADPs	
	2006	2007	2008		2007	2008
School A	6	5	14		8	19
School B	3	2	5		5	15
School C	6	14	13		20	19
School D	2	10	12		34	40
School E		5	8		13	25
School F	1	2	6		7	15
School G		1	1		1	6
School H	9	15	19		40	32
School I		4	11		8	31
School J	3	6	8		25	30
School K	4	15	15		38	52
School L		1	2		1	2
Total	**34**	**80**	**114**		**200**	**286**

Table 9 presents the number of candidates and requests from the centres that used the papers in 2006 and/or 2007 and 2008. Figure 2 shows the percentage of candidates requiring assessment arrangements that used digital papers between 2006 and 2008. In most centres, digital papers have become more popular type compared with other methods over the three examination diets.

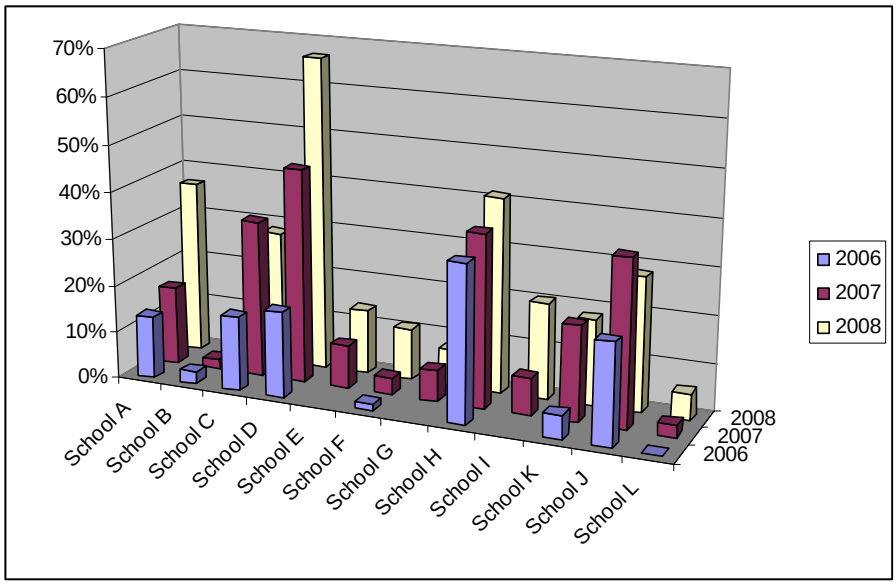

Figure 2: Percentage of AA candidates who used digital papers from 2006 to 2008

Digital papers compared with other support methods

The pilot trials in 2006 and 2007 showed that the adapted digital papers offered a more independent and efficient method of support than reader/scribes, and that many (but not all) pupils preferred the papers to other types of support. We are therefore interested in exploring whether centres and candidates are choosing digital papers rather than other Assessment Arrangements.

Before we look at the uptake in the 46 centres, it is worth noting that the number of candidates and the proportion of the overall number of candidates for whom Assessment Arrangements in general were requested varied quite widely between Centres. The largest percentage of candidates (97%) who needed assessment arrangements were at School A, which caters for pupils with physical disabilities. The percentage of candidates for whom requests were made in the other 45 'mainstream' centres varied from 24% at School B (a school with a remit for educating pupils with dyslexia) to 2.9% at School Q (another secondary school). The average was 9.49%. The percentage of entries for which requests were made ranged from 90% at School A, to 1.55% at School Q, with an average of 7.2% for the mainstream schools and college (i.e. excluding School A). Nationally, there were requests made for 5.9% of examination entries in Scotland, so the centres who used digital papers in 2008 do make use of assessment arrangements as a whole more often than average.

Table 10 is a breakdown of the number of requests made for all the different types of assessment arrangement across the 46 centres. Digital papers account for 515 (4.32%) of the total number of requests. (Note that separate accommodation and prompters are not included in Table 10.)

Digital papers and/or use of ICT account for 12.7% of all requests from the 46 centres while requests for readers and scribes comprised 21.9% and 18.9% respectively. Nationally in 2008, use of ICT and digital papers represented 6.2% of all requests and so there is considerable scope to increase the use of ICT in examinations in centres in Scotland.

Table 10: Assessment Arrangements for 46 centres who used digital papers		
Arrangement	**Number of requests**	**Percentage of requests**
Extra Time	4806	40.35%
Reader	2609	21.90%
Scribe	2257	18.95%
Use of ICT	999	8.39%
Digital Papers	515	4.32%
Coloured Paper	154	1.29%
Calculator	145	1.22%
Enlarged Print	140	1.18%
Transcription with correction	119	1.00%
Transcription without correction	86	0.72%
PA Referral	61	0.51%
Braille paper	11	0.09%
Use of tape recorder for responses	4	0.03%
Question Paper signed to candidate	3	0.03%
Candidate Signs Responses	2	0.02%
Total	**11,911**	

Support for Writing

In 2007, we compared the number of requests for different types of writing support and found that overall, ICT and/or digital papers were more popular than scribes in the 12 centres that used digital papers (figure 3).

