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Evaluation of the 2004/05 SCHOLAR trial

Final report

March 2006

This document is of interest to everyone in the FE sector

Evaluation of the 2004/05 SCHOLAR trial

Final report

SCHOLAR comprises a set of online e-learning resources developed to support five A-level subjects: biology, chemistry, physics, maths and computer science. It was initially developed in Scotland for the Highers system before being converted to support English A-levels, focusing on the structure of the OCR syllabi.

During the 2004/05 academic year the Learning and Skills Council (LSC) funded a trial of SCHOLAR in 56 schools and colleges in England. The attached report by Timmus Limited provides detailed data regarding the uptake and use of SCHOLAR by teachers and students, and describes user opinions, lesson observations, and the profiles of individuals who used the resource at a high level. The report also details an investigation into whether there was any relationship between student attainment at the end of 2005 and student use of SCHOLAR during that academic year.

The LSC would like to thank Dr Tabetha Newman for her work on coordinating this evaluation.

1. Contents

2. Intended audience and aims of this report

Intended audience (primary)	The SCHOLAR trial programme board, notably: • Sue Butler, National Learning and Skills Council (LSC) • Paul Crisp, National Learning and Skills Council (LSC)
Intended audience (secondary)	• Regional LSC and LEA representatives • Interactive University • Becta • Other interested parties
Intended aims of this report	This document provides a summary of how the SCHOLAR e-learning materials were used in 56 schools and colleges during the 2004/5 academic year. Data sources included: • A database that logged the pages of SCHOLAR accessed by every individual • AS and A2 exam information from the Local Education Authorities (LEAs) • Predicted grade information from the A-level Information Service (ALIS) • Interviews with teachers and students • School visits and lesson observations • Questionnaires sent to teachers and students • Informal feedback from teachers • Formal feedback from Becta subject mentors and Teacher ICT specialists
Cautionary notes and assumptions	This trial also ran for part of the 2003/4 academic year in some schools in Cumbria. This final report focuses exclusively on data collected in the 2004/5 academic year, when the evaluation began. Details of SCHOLAR use in Cumbria can be found in the interim report, available from the National LSC. When schools and colleges first registered for SCHOLAR they were given a generic login password that could be used by anyone. This was called a 'CPD password' and its use could not be traced and logged in the evaluation. Calculations show that less than 5% of the data were lost to the use of CPD passwords. As such all usage figures in this report are slight underestimates. Every effort has been made to check and double-check these results, and the author is confident in these analyses. However, due to the nature of this dataset it cannot be completely guaranteed that the data presented here reflect the complete situation. This is mainly because there was no unique ID for students that could link an individual across LEA, ALIS, SCHOLAR and school feedback data. Matching of data had to be completed via searches for first name, surname and school – any alternative naming conventions between e.g. the LEA and SCHOLAR would have resulted in data being missed. The database could only register when a user entered a page of SCHOLAR. There was no way of knowing whether they read and used that page, or just moved through it. These analysis assume that every page visit was a valid one and did not occur e.g. due to refresh or page load problems. All efforts have been made to identify and examine the validity of unusual data points, but it is not possible to state conclusively that these have all been removed.

3. SCHOLAR structure

The SCHOLAR login page can be found at http://courses.interactiveuniversity.net/vle/scholar/login.jsp

The main structural features of SCHOLAR are described below. Illustrations of these SCHOLAR page types are provided on the following pages (Figures a to g).

Interactive pages (activities)	One of the three types of SCHOLAR page. Interactive pages usually contain Flash-based interactive animations (often including a question), but can also sometimes be PDF documents to be printed out and completed off-line (e.g. example exam questions), or a short set of self-test questions. Interactive pages make up about 33% of all SCHOLAR content in a subject.
Link page	A page that usually contains no content other than a hyperlink to launch to a self-assessment.
Mapping document	A web page that lists the pages of SCHOLAR associated with the learning outcomes required in the AQA or Edexcel syllabi (note that the SCHOLAR structure 'as is' is laid out to reflect the OCR syllabus structure for each subject).
Pages of content	SCHOLAR is laid out in 'pages' with forward and backward arrows moving between them. There is also the option to jump out of a page and back to certain levels of navigation. Pages can hold lots of content (requiring users to scroll down through it) or be very short (e.g. just holding one question). Self-assessments are slightly different – they are counted as one unit even where they cross several pages.
Reporting system	The SCHOLAR online reporting system allows students to check which pages they have visited, and what scores they got for self-assessments. Staff can access this information for themselves and their students.
Self-assessments (end-of-topic tests)	One of the three types of SCHOLAR page. Self-assessments (also known as end-of-topic tests) are a set of questions that sit at the end of each topic of content and which are tracked and marked by the reporting system. They make up an average of 15% of all SCHOLAR content per subject. The self-assessments are held on a different URL to the rest of the SCHOLAR materials, which caused some problems in terms of security firewalls stopping some users from reaching them.
Static pages (topic pages)	One of the three types of SCHOLAR page. Static pages make up an average of 52% of the SCHOLAR content in a subject. They are typically made up of text and/or static images.

Figure a. The top-level menu page shown once inside a SCHOLAR subject. Note the link to the mapping document at the bottom of the page.

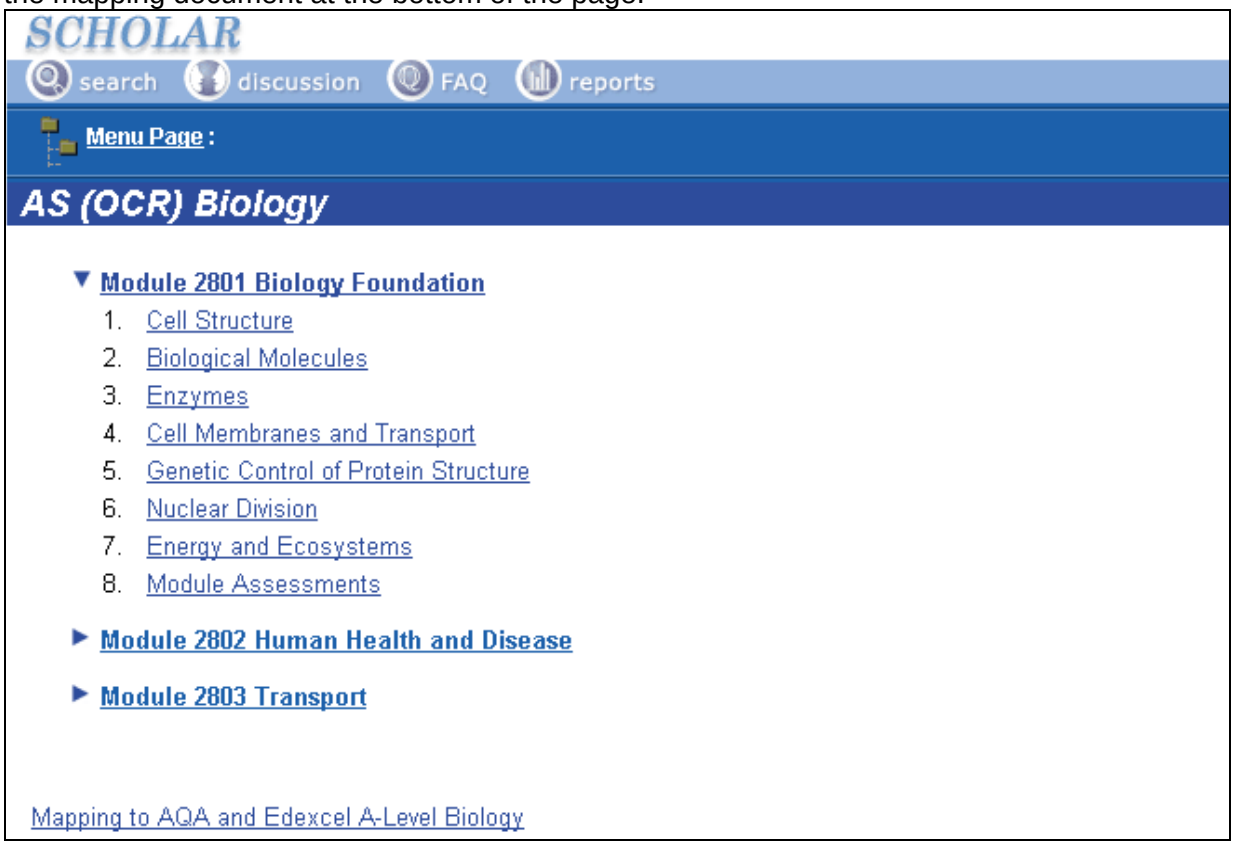
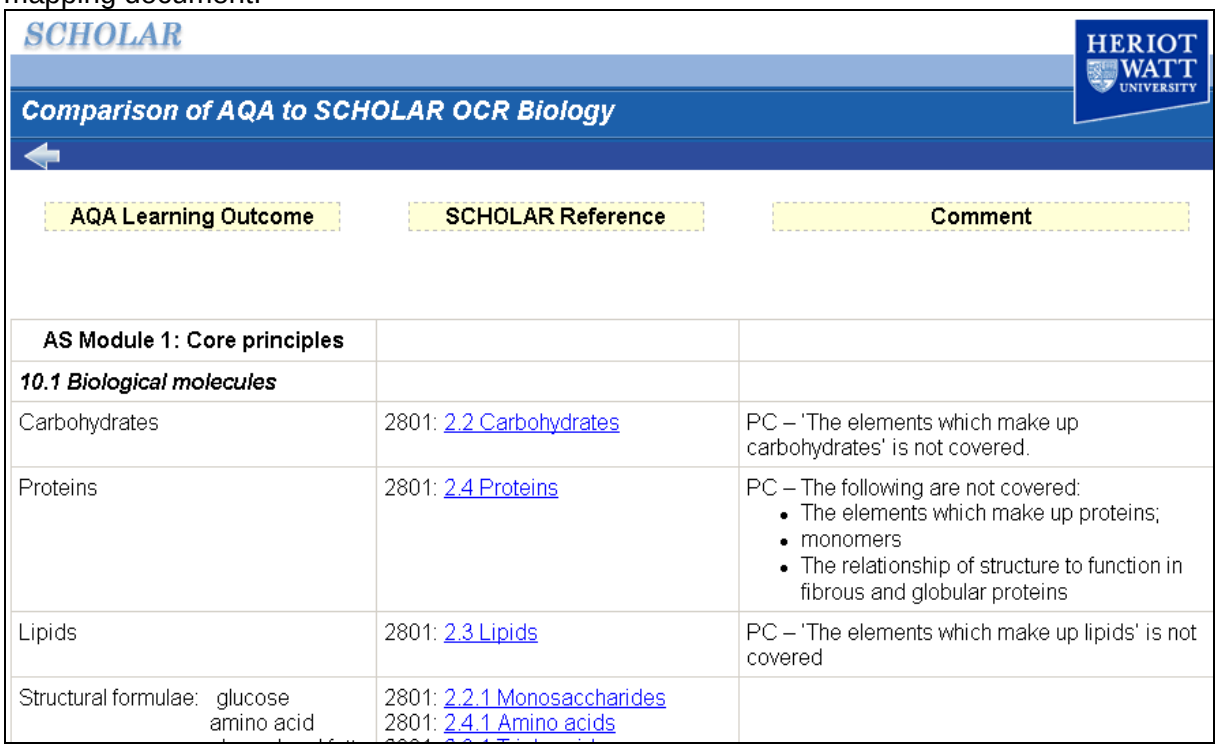