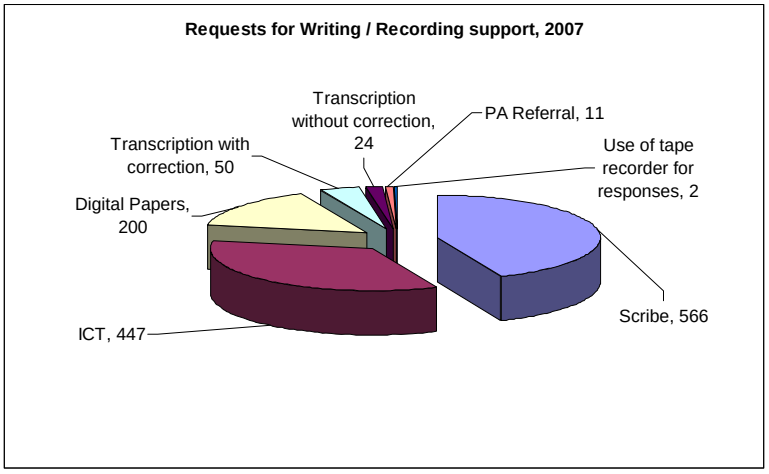

Figure 3: Number of requests for writing support in 12 centres using ADPs, 2007

This was of note because nationally, scribes outnumbered ICT and digital papers in examinations by a factor of 3. If the 2007 use of ICT and/or digital papers could be replicated across all centres in Scotland, then instead of 14,121 requests for scribes

and 3,712 requests for ICT/digital papers, there would be only 9,032 requests for scribes, and 10,325 requests for ICT or digital papers.

So, have we made progress towards this goal in 2008? Figure 4 shows the breakdown of requests for the 46 centres that used digital papers in 2008 and this year, disappointingly, the proportion of candidates working independently using ICT and/or digital papers in the 46 Centres is less than in 2007 (36% compared to 49% in 2007) and the proportion of candidates using a scribe is higher (54% compared to 44%).

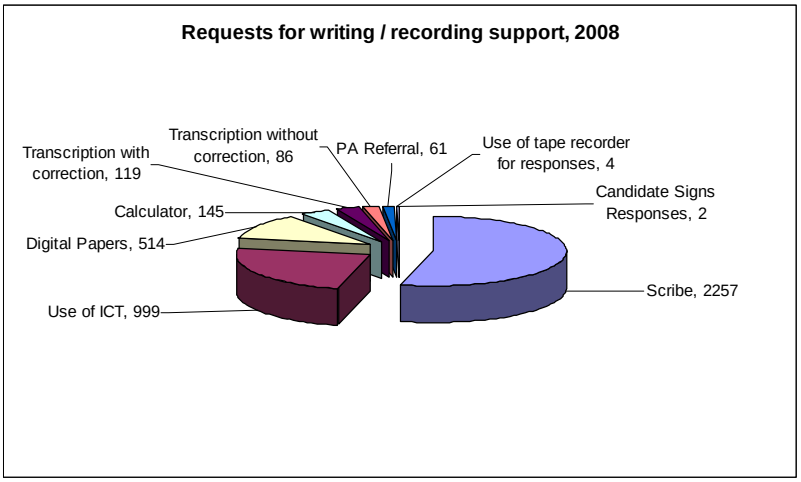

Figure 4: Number of requests for writing support in 46 centres using ADPs, 2008

There are several possible reasons for this. First, the number of centres using digital papers almost tripled between 2007 and 2008 and as we noted earlier, centres using digital papers for the first time in most cases requested papers for a small number of candidates. The figures in 2009 and 2010 will therefore give a more accurate picture of uptake for these 46 centres. If we are interested in trends at this point in time then we must look at the requests for different types of writing support made by the centres that have used papers over the 3 years from 2006 to 2008.

Table 11: Comparison of writing support in 12 centres from 2007 to 2008

Arrangement	Number of requests 2007	Number of requests 2008
Scribe	566	486
Use of ICT	447	495
Digital Papers	200	286
Transcription with correction	50	29
Transcription without correction	24	26
PA Referral	11	8
Use of tape recorder for responses	2	0
Totals	**1300**	**1330**

Table 11 shows that requests for ICT and digital papers increased in the twelve centres that used papers in both 2007 and 2008, and there was a corresponding reduction in requests for other methods of support, particularly scribes (Figure 5).

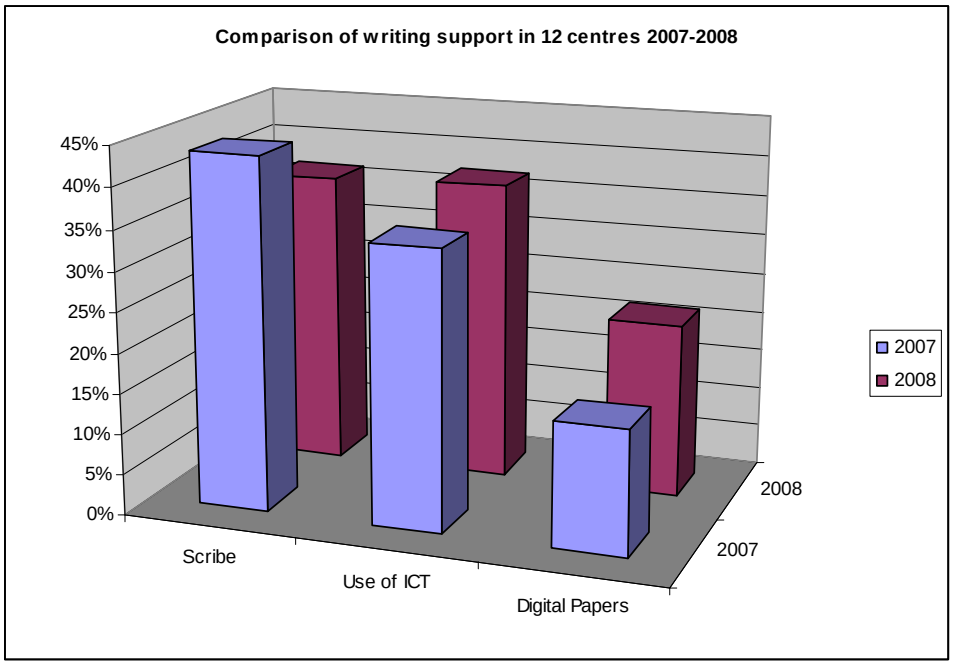

Figure 5: Writing support requests for ICT, digital papers and scribes in 12 centres 2007-2008

Between 2007 and 2008 the percentage of requests for writing support with scribes dropped from 44% to 37% while requests for use of ICT and for digital papers increased from 34% to 37% and from 15% to 21% respectively. This suggests that scribes are indeed being replaced by ICT and digital papers in centres that have adopted the digital papers.