Figure b. The mapping document page which compares SCHOLAR content with the structure of the AQA/Edexcel syllabus, so allowing teachers and students to find material relevant to their learning requirements. This image shows the top of the AS biology AQA mapping document.



AQA Learning Outcome	SCHOLAR Reference	Comment
AS Module 1: Core principles		
10.1 Biological molecules		
Carbohydrates	2801: 2.2 Carbohydrates	PC – 'The elements which make up carbohydrates' is not covered.
Proteins	2801: 2.4 Proteins	PC – The following are not covered: • The elements which make up proteins; • monomers • The relationship of structure to function in fibrous and globular proteins
Lipids	2801: 2.3 Lipids	PC – 'The elements which make up lipids' is not covered
Structural formulae: glucose amino acid	2801: 2.2.1 Monosaccharides 2801: 2.4.1 Amino acids	

Figure c. The menu shown once a user clicks on one of the main topic links from the list shown in Figure b (previous page). This lists the main headings under the topic, and provides small illustrations that inform users whether the content will reveal an interactivity, a set of questions etc. A key is provided at the bottom of the screen. Note at the end of the topic there is an 'end of topic test' which launches to a self-assessment.

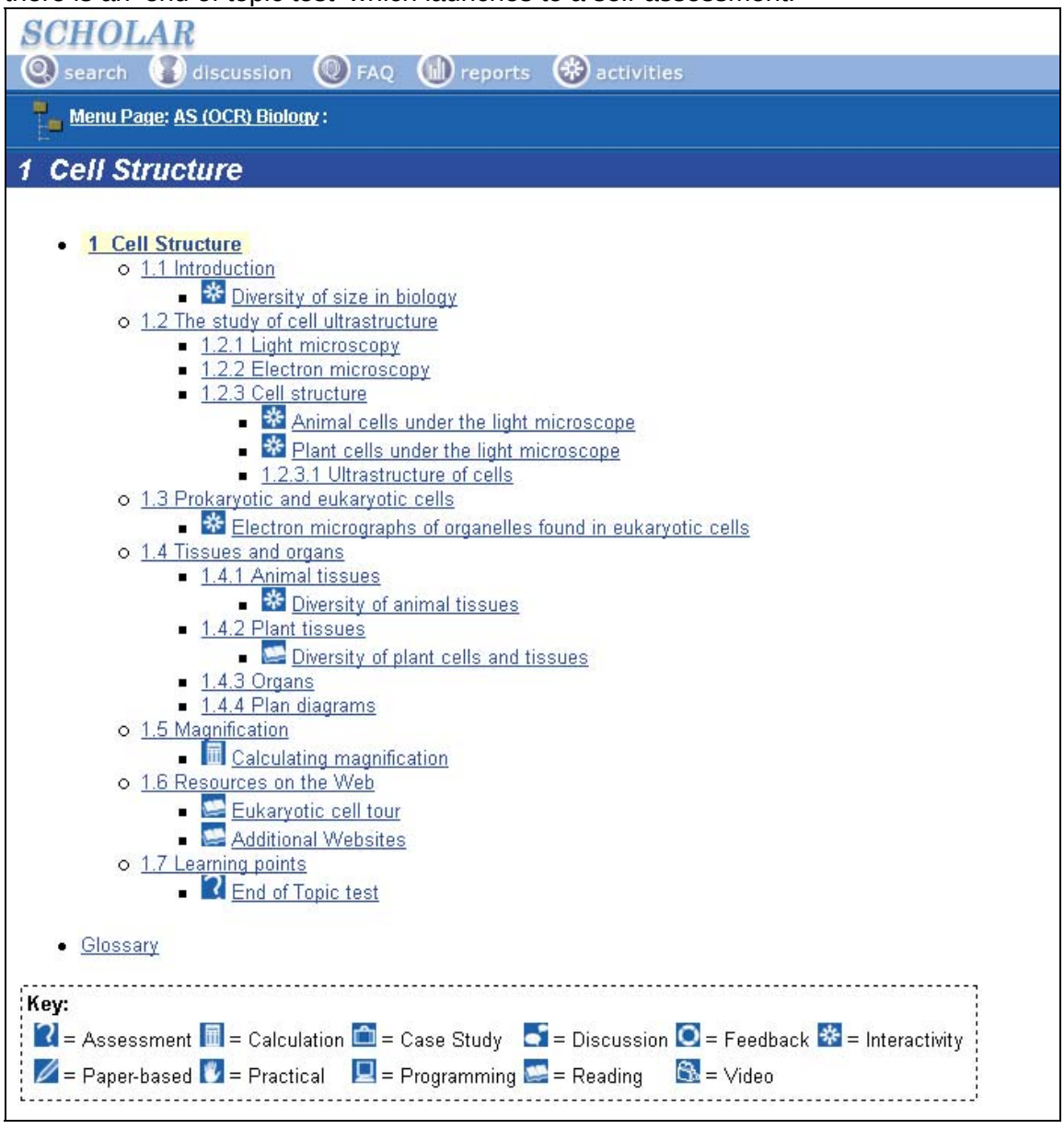


Figure d. An example of a static page. This one has a labelled image on it.

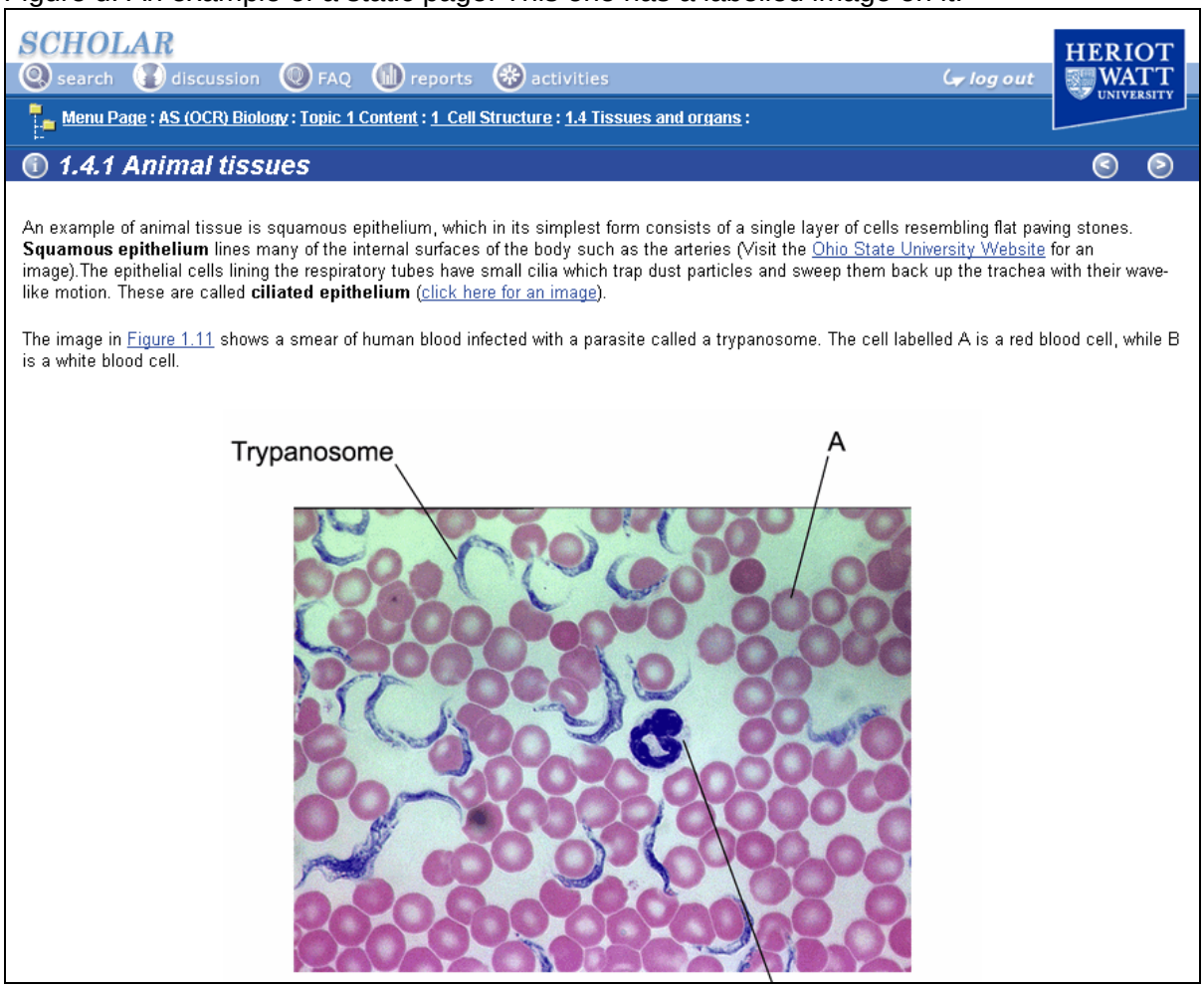


Figure e. An example of an interactive page. Many interactive pages contain some form of Flash-based 'widget' for users to interact with. Often, as with this one, they include some form of question. Here there is a drag and drop question about cell sizes.

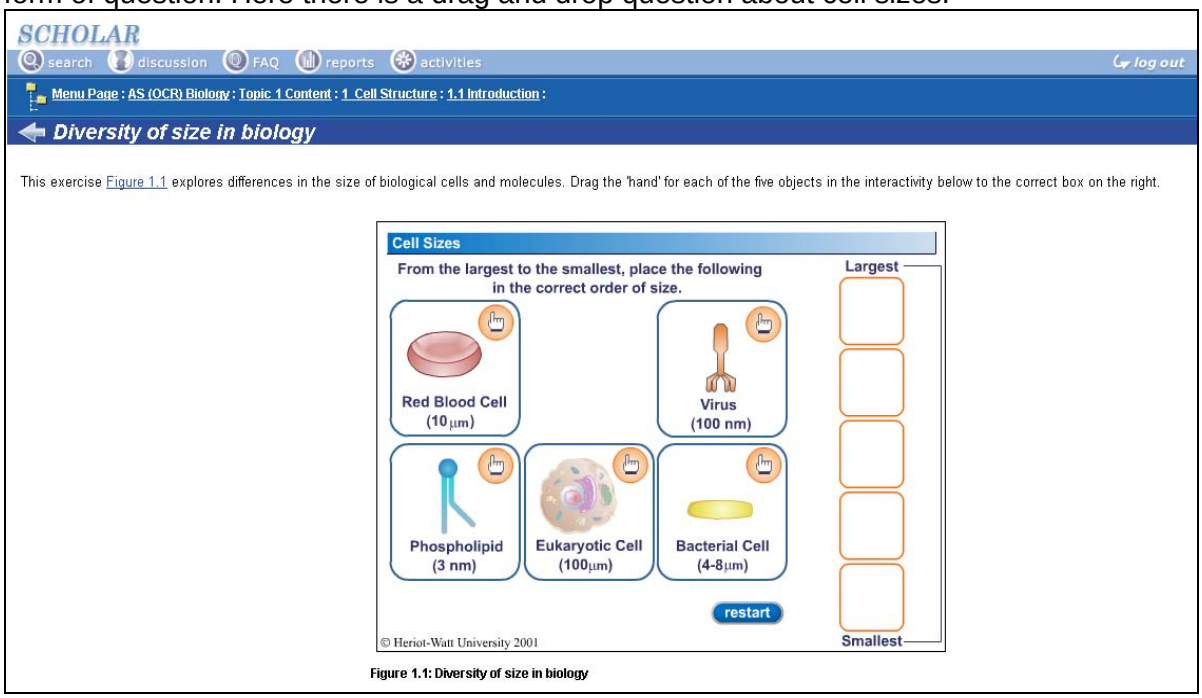


Figure 1.1: Diversity of size in biology

Figure f. A link page that usually contains no content other than the hyperlink to a self-assessment.

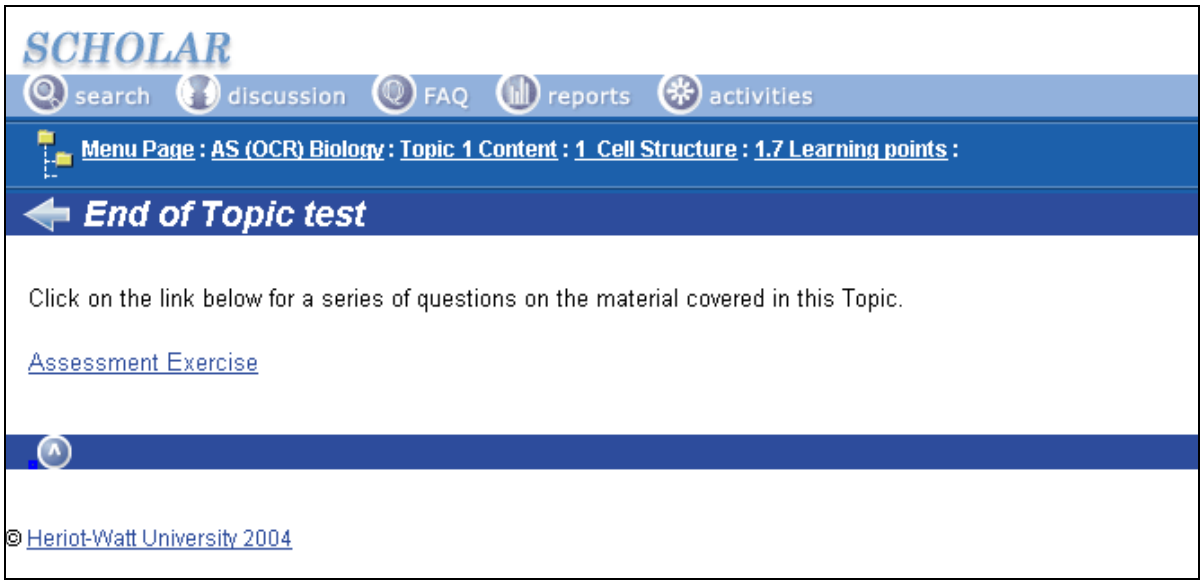
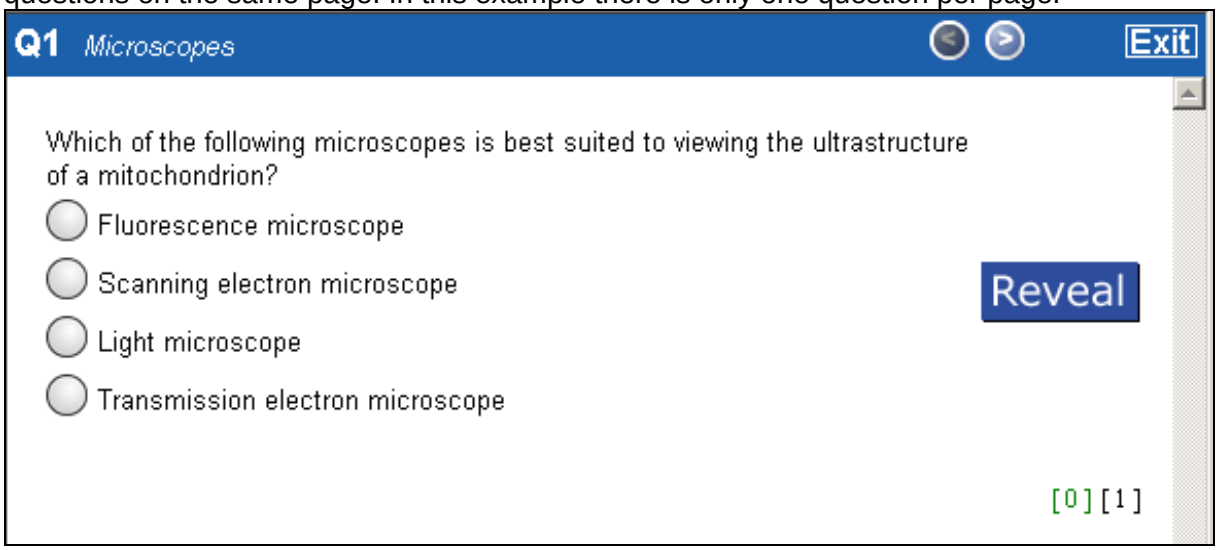


Figure g. The first page of a self-assessment. Many self-assessments have several questions on the same page. In this example there is only one question per page.



4. Key findings

- During the trial, 1,974 (38%) of students and 209 (39%) teachers registered to use SCHOLAR did so at least once.
- The average number of pages accessed by the student and teacher population ranged between 5 and 30 pages per user per month, with a trend for use to decrease through the year. A total of 13% of users looked at over 100 pages of SCHOLAR content in one subject during the trial.
- It is suggested that some individuals initially looked at SCHOLAR out of curiosity, but only those that felt it had relevance and use to them continued to use it.
- Most teachers involved in the trial rarely used SCHOLAR to assist teaching in class, mainly because schemes of work were already in place and/or they felt it did not match their syllabus. However there were some excellent examples of SCHOLAR use by some teachers (e.g. via an interactive whiteboard); see section 7.
- Students were recorded using SCHOLAR during every hour of the 24-hour clock, highlighting the importance of students having out-of-school access to online resources.
- 64 individuals were identified as super-users – they looked at 300 or more pages in a subject (including repeat visits to pages). 90% of these super-users were students.
- The average student super-user got a C grade at AS and a grade D at A2. Many were therefore not the high-achieving students that were often expected to be high-users by teaching staff.
- The top eight individual super-users were all male students and were, where information was available, identified by their teachers to have certain attributes that were not shared equally with the other students – for example one had special learning needs, one was re-taking his A2 exams, and one was described as very quiet and under-confident. Feedback from the schools suggested that four out of six of these students did better than expected in their 2005 exams, and two did as well as expected but without regular attendance in class. No data were available for the other two.
- There was evidence of a correlation between higher SCHOLAR use and higher student attainment at A2 in comparison with AS. However these results must be interpreted with care – whilst it was possible to identify a relationship it was not possible to say whether SCHOLAR *caused* the higher attainment or whether this result reflected other factors at work.

5. Executive summary

Before reading this executive summary it is recommended that the reader familiarise his/herself with the terminology regarding SCHOLAR page structure (page 4). There is also a glossary of acronyms and other terms used in the report that can be found on page 118.

a) Introduction

SCHOLAR comprises a set of online e-learning resources developed to support the teaching and learning of five A-level subjects: biology, chemistry, physics, maths and computer science. The SCHOLAR model also offers optional staff training events to help teachers to familiarise themselves with the materials, and a reporting facility that tracks user progress and self-assessment results as they move through the pages of online content.