Support for Reading

With regard to support for reading, digital papers can benefit candidates through magnification of the paper; use of a different background or text colour; or by the paper being read out using text-to-speech software. It is more difficult to compare the use of digital papers to support reading, with readers, because centres do not state whether the candidate will use text-to-speech (or other facilities to support reading) when a request is made.

In 2007, centres were asked to record which candidates used text-to-speech software in examinations, and figure 6 gives the breakdown across the 12 centres that used digital papers in 2007. By far the most common method of reading support was a reader (figure 6).

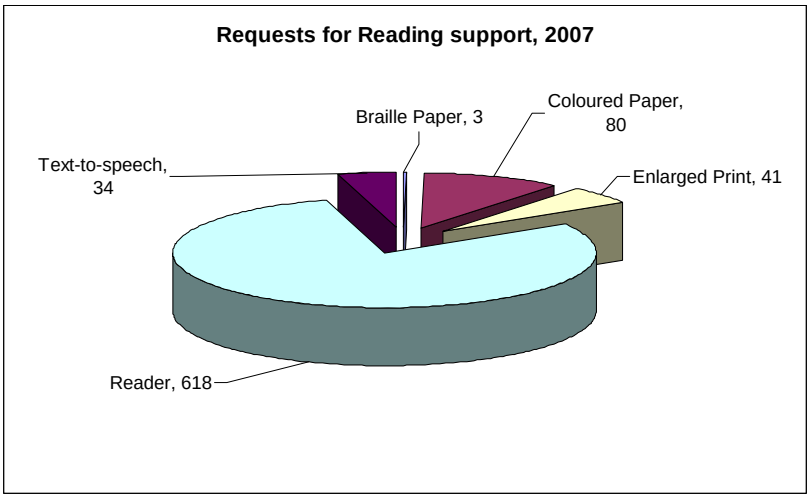

Figure 6: Reading support requested and used in 12 centres in 2007

In 2008, centres were asked to state the number of candidates who had used text-reader software, and the subjects and levels where the software was used. The data was gathered retrospectively via an emailed questionnaire, but only 18 out of 46 centres made returns with the number of entries where text-reader software had been used. Figure 7 shows the number of entries where reading support was requested or used in these 18 centres. Text-reading software does account for a higher percentage of reading support used in these 18 centres (from 4.3% in 2007 to 6.4% in 2008) but we do not know the extent of the use of text reader software in the other 28 Centres.

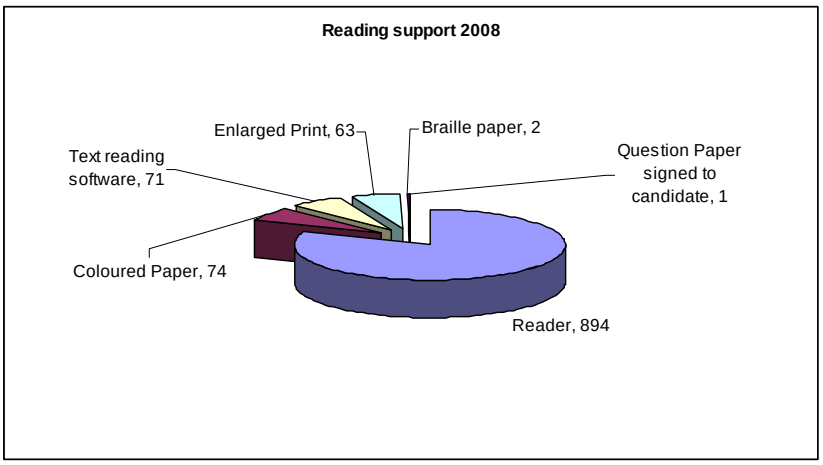

Figure 7: Reading support used in 18 centres in 2008

Of the 18 Centres that responded to the questionnaire, 8 reported the use of text reader software. The breakdown of reading support in the 8 centres is given in table 12. (Note that other centres are known to have used text-to-speech in 2008 but returns were not received and so are not given in table 12.)

The most significant figures in table 12 are the percentage of entries where text reading software was used to support reading. As in 2007, this varied widely, from 1% of entries at School O, to 50% of entries at School D.

Table 12: Requests for Reading support in 8 centres where text-reading software was used, 2008									
	School M	School A	School C	School D	School N	School O	School I	School P	**TOTALS**
Braille paper	0	2	0	0	0	0	0	0	**2**
Coloured Paper	0	3	0	0	0	0	27	2	**32**
Enlarged Print	0	27	7	0	0	11	0	0	**45**
Question Paper signed to candidate	0	0	1	0	0	0	0	0	**1**
Reader	72	9	16	6	5	193	75	94	**470**
Entries where Text to speech was used	13	1	9	6	2	2	30	8	**71**
TOTALS	**85**	**42**	**33**	**12**	**7**	**206**	**132**	**104**	**621**
Number of requests for ADPs	16	19	19	40	10	2	31	16	**153**
% of ADPs where TRS was used	81%	5%	47%	15%	20%	100%	97%	50%	**46%**
% of entries where TRS was used	15%	2%	27%	50%	29%	1%	23%	8%	**11%**

In 2007 we noted that Centres that used text-reading software in 2006 made greater use of the technology in 2007, and figure 8 shows that this trend has continued in 2008. Unfortunately there are only four centres where the use of text reading software is recorded in both years, but in all four centres the proportion of entries where text-reading software was used to support reading increased.