SCHOLAR was initially developed in Scotland for the Highers system before being converted to support English A-levels. Whilst most/all of its content should be applicable for students of every syllabi, its structural layout was based on the OCR syllabus for each subject.

The resources available per subject on average comprise 930 pages of content, of which 52% are static text/image pages, 33% involve some form of interactivity, and 15% are end-of-topic self-assessments.

During the 2004/5 academic year the National Learning and Skills Council (LSC) funded a trial of SCHOLAR in 56 schools and colleges in England. This report provides detailed data regarding the uptake and use of SCHOLAR by teachers and students, and describes user opinions, lesson observations, and the profiles of individuals who used the resource at a high level.

This report also details an investigation into whether there was any relationship between student exam attainment at the end of 2005 and student use of SCHOLAR during that academic year.

Data sources included:

- A database that logged the pages of SCHOLAR accessed by individual teachers and students
- AS and A2 exam information from the Local Education Authorities (LEAs)
- Predicted grade information from the A-level Information Service (ALIS)
- Interviews with teachers and students
- School visits and lesson observations
- Questionnaires sent to teachers and students
- Informal feedback from teachers
- Formal feedback from Becta subject mentors and Teacher ICT specialists

b) Schools, students and teachers involved in the trial

A total of sixty schools were registered to use SCHOLAR in the 2004/5 academic year, although in practice only 56 of these ever had a student or teacher that logged on to the SCHOLAR online site at least once. The data and statistics found throughout this report relate to those 56 schools.

Schools signed up throughout the year, hence some had access to SCHOLAR for a longer period than others.

Twelve (21%) of the schools involved in the trial were selective schools, 39 (70%) were non-selective, and five (9%) were FE Colleges. A list of all participating schools is provided in Table 15 page 66.

During the trial there were 289 visits to training events by 259 teachers from the 56 schools; this represented 49% of the teachers registered to use SCHOLAR. Twenty-two teachers (8%) attended more than one event, with a maximum of four events attended by any one teacher.

A total of 5,180 students and 532 teachers were registered for login access to the SCHOLAR online system via their own unique username and password. Because users were often registered to use more than one subject, this created totals of 8,220 student subject-users and 563 teacher subject-users. Students were therefore registered for an average of 1.6 subjects each; teachers for an average of 1.1 subjects each.

A further 647 temporary student and 299 temporary teacher usernames were allocated across the schools in the event that individuals that had missed out on being sent a unique username required to access SCHOLAR. Use of temporary usernames was removed from all analyses except for those at a population level because it wasn't possible to attribute use from them to any one named individual (one temporary username may, for example, have been shared across a class).

Of those individuals registered, 1,974 (38%) individual students and 209 (39%) individual teachers used SCHOLAR at least once in at least one of the subjects they were registered to access. This represented a total of 2,881 (35%) student subject-users and 217 (39%) teacher subject-users that used SCHOLAR at least once.

c) Use of SCHOLAR by students and teachers

During the trial 157,595 pages of SCHOLAR were accessed by the student population and 14,585 pages were accessed by the teacher population.

The average number of pages accessed by the student and teacher population ranged between 5 and 30 pages per user per month with a trend for use to decrease through the year, perhaps as the novelty faded. There were peaks in activity across the student population during the January and May/June exams, and continued and high level use did occur (see section 8, page 42) but this was for a minority of teachers and students. This paints a realistic picture of what might be expected to happen when something novel is introduced to a population – some individuals had a look out of curiosity, but only those that felt it had relevance and use to them continued to use it.

Students were recorded using SCHOLAR during every hour of the 24-hour clock, highlighting the importance of students having out-of-school access to online resources.

A total of 31% of pages were accessed by students outside of the hours of 9am - 4.59pm, in comparison to only 14% of pages by teachers. Students therefore used SCHOLAR more often than teachers outside of school hours, and feedback showed that they used it as an additional resource for revision or homework support.

d) Subject popularity

Of the five subjects, the most commonly accessed subject was biology, making up 46% and 30% of all subject pages accessed by students and teachers respectively. Biology materials were used more than expected given the proportion of users registered to access them.

In contrast maths materials were unpopular, and evidence suggested this was due to users feeling that they were irrelevant first because they only covered pure maths, and second

because of the difficulties caused when using the question interface (this is discussed in more detail later in this summary).

During the trial the student population looked at between 64% (maths) and 98% (biology) of all the pages of content available in a subject, and the teacher population looked at between 28% (maths) and 87% (chemistry) of the available pages. There was a very big difference in the number of different pages of computer science materials accessed by the student population (92%) and teacher population (37%) and this was probably due at least in part to a handful of students that studied computer science without a teacher in 2005 (see page 44 for a profile of one of these students). Across all subjects both students and teachers visited any one page an average of 1.6 times.

Analysis revealed that students did not use SCHOLAR equally across the subjects they were registered to use. Feedback suggested that students were more likely to engage with SCHOLAR in the subjects where their teacher(s) had also engaged to some degree (e.g. mentioning SCHOLAR in class, asking students to logon and work through sections as revision, or showing animations via a whiteboard).

e) Super, high, medium and low use of SCHOLAR

On average 2% of users were super-users (they looked at 300+ pages of content in one subject), 11% were high users (100-299 pages), 15% were medium users (50-99 pages) and 72% were low users (1-49 pages).

Computer science and biology were the most popular subject materials, with 22% of computer science student users and 21% of biology student users looking at over 100 pages. In contrast maths was unpopular, with only 3% of student users looking at over 100 pages.

Teacher data were almost identical to those from students: on average 3% of teacher subject-users were super-users, 9% were high users, 15% were medium users and 73% were low users.

For teachers, computer science and chemistry were by far the most popular subject materials, with 21% of computer science and 20% of all chemistry teacher subject-users looking at over 100 pages. In contrast maths was, as with students, extremely unpopular – only 2% of users looked at over 100 pages.

There was no difference in the sex ratio of student users:non-users, nor was there a difference between the gender of students that were super, high, and medium/low SCHOLAR users. However it is of interest to note that the ten highest subject-users across the trial were all male students (profiled in 7b, page 43).

f) A profile of the super-users

There were 69 subject super-users (comprising 64 individuals) during the trial; that is a user who looked at 300+ pages of SCHOLAR in any one subject. Ninety percent of super-users were students, and many super-users were looking at biology materials. Two-thirds of teacher super-users were female, whereas two-thirds of student super-users were male.

Teachers from Further Education colleges were over-represented as super-users, suggesting that SCHOLAR lent itself particularly well to the FE environment or teaching approach.

The attainment profile of student super-users showed that the average super-user got a B grade in their GCSEs, a C grade at AS and a D grade at A2. Many super-users were therefore not the high-profile high-achieving students that were often expected to be high-users by teaching staff.

The top ten subject super-users (comprising eight individuals) were profiled in detail. All looked at between 690 and 945 pages of SCHOLAR in any one subject (including repeat visits to pages) and all were male students. All were identified by their teachers to have certain attributes that were not shared equally with the other students, for example they were either:

- A student with special learning needs
- A high-achieving, highly motivated student
- 'Problem' students
- Were re-taking exams
- A mature part-time student
- Absent a lot
- Completing a qualification without a teacher
- Very quiet and under-confident

One student made the top ten subject super-users three times for all three of the subjects for which he was registered.

Feedback from the students' schools suggested that four out of six of these students did better in their 2005 exams than was expected (data were unavailable for one student). Two students did as expected in their exam, but they did so without attending lessons for some or all of the year.

Although their use was classed as super-use, these top ten super-users still only looked at between 29% and 57% of all of the unique pages of content available in the subject in question. However, seven of them were AS students in 2005, hence roughly half of the materials would not have been relevant to them in 2005.

In summary, for the eight super-using individual students profiled, SCHOLAR seemed to provide a source of information that they could not / were not getting from their teacher(s).

g) SCHOLAR use and student exam success

Comparing students' actual versus predicted grades (data from ALIS)
The ALIS data provided the opportunity for a robust and statistically valid way to look at SCHOLAR and attainment by allowing comparison of SCHOLAR students with a matched student somewhere else in the country that had never had access to SCHOLAR. However the ALIS dataset included only 6 of the 55 individual student super-users and only 19 of the 331 individual student high-users. Students with data in ALIS and with SCHOLAR usage data looked only at an average of 70.4 pages of SCHOLAR (i.e. they were medium users).

Analysis revealed that students' average attainment at GCSE level was a very good indicator of how well they then did in their A-level exam. Analysis also showed that 'high achievers' (A and B grade students) were not more likely to use SCHOLAR in comparison to those that attained lower grades. This is contrary to some people's expectations that it would mainly be keen, high-achieving students would be likely to engage with SCHOLAR.

However, there was no relationship between the amount that a student used SCHOLAR and student attainment at A2 / AS.

It would have been more valid to run this analysis on high and super-users, but unfortunately the data were unavailable because most schools had not paid ALIS to produce predicted grades.

Comparing students' A2 attainment in the SCHOLAR trial year with their AS attainment the year before the trial (data from LEAs)
This dataset focused on a subset of students who didn't have access to SCHOLAR in 2003/4 when they completed their AS exam, but who did have access to SCHOLAR in 2005, when they completed their A2 exam. The aim here was to see whether students who used SCHOLAR a lot during their A2 year had a significantly bigger positive difference between their AS and A2 exam grade in comparison to students who had access to SCHOLAR in their A2 year but decided not to use it.

This dataset, gathered from each LEA, differed to that from ALIS because it focused on attainment at A2 versus AS, rather than GCSE attainment versus A2/AS attainment. Data from the LEAs provided a larger sample size than ALIS, and incorporated more super-users and high-users of SCHOLAR. This dataset also incorporated a 'matched pairs' design, although this time the match was an individual before and after SCHOLAR exposure rather than an individual being matched to a different person. However, the LEA data could not provide the predicted grade information.

Analysis revealed that there was a positive correlation between the number of SCHOLAR pages accessed by a student and the difference between their AS and A2 grade. The more pages of SCHOLAR accessed by a student, the more likely they were to improve a grade between AS and A2.

There was also a significant difference between high, low and non-users of SCHOLAR in terms of the variation in A2-AS grade. This significant difference was driven by the high users group, which had a higher average rank in the analysis in comparison with the no and low-user groups. Figure 9 on page 85 shows the differences between the median and range of the data in the no, low and high-user groups.

These data provide evidence for a relationship between higher SCHOLAR use and higher attainment at A2 in comparison with AS. However these results must be interpreted with caution – whilst it was possible to identify a relationship it was not possible to say whether SCHOLAR *caused* the higher attainment or whether this result merely reflected other factors at work. For example, these high-SCHOLAR-using better-attaining students may have become more motivated in their second year, and thus became more likely to engage with optional resources such as SCHOLAR.

h) Feedback from students
Of the 530 students who answered the questionnaire, 80% said they were using/had used SCHOLAR and 20% had decided not to use it. The most common reasons for non-use were that students preferred to work with paper-based resources, or that SCHOLAR was too difficult/irritating to use once logged in.

Students were asked to respond to 13 statements about SCHOLAR (see figure 1, page 57). On average students answered positively to nine statements and neutrally to four statements.

Students said that, on average, they could *often* although not *always* get online at home and at school. Analysis revealed that ease of access to the Internet was not affected by the type of school that students attended (selective v non-selective v FE College). Despite this and with the exception of occasional searches on Internet search engines, the majority of students said they tended not to use computers for their studies, instead relying solely on their class notes and textbooks.

Several students commented that they found it very useful when teachers used SCHOLAR animations to visually explain certain concepts, such as bond angles in chemistry. They

mentioned that some concepts became far easier to understand when shown visually rather than described verbally.

There were significantly fewer students even logging on to look once at the maths and computer science materials than expected given the proportion registered for these subjects. From the feedback given in questionnaires and interviews this was probably due to the fact that these two subjects seemed particularly irrelevant to many students in the trial: in addition to syllabus mismatch issues (unless taking OCR), SCHOLAR maths only covered pure maths, and computer science contained irrelevant content for those students registered to access it who were actually completing a qualification in ICT.

i) Feedback from teachers

SCHOLAR integration within a school depended greatly on the initial judgment made by key staff, and this was possibly affected as much by factors such as their general opinion of e-learning, the school's ease of access to highly qualified teaching staff, or their opinion of trial projects in general as it was about the resource itself.

The CPD entry-level training day offered by SCHOLAR was found to be useful by most teachers who attended, mainly because it gave them time to look through SCHOLAR and discuss with contemporaries how it might be used. A total of 49% of teachers registered to use SCHOLAR also attended a training day.

Twelve percent of the 99 teachers who answered the questionnaire said that they had decided not to use SCHOLAR at all. A further 21% said that they were not using it but were happy for students to use it as an optional additional resource in their own time.

There was no significant relationship found between teachers' opinions of SCHOLAR and the years that they had been teaching. Nor was there a significant difference between teachers' opinions of SCHOLAR and the type of school in which they worked. Finally, there was no relationship between school type and the likelihood of SCHOLAR being used by a teacher in class.

The most common reasons for teachers not using SCHOLAR were that it did not match their syllabus well enough, that they didn't have time, and/or that pupils gave negative feedback (often about difficulties involved in answering questions in the system). Only 3% stated lack of access to IT resources as the reason for not using SCHOLAR. Indeed only 4% of teachers who replied to the questionnaire said they had no classroom access to a computer at all, and 41% said they had classroom access to a computer for every 1 - 3 students.

Most teachers looked at SCHOLAR and suggested to their students that they use it as an optional additional resource. Some felt it was too dangerous to let students use SCHOLAR on their own because of the syllabus mismatch issues – they were worried that students would learn the wrong content at the wrong depth. The majority of teachers did not use SCHOLAR themselves when teaching, usually because they said that they already had schemes of work in place for that year.

Several teachers did say that they had used SCHOLAR in class a few times to try it out. Usually teachers asked students to login individually or in pairs to revise or look through a certain topic. Only a minority of teachers were more hands-on, using SCHOLAR via an interactive whiteboard or projector to talk through various concepts and questions with the class.

j) SCHOLAR page types

SCHOLAR has three types of page within the content: static pages, interactive pages and self-assessments (see page 4 for a description of each).

For all subjects except biology one type of page was used less often than expected (given the proportion available) by students – for chemistry and computer science these were the interactivity pages, for maths and physics these were the self-assessment pages. This result supported feedback from some users relating to the difficulties involved with using self-assessments in maths and physics in particular (discussed later in this summary).

For teachers (as with students) for all subjects except biology one type of page was used less often than expected – for computer science these were the interactivity pages, for chemistry, maths and physics these were the self-assessments. Again this partly supports feedback from users relating to the problems involved with using self-assessments in maths and physics in particular.

With teachers and students it was the biology materials where a page type was used more than predicted given its availability. Students used biology self-assessments more than expected, whereas teachers used the interactivity pages more than expected. This may have been an indicator of students using biology self-assessments to re-test themselves (firstly because biology materials were popular and secondly because there were a smaller proportion of biology self-assessments available in the biology content in comparison with all other subjects), and of teachers focussing on the interactivities to show their class certain concepts visually.

In terms of the top ten most visited pages per subject it was interesting to notice that pages holding only a hyperlink to a self-assessment were often visited more often than the assessment itself. This suggests either that some users had problems reaching the assessments from the link, and/or that users visited the link and remembered that they had completed that assessment already.

Interactive pages made the top ten most popular pages 13 times across the subjects for teachers, but no times for students. This may indicate a preference for teachers using interaction pages such as animations to show concepts visually to a class. Certainly feedback from students suggests that some concepts were far better understood when explained with visual props such as animations. Alternatively teachers may have just singled out the more interesting non-text pages when investigating SCHOLAR, because interactive pages are labelled as such from the content index in each SCHOLAR subject (see Figure c page 6).

Chemistry materials were particularly popular with teachers, which correlates with some known high use of SCHOLAR chemistry by teachers in one school and one college in particular (see section 7, case studies 1 and 2 respectively).

k) Problems with SCHOLAR usability and interface structure

E-learning often suffers from problems relating to an initial requirement to download plug-ins that allow certain features (e.g. animations) to run. With SCHOLAR this issue caused a few problems for some schools at the beginning of the trial, although this was usually overcome quite quickly.

Some users had problems in accessing the self-assessments because they were held on different URLs to the rest of the of the SCHOLAR content. In addition several users also commented that they found it difficult to remember the URL for the SCHOLAR login page (shown on page 4). These are both basic usability problems that probably stopped some users from reaching the content.

Many users were not following the OCR syllabus for which SCHOLAR was primarily designed. For this reason users often found it difficult to know where the content was for a specific part of their syllabus, particularly because the content was partitioned at a top level into AS and A2 materials which was incorrect for syllabi other than OCR. In response IU did create a mapping document per subject for the AQA and Edexcel syllabus structures, and this contained hyperlinks from the framework of the syllabus to the correct areas of content within SCHOLAR (see Figure b, page 5). When students and teachers were aware of this document they usually found it useful. However many users had not found the mapping documents, and several suggested that they should be placed in a more prominent position on the SCHOLAR site.

As with the mapping documents, few teachers and students were aware of the reporting facility, which held great potential, especially for teachers wishing to track their students' self-assessment scores. Indeed only 8% of students and 54% of the teachers that replied to the questionnaire had ever used it. Feedback suggested that this may have been due to the SCHOLAR interface design, and it was suggested that the reporting button should be made more prominent and/or re-named to make it more intuitive.

The most important issue regarding the interface design related to the manner in which answers to questions had to be inputted, especially in maths and physics. This caused the most complaints from students and staff because:

- Non-intuitive SCHOLAR-specific formatting was required in order to input formulae
- Often (but not universally) numerical answers were required to three significant figures (English users were used to two significant figures)
- Alternative spellings or use of CAPS were often not allowed

Failure to input an answer in exactly the right way resulted in an 'incorrect' mark, and this caused huge irritation and demoralisation to teachers and students. More flexibility in the system would have helped users greatly, particularly because students said that ideally they wanted access to more questions and self-tests to assist with revision outside of classes. Certainly analysis showed that physics and maths self-assessments were used less by students than expected given the number available, which was possibly a reflection of this problem.

Lastly, many teachers found the process of registering students onto the SCHOLAR system to be incredibly complex and time-consuming. IU has already acted on this feedback, and the 2005/6 academic year has seen the launch of a simpler system.

I) SCHOLAR versus other resources

Feedback from Becta subject mentors and teachers with experience of ICT resources in their subject was generally positive. Most felt that SCHOLAR would make a useful additional resource, although several felt that the cost was high, which might stop schools from buying and using it. All felt that there were alternative products available that were also to be recommended, although often these could not be accessed outside of schools. (In addition, other resources were out-of-the-box software packages without the staff training that is associated with SCHOLAR integration in a school.)

Both teachers and students said they sometimes used other computer-based resources to assist with their teaching/learning. However, there was little overlap between the resources preferred by students and those preferred by teachers. Students' three most commonly named products were *AS Guru*, *S Cool* and *Mei-online*, whereas teachers' were *Autograph*, *SAM Learning* and *Multimedia Science School*.

m) SCHOLAR within the different school types

Across all five subjects there were significantly more student users:non-users from selective schools, and fewer users:non-users from non-selective schools.

Data showed that this was not due to teachers in selective schools using SCHOLAR more than teachers in non-selective schools, nor was it due to students in selective schools having more access to IT resources. One theory is that selective school students' academic aptitude, and/or the teaching style used in selective schools may have promoted a stronger culture of investigation and self-learning that resulted in students who were more likely to investigate novel resources such as SCHOLAR at least once. Alternatively this result may just have been a consequence of a more organised system of distributing usernames and passwords in selective schools in comparison to non-selective schools.