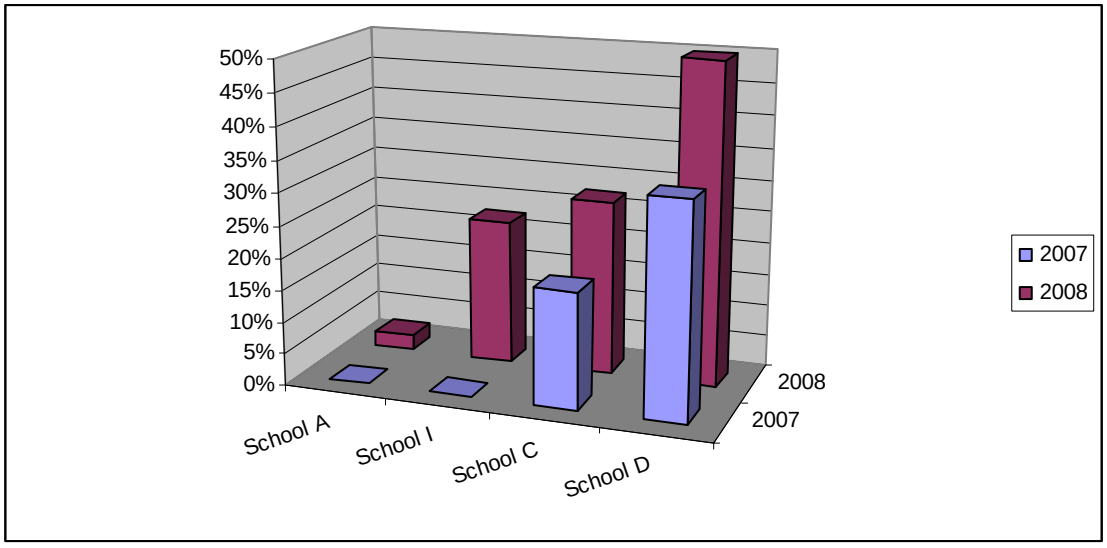

Figure 8: Use of text-to-speech software as percentage of total entries with reading support

In most cases, the increase in use of ICT to support reading corresponded with a reduction in use of readers (figure 9). The only exception here was Ashcraig, where the number of requests for reading support increased eightfold from 10 in 2007 to 85 in 2008. Figure 9 does then suggest that ICT can replace human readers. Uptake of text-reading software to support reading is likely to be slower than the use of digital papers for writing support because the text-reading software requires installation;

additional training for staff and pupils is needed; and it is more challenging to support pupils who need help with both reading and writing than pupils who just need help with writing.

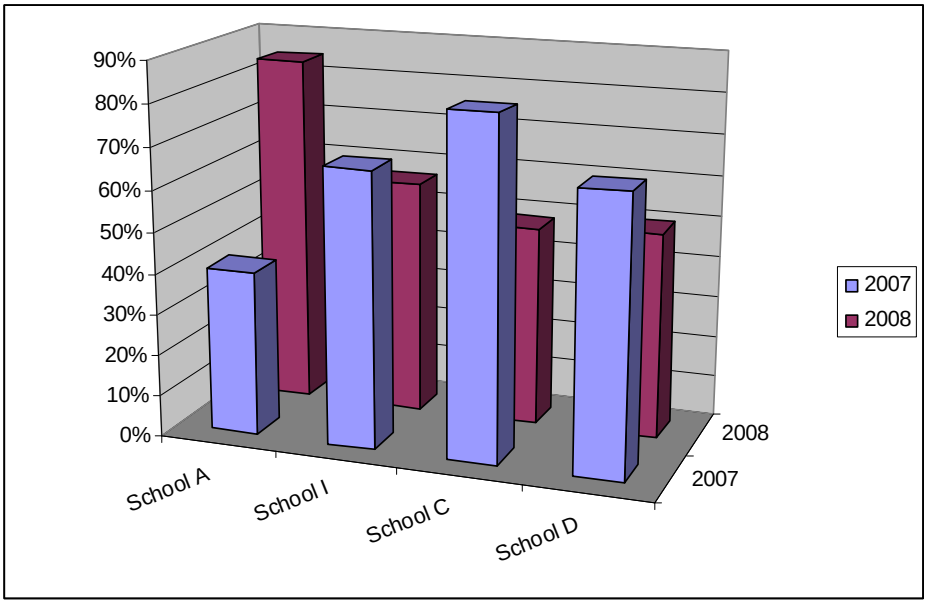

Figure 9: Use of readers as percentage of total entries with reading support

4. Feedback from centres in 2008

Centre Questionnaire

Detailed evaluation and feedback was sought from candidates and staff who used digital papers in the 2006 pilot (Nisbet *et al*, 2006) and additional feedback requested from centres in 2007 (Nisbet, 2007b). Given the number of centres using digital papers for the first time in 2008, we felt it appropriate to ask for feedback once again and give staff an opportunity to identify issues with the papers themselves, with ICT, or with procedures.

A questionnaire was designed (Appendix 1) and emailed to centres by SQA. The questionnaire was in PDF with form fields for answers (i.e. similar to the digital papers) and staff could either complete it and email it back to SQA, or print it out and post it.

SQA staff collated the responses and provided the summary below.

Analysis of Questionnaire Feedback

46 Centres were sent questionnaires. Returns were received from 20 Centres (44%). One return was not on the questionnaire so the analysis below is based on 19 returns.