The trend for more students from selective schools to login once was not repeated when the focus shifted to look at high or super-users of SCHOLAR. For example, regarding super-users there was no difference in the proportion of students from each school type.

In chemistry, FE teachers were significantly more likely than expected to engage with SCHOLAR – a trend reflected in students. There were a total of eight chemistry teachers from FE, four of whom were from one college (see case study 10), and two of whom were from a second college (see case study 1, section 7). Both of these colleges were recently subject to Ofsted inspection and were actively implementing increased use of ILT resources across the board in 2004/5. This engagement was reflected in student use: there were five FE colleges with 84 students who engaged with SCHOLAR – 68 of these students (81%) were from these two colleges. This provides strong evidence to suggest that teacher engagement with e-learning such as SCHOLAR influences student engagement.

n) SCHOLAR's key strengths:

- Time spent organising a framework that went beyond the online resource – for example the set-up of regional steering groups ran every six weeks to bring key stakeholders together and integrate SCHOLAR into the local education structures.
- The provision of an optional structured training day for teachers to introduce them to SCHOLAR – this gave staff time to take a look and consider whether and how to use it.
- Its completeness – the online materials contained all of the (often text-based) content relevant for a course in addition to interactive pages and self-assessments.
- Its versatility – SCHOLAR could be used for self-directed learning, assessment and score tracking, reference, self-testing or as a demonstration teaching aid.
- Its accessibility – out-of-school access is unusual for an online resource, and this alone was a driving factor for SCHOLAR use by teachers or students, even when they knew of better resources elsewhere.

o) SCHOLAR's key weaknesses:

- The mismatch to syllabi other than OCR, most notably in terms of the self-assessments.
- The interface structure, which meant that many users were unaware of the mapping documents or the reporting facility.
- Issues relating to the unintuitive interface, most notably in terms of trying to input the answers to questions particularly in maths and physics.
- The maths materials, which proved to be a real turn-off to the majority of maths teachers and students (particularly because they only related to pure maths).
- The advanced CPD training days, which many teachers felt gave them nothing new.

6. Continuing the evaluation in 2005/6

The results of this report provide some strong arguments for continuing the evaluation in the 2005/6 year, so following the roughly 20 schools and colleges that have decided to pay (with the help of regional LEA and/or LSC funding) to continue to access SCHOLAR.

Data in this report show a relationship between attainment and high SCHOLAR use and suggest that the highest users are often not traditional 'high-achievers' but in fact C/D grade students whose use of SCHOLAR had often gone unnoticed by their teachers.

However, it is still not possible to say whether the relationship between higher use of SCHOLAR and increased attainment at A2 versus AS was **caused** by SCHOLAR, or whether, for example, higher student motivation in some students was the cause of them using SCHOLAR more.

It would therefore be useful to:

- Obtain a complete dataset from ALIS for all students involved in the trial. This would provide an unrelated set of data to the LEA information – if a difference in achievement was also found from this dataset it would certainly be compelling evidence to suggest that something positive happens to students who are also high users of SCHOLAR.
- Interview high-using and low-using students who are now in their A2 year to ask them about SCHOLAR and their AS attainment. This would give an indication about whether they feel that SCHOLAR is a factor in their attainment.

In addition, new data could be collected to:

- Investigate whether students do understand certain concepts better if they are shown visual animations.
- Compare retention and progression figures in 2006 with those in 2004 and 2005.

Regional representatives have expressed an interest in the evaluation continuing because it provides useful information about school and student usage at six-weekly intervals throughout the year (at steering group meetings), so allowing certain schools to be targeted for more training etc.

A decision about continuation would have to be made before the end of November 2005 in order to continue links with the relevant LEAs and avoid data loss from the SCHOLAR database.

PART A: QUALITATIVE DATA *(case studies and feedback)*

7. Visits to participating schools

Visits to schools and colleges in Cumbria were made in December 2004, and in Bexley / Kent / Medway in February 2005. No visits were made to schools in The Black Country because they joined the trial later in the academic year, and it was then too late to arrange visits before the exam period.

Each case study provides information on:

- A summary of SCHOLAR use during the year
- Lesson observation details (where available)
- Teacher opinion, from face-to-face interviews
- Student opinion, from face-to-face interviews
- Quotes from teachers in the school (where available)

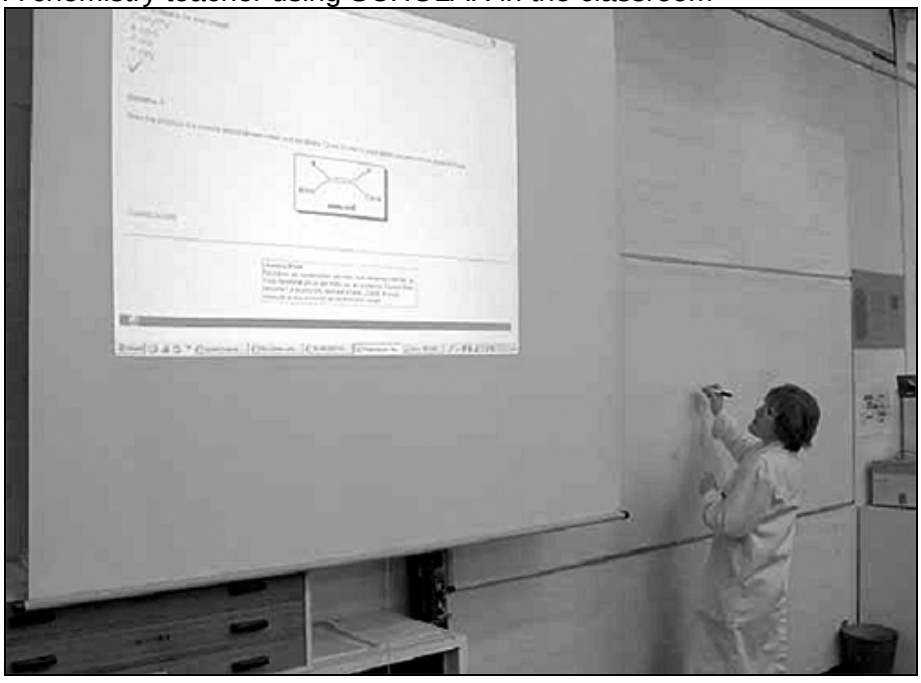
a) Case study 1

School type	Further education college
Ofsted information	Last report date: 2005 Graded satisfactory (grade 3) in science and maths. *"Staff make good use of ILT resources. Some have a considerable collection of well-designed resources on the virtual learning environment and, in chemistry and biology, the Scholar ILT programme is used to good effect".* Ofsted report
Nature of visit	Discussion with 3 x teachers (2 x chemistry, 1 x biology)
Month of visit	February 2005
Involved in second year of trial?	Yes, conditional on them paying 25% fee.

Summary of SCHOLAR use
In this college, seven of the nine registered teachers used SCHOLAR last year. The seven teachers who used SCHOLAR did so at a high rate, looking at an average of 141 pages of SCHOLAR content each. Highest use was in the subjects of chemistry, biology and maths, and the Head of Science was the highest single teacher user.

This college was subject to several new initiatives regarding use of ILT in 2005, driven in part by an impending Ofsted inspection, and the fact that a previous inspection had noted weakness in use of ILT. This college's ILT initiatives in 2005 led them to enter the Ferl Practitioners' Programme 'Exemplar Colleges Project', for which they were awarded the runner-up position (see http://ferl.becta.org.uk/display.cfm?resID=11542 to view their report about the integration of ILT into teaching and learning).

A chemistry teacher using SCHOLAR in the classroom



Teacher opinion

Head of Science (chemistry teacher): The Head of Science said she used SCHOLAR in class via a projection system (see photograph on previous page), demonstrating concepts and running animations whilst explaining equations and writing further notes on a whiteboard. She would also ask students to logon individually and go through various sections. She mainly used animations and interactive pages to illustrate concepts visually, and felt this was the best use of SCHOLAR as a teaching aid. She said she would recommend SCHOLAR to colleagues.

This teacher was less sure about the SCHOLAR maths materials. She said that the exercises were too mixed in terms of difficulty, and that they should instead start easy and get harder as they went along. She felt that overall, the way that SCHOLAR answered questions was too specific, and commented that 1) it marked answers as wrong when students hadn't used the correct decimal places, and (2) special SCHOLAR-specific formatting was required to input measures (for example coordinates were a problem – when typing in 'x, y' no comma or capitals were allowed). This resulted in questions being marked mistakenly as incorrect, which demoralised the students and irritated the teachers.

She said that staff had problems registering their usernames and passwords, such that they had often had to use temporary passwords [*author: which are not included in the analysis within this report as they are untraceable in the database*]. The teacher felt that the difficulties involved in registration were a barrier to SCHOLAR use and caused unnecessary stress for all who tried to resolve it! The structure of the materials and the mismatch with their syllabus also caused some problems in finding the relevant content.

She had attended a CPD training event together with another teacher, but they found it was too long and went over information that they knew already – notably all the general background regarding pedagogy. They wanted to get hands-on straight away. She was not using the reporting facility at the time of interview due to problems with it not listing all of her class.

Chemistry teacher # 2: This teacher used SCHOLAR to demonstrate concepts to the class and to run through questions with them. He said that he had given temporary student passwords to several students, particularly non-A-level students for which some of the materials were still relevant. He attended a CPD training event and found it quite useful, mainly as a chance to have time to look through the materials. He would recommend SCHOLAR to colleagues.

Biology teacher: This teacher felt that SCHOLAR had potential, but her password was still not working properly at the time of interview and so she didn't feel too confident about it. Her students had mentioned that it didn't match their syllabus, which was off-putting. She had used SCHOLAR once or twice in the class when the laptops were available, usually to run through an interactive page. She had not attended a CPD event, and was unaware of the reporting facility. This teacher also mentioned that she had her own electronic materials that were posted on the Blackboard VLE, and also used www.biologymad.com.