Was the format and quality of the digital papers acceptable?	
Yes	16 (84%)
No (Not useful for this particular student as font size too small and font not Tahoma)	1
Not sure (Not sure, only involved in setting up PC, didn't see the question paper)	1
Yes and No (PDF format fine for most subjects, but PC froze when candidate tried to use drawing tools for Chemistry (used pen and paper instead). Programme for PDF files could only be used on networked computers.	1
Were there any errors in the papers?	
Yes (Biology Intermediate 2 had a missing text box. Chemistry SG had no facility to circle answers)	2
No	17
Was the delivery of the CDs at your centre satisfactory?	
Yes	17
No (Not good that delivery was staggered. CDs initially delivered without notification, "dumped" with other mail and not distributed to SQA coordinator/chief invigilator immediately.)	2
Does the SQA Guidance material adequately cover the arrangements that need to be put in place in order to use digital papers?	
Yes (Checklist was particularly helpful)	15
No (Guidance more complicated than necessary – reality easier. More advice required re applying for backup arrangements. Need more time to prepare.)	4

Did you use standalone or networked machines (or both)?	
Standalone	9
Networked	6
Both	4
Which text-to-speech program did you use?	
Browsealoud	1
PDFaloud	3
Read and Write Gold	5
None	11
Other (Adobe Acrobat)	1
Which candidates used Text-to-speech?	
Number of candidates (18% of candidates)	37
Number of Entries (14% of entries using digital papers)	71

Other comments from staff

Issues with Digital Question Papers

- "Better if all digital question papers could have answer boxes or answer books are provided with relevant information boxes on front page which can be completed on PC.
- Good if template were available for answers which require to be word processed.
- In Chemistry SG no facility to circle answers – printed paper used to do this.
- System froze when candidate tried to use drawing tools.
- Better if multiple choice questions could be answered within the pdf, eg, underlined or highlighted.
- Consistency of method for answering multiple choice questions, eg, circle, highlight, shade box? – problem is as printed paper.
- Only problems seemed to be with mathematical questions and drawing of graphs. Although some candidates were able to use the drawing tools.
- Require more advice/training using Maths equation software with Acrobat.
- Better with tabbed form fields for graphs.
- Is it possible to save a graph as a Word document so it can be completed on PC?
- Difficulty printing
  - Printing red on diagrams (known problem with Hewlett Packard printers).
  - Two instances where candidates couldn't save or print their work.
  - Marking tools used to fill in a graph but it didn't print.
  - Quantity of paper required to print completed papers (eg History SG Foundation) could deter expansion of use, in light of budget cuts. Would be better to save to and return a disk.
- One candidate worked directly on CD, therefore unable to save work, had to print his paper page at time in case PC crashed.
- Tailor pdf files to candidate's requirements as with hard copy.
- Prefer two copies of question papers – one to read from and one to record answers on.
- Prefer digital maps for Geography
- Require clearer instructions on what to do if pupils' answers are longer than the available fields.
- Screen Readers
  - Texthelp is not precise enough, ie, it doesn't always convey the information accurately.
  - Browsealoud and R&W Gold are fiddly and temperamental. Pdfaloud is stable but expensive. Read out loud works but doesn't highlight. Also need to sort out

language voices and maths symbols. o Candidates found the speech too slow and gave up using it. o Difficulties and cost implications updating TTS software"
Examination Arrangements • "Prefer more time to set up o Half an hour is not much time to check the files for faults o Times between exams quite short. Takes time to load files onto standalone PCs when numbers of candidates are larger. o Technicians found the system "workload heavy" within a limited time schedule – setting up, checking, ensuring all in order, collecting, printing. o Copied the contents onto a pen-drive for each pupil – would prefer to be able to do this the day before. • Length of time it can take to print off a long question paper • No map provided for candidates using digital question papers (used spare copies) • Applied for Reader/Scribe as backup, also wanted transcription for correction but this could not be applied for alongside scribe on AA database. • One disk wouldn't load • More issues with laptops than desktop PCs • Laptop froze, couldn't retrieve work that had been completed. • 2 occasions where problem loading completed paper to disk to print. • Difficulty loading Acrobat 8 to laptops not linked to network/internet – need that to accept the licence agreement."
Guidance Material • "Checklist was particularly helpful • Guidance more complicated than the reality • More advice required on applying for backup arrangements"

Focus Group Feedback

A Focus Group meeting was held on 3rd December 2008 to offer Centres an opportunity to provide more feedback and to discuss issues and approaches to using the digital papers. A number of points were raised:

- It was suggested that a 'more accessible' font is introduced for all SQA question papers. Research into fonts for people with visual impairment suggests that Arial is preferred, while many staff and organisations advocate San Serif fonts for dyslexic pupils. The current SQA font was chosen for its readability and there is no evidence that fonts preferred by pupils with reading difficulties are more readable by pupils without reading difficulties. Before introducing a different font for all SQA papers it would therefore be essential to conduct research into which font(s) are most readable for the majority of candidates.
- Staff felt that digital answer booklets, prepared with question numbers to match the question papers, would be helpful. While blank templates in PDF or Word would be an option, SQA staff thought that digital booklets with prepared numbering might confer an advantage compared to pupils using paper booklets who did not have the question numbers. SQA agreed to consult with colleagues.
- Pupils who view papers at high magnification or pupils with physical access issues may benefit from hyperlinks between and within papers to improve navigation around the papers.

- In some cases, underlining and other markups created using the Adobe Reader drawing tools were not clearly visible on the printed digital paper. This was because the default line drawing colour in Adobe Reader is red which may not print clearly on cheaper ink-jet printers; it was agreed that guidance notes on using digital papers should direct staff and pupils to use a darker colour for drawings and markups.
- Invigilation procedures varied between Centres: SQA would provide information again at Invigilator briefings.
- Staff requested more information on setting up user profiles for using digital papers on networked machines.

5. Adapted Digital Papers Developments in 2007-08

Adobe Reader

Candidates used Adobe Acrobat Standard software to access the digital papers in the 2006 and 2007 pilots, which cost around £20 per licence. In 2008, Centres were able to use free Adobe Reader software to access the papers. This is because version 7 of Acrobat Professional has a facility to 'enable user rights' so that Adobe Reader can be used to enter and save answers and insert drawings and annotations. Offering digital papers which can be accessed using free software has many advantages: clearly there is a saving for schools and centres using the papers, and it also means that centres can evaluate the papers at no cost; that Adobe Reader can be made available on all computers (instead of having Acrobat Standard only available on designated machines); and that candidates can practice and revise on their own computers at home using the free software.

Text to speech software

When digital papers were first trialled in 2005, SQA purchased a licence from TextHelp Systems to 'speech enable' the papers so that they could be read out using free *PDFaloud* software. This facility was helpful to candidates with visual or reading difficulties. At the time TextHelp offered two versions of PDFaloud: a free version which could only read out files that had been speech-enabled, and a paid-for version that could read any PDF. By offering speech-enabled papers, SQA minimised cost for Centres thereby encouraging uptake of digital papers.

However, TextHelp have not updated the free version of PDFaloud as new versions of Adobe Reader appeared and in 2007 instead offered *Browsealoud*, a program primarily for reading web sites, but which could also read out PDF documents (including the digital papers). For the 2008 diet, Centres had several options: use the free basic text-reader tool within Adobe Reader itself; use the free Browsealoud; or purchase PDFaloud, *Read and Write Gold* (TextHelp's more expensive product which incorporates PDFaloud), or one of the many other text-to-speech tools available. We know from comments and calls from staff that this constantly changing situation regarding software did not encourage centres to install and use text-to-speech. In the event, 5 Centres reported that they used Read and Write Gold; 3 used PDFaloud; and 1 each used Browsealoud and Adobe Reader's built-in facility.

In May 2008, TextHelp released Browsealoud 5, which could not read the SQA digital papers at all. Adobe also released Adobe Reader 9 in the summer of 2008 and Browsealoud 4 did not work with it at all. Discussions were held with TextHelp staff to encourage the company to rationalise the situation: ideally to have one free text reader to read speech-enabled papers, and one paid-for program to read any PDF, both to work with Adobe Reader 8 and 9. This did not fit with TextHelp's development plans and so there is no point in SQA taking out a new licence to speech-enable the digital papers in 2009, because TextHelp does not have a working free program to read them.

For the 2009 examination diet, centres can either use the free built-in basic text-to-speech facility in Adobe Reader itself, or buy PDFaloud or another text-reader program. CALL recommends buying a site licence of PDFaloud because we regard it as the best PDF text-reader available.

PDFaloud site licences for Scottish schools

TextHelp discontinued PDFaloud as a separate product in 2007 and instead promoted their full Read and Write Gold package (currently costing £1,995 for a secondary school site licence). However, centres may not need all the features in Read and Write Gold or they may already have other text-to-speech programs such as ClaroRead, Penfriend or WordTalk. Given the considerable interest in the digital papers, CALL saw a demand for PDFaloud as a separate product and approached TextHelp and Learning and Teaching Scotland and suggested that LTS negotiate a licensing arrangement for Scottish schools. Centres can now buy a site licence of PDFaloud for £295 from LTS[2]. We regard this as good value because as well as reading the digital papers, PDFaloud can access almost any PDF file including NAB and 5-14 assessments; prelims and resources made by staff; electronic textbooks.

The Scottish Voice

The early trials of digital papers revealed that the quality of the computer voice used to read the papers was in some cases an issue (Nisbet, Aitken & Shearer, 2004 p.4; Nisbet et al, 2006 p. 30). The voices supplied with Windows and Mac OS have robotic, American accents and while better, more natural voices can be purchased, those with British accents are very 'English'. CALL approached CereProc, an Edinburgh firm and world leader in speech synthesis technology, to explore the possibility of developing and licensing a desktop version of one of CereProc's high quality Scottish voices. Funding was granted by the Scottish Government for the work and in May 2008, 'Heather', the Scottish Voice, was made available on a CALL mini-site[3]. CereProc worked with TextHelp to ensure that PDFaloud would operate correctly with the voice. 'Heather' is licensed for use by any pupil, teacher or support service in Scottish primary, secondary and special schools, and also for use by pupils at home.

Mathematical and scientific symbols and equations

The answer boxes in the digital papers are plain text fields and options for typing or inserting symbols are limited. Experiments were carried out to investigate if and how symbols could be inserted into the fields. The project team could not find a technique for typing symbols directly using the keyboard, but it is possible to copy a symbol from a PDF file and paste it into an answer box. A single page PDF was therefore created with a selection of common symbols which can be copied and pasted into the digital papers. The file (Appendix 2) is available from CALL's mini web site[4]. Copying and pasting symbols from one file into a paper is relatively slow and crude, and so the project team will continue to explore other methods.

The project team experimented with several equation editors (Microsoft Word Equation Editor, MathType, Efofex FX Equation and MathCast) and the fundamental limitation with all of them is that equations cannot be pasted into the answer boxes. This is because the answer boxes accept plain text whereas the equation editors produce either a graphic object or a MathML expression. When an equation is pasted into a digital paper it is 'hidden' behind the text answer box and so it cannot be seen (because the answer boxes are not transparent) or re-sized. One solution is to use transparent answer boxes so that any equations or other drawings

[2] http://www.ltscotland.org.uk/aboutlts/resources/software/school/index.asp
[3] http://www.thescottishvoice.org.uk/
[4] http://www.adapteddigitalexams.org.uk/FAQs/

can be seen. However, given that centres and candidates are now used to opaque answer boxes, it would be necessary to trial papers with transparent fields to ensure that they are satisfactory before introducing them.