Student opinion

Staff recorded these student quotes in order to be used at the NILTA Conference in January 2005. The author of this report, two staff members from the college and one of the Interactive University trainers presented a talk about the SCHOLAR trial at this conference which included the recordings.

> *"I like using SCHOLAR because I like using computer-based learning techniques, and I also enjoy it because of the visual representations of how things work." Female biology student*

“Just recently in chemistry I was having trouble making polymers into monomers and visa versa, so I asked my teacher and she showed me on SCHOLAR. And it was easy and I wondered why I hadn’t understood it before!” Female chemistry student

“It’s generally helped me study and revise. There’s also examples included on SCHOLAR and questions about the syllabus. So generally it helps me all the way round.” Female chemistry student

b) Case study 2

School type	(Non-selective) secondary modern
Ofsted information	Last report date: 2001 Teaching quality: very good Performance year 13: E (well below national average)
Nature of visit	Lesson observation (chemistry)
Month of visit	February 2005
Involved in second year of trial?	Yes, conditional on them paying 25% fee.

Summary of SCHOLAR use
This school had one of the highest uses of SCHOLAR per teacher found across the trial. Three of the five registered teachers used SCHOLAR last year. A closer breakdown showed that the vast majority of this use was from one teacher in the subject of chemistry.

Lesson observation
SCHOLAR was used in a double period AS chemistry lesson that contained five students. Usually the class also included a further 5 students from the nearby school, but these students were missing on the day of observation. (Note that in this area of Bexley a group of schools share some science teachers because they are so difficult to recruit.)

During the lesson the teacher used SCHOLAR in several ways. Initially she began by using SCHOLAR via an interactive whiteboard to help her to discuss Hess' Law of enthalpy changes with the class. She led the students through an interactive page, explaining as she went and writing explanatory equations on the whiteboard next to SCHOLAR. She also opened a MS Word document which contained notes that the students had already been given.

She then asked students to logon to SCHOLAR with their own passwords (approx. five PCs were available in the classroom). Students were asked to go through several SCHOLAR sections and answer questions at the end.

Finally students were asked to use their textbooks to go through the section on Hess's Law. In total SCHOLAR was involved in about half of the lesson.

Teacher opinion
The chemistry teacher felt that SCHOLAR was very useful. She said that she sometimes used it in class, and sometimes for optional additional homework (she was reluctant to make this compulsory due to limited student home internet access).

The teacher said she was happy to use the static and interactive pages in SCHOLAR, but avoided use of the self-assessment pages because they were too focussed on the OCR syllabus, which she didn't use. She commented that some animations were particularly useful for visually explaining difficult concepts.

The teacher attended two CPD SCHOLAR training events, and commented that the first was useful, but the second repeated too much of the content from the first training session. She was unaware of the existence of the reporting facility to track student use.

Student opinion
Generally the group of students felt that they liked SCHOLAR, but that although they were registered for other subjects (biology and/or physics) they only mainly used it in chemistry because the chemistry teacher was using it. SCHOLAR use was usually in-school, as several students commented that their Internet connections at home were too slow. Some students occasionally used SCHOLAR to assist with homework questions.

All students commented that it was useful to have a large bank of all the relevant information available, and that the interactivity pages with questions were useful.

None of the students said they used the reporting facility. None of the students said they used other e-learning resources to assist with their A-levels.

c) Case study 3

School type	(Non-selective) comprehensive
Ofsted information	Last report date: 2000 Teaching quality: Very good Performance Year 13: B (above average)
Nature of visit	Discussion with three students and two teachers outside of classes.
Month of visit	December 2004
Involved in second year of trial?	Possibly.

Summary of SCHOLAR use
A total of 18 of the 45 registered students used SCHOLAR last year. Those that did so looked at an average of 89 pages of content online (14th highest student average of the 56 participating schools). Two students – HM (female) and ME (male) – looked at over 400 pages each, which inflated the overall student average. Five of the 10 registered teachers used SCHOLAR at least once. Of those that did so, they looked at an average of 20 pages each.

Feedback on this information from the school:

> *"It might interest you to know that ME was a "weak" student who would probably not have been accepted on the old A level course. His predicted grade from ALIS was I think an E grade, we had predicted a D but he obtained an A2 C grade in the final analysis. I suspect that the opportunity to revisit material using scholar was a significant factor in his exceeding expectations.*
>
> *"HM just missed a grade at AS, her practical exam was not good. She is going to continue with the course to A2 and with a re-sit and increasing maturity I think she will improve this year. She is an introverted student and scholar has allowed her to practice without letting some of the other students be aware of her weaker areas. I think she finds this embarrassing, although she is not alone in having problems. It was ever thus!"* Teacher

Teacher opinion
Both teachers felt that the lack of direct relevance to their syllabus was a problem in terms of them engaging with SCHOLAR. They also felt that it could mislead students by going into more depth in some topics than they were required to cover in their syllabus. In some subjects they thought it had a lot of potential use if it were syllabus-specific, but staff just needed some time to engage with it.

They said that student use was entirely outside of classes, and that this was hampered by IT issues within the school (for example access to computers in classrooms was limited, and the assessments and reporting facility on SCHOLAR were being blocked by their antivirus system). The teachers also mentioned that there were problems showing animations because a plug-in was required before they would run.

Student opinion
Students felt that the structure of SCHOLAR was too complex, which made navigation difficult. They couldn't access the assessments because of the school's IT settings, and they found it difficult to remember the URL for the SCHOLAR login page *[shown on page 4]*. However they thought that SCHOLAR was good for revision and for helping with homework. They wanted more visuals and animations, and more questions to stop it from looking "like a book".

Students also wanted to be able to change their passwords – at the time of visiting students in this school needed to remember five different passwords in order to access the school network, SCHOLAR, the VLE, SAM Learning and to email things home!

d) Case study 4

School type	Grammar (selective)
Ofsted information	Last report date: 2004 Teaching quality: Excellent in sixth form Performance Year 13: A (well above average)
Nature of visit	Lesson observation. Individual discussions with three teachers (biology, chemistry & biology, physics) and six students.
Month of visit	February 2005
Involved in second year of trial?	Yes, conditional on them paying 25% fee.

Summary of SCHOLAR use
A total of 229 of the 383 registered students used SCHOLAR at least once last year. Those that did so looked at an average of 115 pages of content online, most of which were in the subjects of biology or chemistry. Several students looked at over 400 pages each, with one student looking at 1,095 pages (making him the second highest student user in the trial). He looked at 670 pages of biology materials alone, and he is profiled in section 8b, page 47. Fifteen of the 23 registered teachers used SCHOLAR at least once. Of those that did so, they looked at an average of 76 pages each.

Feedback on this information from the school:

> *"Looking at [the end of year] usage figures one or two students stand out. The second* [highest user per subject] *in the usage list, CM (female), surprised me as I was expecting a grade C in chemistry but she was 2 UMS short of an A (predicted 45 UCAS points, achieved 60 UCAS points). I would definitely say that Scholar made a difference to her in Chemistry as it did to SO (male) who was third (predicted 36 UCAS points, achieved 50 UCAS points).*
>
> *The next student is a year 12 IB student and so does not have a result, whilst the fifth* [highest user per subject] *is a Year 13 IB student who achieved a world class Level 7 in Standard Level Chemistry, but somewhat underachieved in Higher Biology only achieving a level 5. She was predicted to achieve 114 UCAS points in Chemistry and the Biology would have been similar."* Senior Teacher

Lesson observation
A biology revision class was observed in the library. There were a mix of approx. 20 AS and International Baccalaureate 2 (IB) students in the class. This revision lesson involved students logging on to SCHOLAR individually or in pairs. They were asked to (1) carry out independent revision in areas that they felt they were weak on, and (2) were given a subject in biochemistry to research using SCHOLAR and textbooks in preparation for giving a presentation on that subject in the near future. This made up one hour's lesson.

Teacher opinion
Senior teacher (chemistry/biology) and SCHOLAR coordinator: This teacher said that the school were using SCHOLAR in biology, chemistry and physics, but that the maths teachers were instead using a product called MEI that was tailored towards the AQA syllabus *[Note*

that since this visit students have asked to instead use SCHOLAR maths because MEI only contains assessments without any supporting text]. He said that SCHOLAR offered great flexibility when teaching, which is particularly useful because the school has a mix of A-level and IB students. About half of their students complete IB rather than A-level, and all IB students have to study science and maths in their first year, so SCHOLAR was relevant to a lot of students at the school.

In 2005 one lesson in five was spent in the PC room in order to gain access to IT resources. Teachers had only used SCHOLAR to a limited degree during the trial year because schemes of work were already in place, however they were keen to integrate it more in the future.

He felt that the text in SCHOLAR was useful because all content relevant to a course was therefore available in one place and in context should it be needed. He used the reporting facility and found it to be a very powerful tool allowing him to find out where students were going wrong. Teaching could then be changed to work through any problems.

He felt that the CPD training was useful to understand the full functionality of SCHOLAR, and had attended three events. He had recommended SCHOLAR to other colleagues.

This teacher mentioned that registering students to use SCHOLAR had been problematic and took a lot of time. Acting as SCHOLAR Coordinator had also taken more time than he expected it to. In addition, it took time to install the necessary plug-ins onto each computer. In terms of the nature of the materials, he felt that the chemistry resources could do with more examples and questions to work through.

Biology teacher: This teacher said that she had only looked at SCHOLAR briefly, and that the lack of easy access to IT equipment had been a barrier (there was no whiteboard or internet access in her lab'). She was using the Edexcel biology syllabus, which didn't map exactly to SCHOLAR. However her students had heard about SCHOLAR and asked her to integrate it into some lessons. She was therefore aiming to use SCHOLAR for two revision classes, this being the first one (see 'lesson observation' above). She had not attended a CPD event, and didn't know about the reporting facility.

Physics teacher: He used the Edexcel physics syllabus but had found the SCHOLAR mapping document useful in terms of finding relevant content in SCHOLAR. However he commented that this takes time that full-time teachers often don't have. He was part-time and has tried to get to grips with SCHOLAR because students asked him to do so. He didn't use SCHOLAR often although he did have classroom access to 15 PCs between 19 students. When SCHOLAR was used in his class, students logged on individually. He had only tried it once or twice via an interactive whiteboard.