Adapted Digital Papers and screen magnifiers

The digital papers can be magnified using zoom facilities built into Adobe Reader, and work in 2007 (Nisbet, 2007a) suggested that this facility may be acceptable for some candidates who require a font size of approximately N18 and possibly N24 (when the paper is viewed on a 15" screen or a 17" screen respectively). However, the magnification tools in Reader are basic and candidates with significant visual impairment are likely to prefer using a specialist screen magnification program such as Lunar, SuperNova[5] or Zoomtext[6]. Trials were conducted with a pupil and staff at Hawick High School using SuperNova who found that that the Imprint font used in the standard adapted digital papers was badly pixelated when magnified. Tests showed that the papers were satisfactory when the Arial font was used and so any papers that are to be accessed using a screen magnification program should be produced in Arial.

Adapted Digital Papers and screen readers

The team were aware that the adapted digital papers are not optimised for access using a screen reader and identified several issues: the order in which the elements on the paper are spoken may not be correct; some unnecessary text may be read out; images require a text description; and it was not clear if the screen readers would function efficiently with the answer boxes in the question and answer papers.

A series of experiments were conducted to investigate which digital formats would be most suitable for use with a screen reader such as Jaws[7] or HAL[8].

- The simplest provision is to save the digital paper as a text file and then edit it to ensure the reading order is correct and add descriptions of images and instructions for answering questions. This text file could then be opened on the candidate's preferred word processor and read using a screen reader. The process is similar to that already used by SQA to create papers for printing in Braille. The disadvantage of a text file is that the candidate could inadvertently delete or amend the paper text.
- It is possible to change the reading order of the PDF paper using Adobe Acrobat Pro but this was found to be a very slow and unreliable process.
- Microsoft Word (DOC) format was explored but the screen readers did not handle the Word form fields well.
- One option is to design the papers using Adobe LiveCycle, which is bundled with Adobe Acrobat Pro. LiveCycle offers better control over form fields and reading order and some papers will be trialled with users from the Royal Blind School.

[5] http://www.yourdolphin.com/products.asp?cat=1
[6] http://www.sightandsound.co.uk/visually_impaired/zoomtext/
[7] http://www.sightandsound.co.uk/visually_impaired/jaws/
[8] http://www.yourdolphin.com/products.asp?cat=1

6. Areas for development

Digital Question Papers

- Centres report that in general candidates prefer digital papers in question and answer format compared to reading the question paper and answering using a separate document. However, there are technical issues with adapting digital papers to be question and answer format; and also concerns about changing the assessment itself. The various options should be explored.
- Feedback shows that some staff were not aware of the facilities in Adobe Reader to answer multiple choice questions, or to draw and mark up the papers. Additional guidance may address this.
- The Adobe Reader tools for answering mathematics and science and for drawing graphs and charts are limited. Symbols can be inserted into answer boxes but further improvements will require development of facilities in PDF and Reader itself.
- A PDF file from which candidates can copy and paste mathematical and science symbols was created for the 2008 diet: a similar facility for modern language characters should be created and made available to Centres.
- Current practice when inserting answer boxes into the papers is to use a white 'fill' colour so that the fields are clearly visible. The disadvantages with this are that the answer boxes remain white if the candidate chooses a different colour for the paper background, and that any drawings or markups are hidden 'under' the answer box. Some papers should be piloted to explore whether answer boxes should be transparent.
- The possibility of providing Answer booklets in either PDF or Word format should be explored.
- Some terms are not pronounced correctly by the computer voice. Biology, Chemistry and Physics papers will be reviewed, mis-pronunciations identified, and feedback given to Cereproc, the creators of the Scottish Voice, to improve the voice.
- Accessibility of the digital papers should be further explored for visually impaired candidates who use screen reader and screen magnification software, and for candidates with severe physical disabilities.

Delivery of digital papers

- Sending digital papers to Centres on CD and receiving printed completed papers in return fits with the existing SQA procedures for handling examination papers. It is also 'low tech', well-proven, reliable and does not require internet access. However:
    - Duplicating, processing and mailing hundreds if not thousands of CDs is expensive and so the possibility of delivering papers via secure sever should be considered.

- Printing completed papers can be time-consuming and expensive in terms of printer consumables and so the possibility of submitting completed papers electronically should be explored.

Information and CPD

- While most staff felt that the information and guidance provided by SQA and CALL is satisfactory, it is clear that some Centres would like more support. SQA and CALL both have web sites[9]; SQA provide briefings for invigilators and coordinators; and CALL offers CPD events.
- SQA and CALL should continue to update and develop support resources for staff and pupils, such as online video demonstrations of papers being used.

[9] http://www.sqa.org.uk/sqa/14976.1684.html and http://www.adapteddigitalexams.org.uk/

7. References and publications 2007-2008

Publications

Nisbet, P., Aitken, S., Shearer, N. (2004) Trial of External papers in Accessible PDF for Candidates with Additional Support Needs. Report to Scottish Qualifications Authority, August 2004. CALL Centre, The University of Edinburgh.

Nisbet, P., Shearer, N. Balfour, F., Aitken, S. (2006) *SQA Adapted Examination Papers in Digital Format: Feasibility Study 2005 – 2006: Final Report*. Submitted to Scottish Qualifications Authority. October 2006. CALL Centre, The University of Edinburgh. http://www.callcentrescotland.org/digitalexams/

Nisbet, P.D. (2007a) *SQA Digital Question Papers for Candidates with Significant Visual Impairment*. Briefing Paper for SQA, June 2007. CALL Centre, The University of Edinburgh.

Nisbet, P.D. (2007b) SQA Adapted Examination Papers in Digital Format: 2007 Pilot Project Report. Report to Scottish Qualifications Authority. December 2007. CALL Centre, The University of Edinburgh. http://www.adapteddigitalexams.org.uk/Pilot-Trial/

Nisbet, P.D. (2008) *The Right Support: Introducing Digital Exam Papers*, **Connected**, Spring 2008.

Nisbet, P.D. (2008) *Scottish Exams on Computer* **Dyslexia Contact** Vol 27 No 3.

Nisbet, P.D. (2008) *Exams on Computer: Results of Trials of SQA Digital Question Papers*. **Dyslexia Review** Summer 2008 Vol. 19 Number 3. ISSN 0308 6275.

Media reports

Digital Exams. **The Herald**, 12/6/2007. http://www.theherald.co.uk/misc/print.php?artid=1463815

Digital exam papers from 2008. **Moving forward**...Issue 10 - June 2007. Additional Support for Learning Act – implementation newsletter.

From smart wheelchairs to digital exams. **Knowledge Transfer News**, CHSS, University of Edinburgh, Issue 5 Summer 2007, http://www.hss.ed.ac.uk/kt/documents/ktnewsletsummer2007.pdf

Using Technology for Children's Learning (2008) **Adobe Customer Showcase** http://www.adobe.com/cfusion/showcase/index.cfm?event=casestudydetail&casestudyid=392661&loc=en_us

Exam Papers go Digital. **Times Educational Supplement Scotland**, 9/05/2008. http://www.tes.co.uk/search/story/?story_id=2619419

Better access to learning resources. **Scottish Government Press Release**, 11/05/2008. http://www.scotland.gov.uk/News/Releases/2008/05/09141804

The days of holding support staff hostage may be numbered. **The Scotsman**, 13/5/2008 http://news.scotsman.com/entertainment/Hugh-Reilly--TheDays.4079285.jp

The Voice in the Machine. **Times Educational Supplement Scotland**, 30/5/2008. http://www.tes.co.uk/2625734

Appendix 1

2008 Digital question Papers - Feedback Request

This was the first year that Digital Question Papers were made generally available as an assessment arrangement for candidates with disabilities and/or additional support needs. In order to improve the provision of these papers we would very much appreciate if you could take time to complete this feedback request form, returning it to Maggie Quinn, email, maggie.quinn@sqa.org.uk.

1. Was the format and quality of the digital papers acceptable? yes ☐ no ☐

Comments

2. Were there any errors in the papers? yes ☐ no ☐

Please give details.

3. In what way(s) could the digital papers be improved?

Comments

4. Was the delivery of the CDs at your centre satisfactory? yes ☐ no ☐

Comments

5. What were your accommodation arrangements?

6. Where there any problems with the examination arrangements?

7. Were the technical arrangements for the examinations satisfactory? Please include details of any difficulties encountered with PC equipment, etc.

8. Does the SQA Guidance material adequately cover the arrangements that need to be put in place in order to use digital papers?

yes ☐ no ☐

Comments

9. Did you use standalone or networked machines (or both)?

Standalone ☐

Networked ☐

Both ☐

Comments

10. We are particularly interested to chart the use of the Text to Speech (TTS) feature of the digital papers and compare this with the use of Readers. Please can you complete the information below to tell us which candidates at your school used TTS.

Which text-to-speech program did you use?

Browsealoud ☐

PDFaloud ☐

Read and Write Gold ☐

None ☐

Other ☐

Give details, if other

11. Which candidates used Text-to-speech?

Candidate	Subject	Level	Tick if the candidate used TTS
			☐
			☐
			☐
			☐
			☐
			☐
			☐
			☐
			☐
			☐
			☐
			☐
			☐
			☐
			☐
			☐
			☐

Please provide any additional comments here.

Thank you for completing this form.

Please return to: Maggie Quinn - email: maggie.quinn@sqa.org.uk
SQA
Ironmills Road
Dalkeith
Midlothian
EH22 1LE

Appendix 2

Mathematical and scientific symbols

To copy and paste a symbol into the digital paper:

1. Select a symbol with the Select Tool 
2. Copy it (Edit > copy or CTRL-C)
3. Click in the answer box, then paste (Edit > Paste, or CTRL-V)

Operators and symbols

€	Ω	e	μ	∂	Δ	∏	∑	*f*	±							
¼	½	¾	⅓	⅔	⅛	⅜	⅝	⅞	÷							
←	↑	→	↓	↔	↕		°	^{0}	^{1}	^{2}	^{3}	−	n			
−	⁄	·	√	∞	∟	∩	∫	≈	≠	≡	≤	≥	⌂	⌐	⌠	⌡

Superscripts

(	)	+	−	0	1	2	3	4	5	6	7	8	9			

Subscripts

(	)	+	−	0	1	2	3	4	5	6	7	8	9			

Greek letters

Upper	Lower	
Α	α	
Β	β	
Γ	γ	
Δ	δ	
Ε	ε	
Ζ	ζ	
Η	η	
Θ	θ	
Ι	ι	
Κ	κ	
Λ	λ	
Μ	μ	
Ν	ν	
Ξ	ξ	
Ο	ο	
Π	π	
Ρ	ρ	
Σ	ς	σ
Τ	τ	
Υ	υ	
Φ	φ	
Χ	χ	
Ψ	ψ	
Ω	ω	

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