He was wary of the self-assessments because of the mismatch in syllabus content. He did not attend a CPD training event but had used the reporting facility to check up on student progress. He found the question input difficult – he said that the fact that you had to enter answers to three significant figures and use certain formatting conventions caused users to get questions wrong when they had answered correctly – he found this very annoying. He also felt that some questions were wrong in terms of the answers themselves. He felt that the ability to show some concepts visually was useful.

Student opinion

Student #1: *[Note that this student surprised his chemistry teacher because he was expected to get an E and actually got a C in his January exam. When asked about this success he said that this was due to him using SCHOLAR. The teacher contacted the SCHOLAR*

Coordinator and asked this information to be passed to the author of this report. He was subsequently interviewed during a visit in February.]

This AS student said he used SCHOLAR equally for biology and chemistry. He used it the night before his mock chemistry exam, and found that it helped him to remember facts and "avoid silly mistakes". He said that the SCHOLAR maths materials didn't seem relevant to him, but that the biology and chemistry resources were useful for him to use outside of class. Sometimes he had witnessed SCHOLAR being used via interactive whiteboards in chemistry lessons. He had not used the reporting facility. He would recommend SCHOLAR to other students, and didn't use other online resources to assist learning – just the textbook, his class notes and SCHOLAR.

Student group (four students): These students were all in the second year of the IB and said they found SCHOLAR useful to go over information they had already been taught. They particularly used the self-assessments to self-test their learning. In a few classes the teacher had used SCHOLAR on a whiteboard to show animations about e.g. cell division or bonding in chemistry. They had also been set homework to complete self-assessments. These students planned to use SCHOLAR for revision.

Students found SCHOLAR particularly useful when helping them to visualise difficult concepts, especially in chemistry (e.g. bond angles and MMR and IR absorption spectra). They liked the fact that all information was available in one place, even though some of it was quite text-heavy.

Most of their use of SCHOLAR was outside of lessons or self-directed in classes. All students were unaware of the reporting facility. They would recommend SCHOLAR to other students because it highlights gaps in knowledge and/or can be useful to self-test and receive immediate feedback. One student had even recommended it to a friend who didn't go to the school, and had given him access to his username and password! However none of the students found SCHOLAR useful for maths.

e) Case study 5

School type	(Non-selective) comprehensive
Ofsted information	Last report date: 2001 Teaching quality: good Performance year 13: B (above national average)
Nature of visit	Discussion with the staff member responsible for the overall curriculum model at GCSE and A-level, who was also the SCHOLAR contact at the school.
Month of visit	December 2004
Involved in second year of trial?	Probably not.

Summary of SCHOLAR use
A total of 43 of the 131 registered students used SCHOLAR at least once in 2004/5. Those that did so looked at an average of 39 pages of content online, most of which was in the subject of biology. Three students looked at between 200 and 300 pages. Eleven of the 14 registered teachers used SCHOLAR at least once. Of those that did so, they looked at an average of 37 pages each.

Opinion of SCHOLAR
The staff member in question was interviewed about SCHOLAR and responded with a summary of staff opinions. He felt that they had continued with SCHOLAR because if was free, but that they wouldn't be interested if there was a charge because:

- The mapping document did not do enough to make the materials relevant to any syllabus other than OCR
- The staff-training event was not useful and made staff feel negatively towards SCHOLAR. *[The comments suggested that the main problem was the SCHOLAR trainer being used in Cumbria at the time.]*
- There were too many emails from IU with training information / asking for feedback on training / with technical information

He said that the IT department at this school was exemplar, and the staff often collated and made their own IT resources which they felt were better.

f) Case study 6

School type	(Non-selective) comprehensive sixth form (separate sixth form site for two secondary schools)
Ofsted information	Last report date: 2004 Teaching quality: 3 *"Students achieve well in relation to their earlier learning and capabilities… Standards are well above average in … physics, ICT …"* Ofsted report
Nature of visit	Discussion with one teacher (Computing and ICT) and 11 students outside of classes.
Month of visit	December 2004
Involved in second year of trial?	Probably not.

Summary of SCHOLAR use
Although only 30 of the 134 registered students used SCHOLAR, those that were users looked at an average of 136 pages each. Highest use was in the subject of computer science, followed by biology. One student was a particularly high user of computer science (see section 8b, page 46), but also of chemistry, biology and physics (looking at 1,227 pages in total, including repeat visits to pages).

Teacher opinion
ICT teacher: This teacher replied that she used SCHOLAR quite a lot in lessons, both to show material to the class via a projector and to allow students to logon individually. She also set homework using SCHOLAR, and used the reporting facility to track progress. She commented that when off sick once she set SCHOLAR work for the lesson and then used the reporting facility to track the students' progress live from the school whilst she sat in bed!

She had attended three CPD training events, and used other e-learning materials to assist teaching in addition to SCHOLAR (e.g. the Payne & Gallway interactive resources). She would recommend SCHOLAR to other teachers.

She commented that for further use SCHOLAR should be mapped to the new Applied A-level ICT course using sections that were not currently available for the computing course. She also commented that the way in which answers needed to be inputted into questions was sometimes irritating as it marked things as wrong when in fact the input was just different, for example writing '*wordprocessing'* rather than *'word processing'*.

Student opinion
Students commented that they used SCHOLAR for homework for their IT course. However they felt that SCHOLAR wasn't in-depth enough if you were interested in something specific, e.g. the structure and function of the eye in biology.

In IT, students wanted more practical examples added, e.g. *'what are LANS used for?'*. All students would like more questions to allow self-testing, and exam-style questions and animations. Students found the logout after five minutes of inactivity to be very annoying.

g) Case study 7

School type	(Non-selective) comprehensive
Ofsted information	Last report date: 2003 Teaching quality: good Performance year 13: E (well below national average)
Nature of visit	Lesson observation (physics) Discussion with 2 x teachers (physics and biology/chemistry)
Month of visit	February 2005
Involved in second year of trial?	Yes, conditional on them paying 25% fee.

Summary of SCHOLAR use
A total of 27 of the 89 registered students used SCHOLAR last year. The 27 students who used SCHOLAR did so at a high rate, looking at an average of 162 pages of SCHOLAR content each. The vast majority of this use was in chemistry and biology.

Lesson observation
Students were observed during a double period AS physics lesson. The teacher had booked out the library computing space to allow students access to individual PCs. They logged in with their own passwords and were asked to work through some sections. Students had been asked to complete some work beforehand at home, but few of them had done so.

Teacher opinion
Physics teacher: The teacher felt that the physics textbooks used were not comprehensive, therefore that SCHOLAR was useful because it added breadth to the learning and because students could access it outside of school. He said that AS and A2 physics students were not using SCHOLAR very much, that they didn't use SCHOLAR very often in lessons, and that he had never used the reporting facility.

He found it frustrating that the questions were not intuitive because (1) they marked answers as wrong when students hadn't used three decimal places – they always rounded off to two decimal places, and (2) special SCHOLAR-specific formatting was required to input measures such as 'dm^3' – which in SCHOLAR must be typed in as 'dm*3'. He felt that this really irritated the students.

Biology and chemistry teacher: The teacher had introduced biology and chemistry students to SCHOLAR and told them to use it as an optional additional resource. She felt she would recommend it to colleagues together with Plato's Multimedia Science School (which sadly students couldn't access outside of school).

She had attended two CPD SCHOLAR training events, and felt that the first was useful but the second repeated the same material. She had used the reporting facility a little. She felt that SCHOLAR usernames and passwords were the biggest barrier to its use – because students couldn't change the set username and password they always forgot it and pestered staff for reminders.

Student opinion
Comments were collected when chatting to small groups of students in the physics lesson. Some students had used SCHOLAR at home, usually to run through the questions for revision. They felt SCHOLAR was useful to go over things once the teacher had taught them, but that it wasn't useful for learning concepts afresh.

Students said that they weren't ever set homework using SCHOLAR, and that use was mainly restricted to occasional in-class use both in biology and physics. In chemistry SCHOLAR was used as an optional extra homework resource.

Students felt that they would probably recommend SCHOLAR to other students, but that it needed more questions. They also commented that the way in which questions needed to be answered was unnecessarily confusing.

h) Case study 8

School type	(Non-selective) comprehensive
Ofsted information	Last report date: 2000 Teaching quality: Very good Performance Year 13: B (above average)
Nature of visit	Discussion with SCHOLAR Coordinator (maths teacher), one teacher and one student
Month of visit	December 2004
Involved in second year of trial?	Probably not.

Summary of SCHOLAR use
A total of 74 of the 117 registered students used SCHOLAR at least once in 2004/5. Those that did so looked at an average of 55 pages of content, most of which were in the subjects of computer science, followed by biology. However, of the 4,077 pages accessed by students, 904 pages (22%) were from one male student, 734 of which were in the subject of computer science. This student was the sixth highest user in the trial, and is profiled in section 8b, page 46. Eight of the 17 registered teachers used SCHOLAR at least once. Those that did looked at an average of 60 pages each.

Teacher opinion
SCHOLAR Coordinator (maths teacher): He said that the maths department were very proactive, and had access to interactive whiteboards in all rooms. They often used the MOTIVATE video conferencing maths system to assist learning, and they felt that SCHOLAR maths materials were limited and dull.

Physics teacher: In physics he used SCHOLAR to set some homework, and used the reporting facility to track progress. However he felt that he needed more time to integrate it into his schemes of work. He said SCHOLAR was currently too difficult to use in classes, especially as the science labs did not have the necessary IT equipment. He felt they would use it far more if it matched their syllabus exactly. It was also confusing to have AS and A2 materials partitioned off on the site when it didn't correlate to his syllabus.

He attended several CPD events and found them to be of mixed use. Some of them were very bad and very disorganised, mainly due to the trainer involved at that time.

Student opinion
The student said he used SCHOLAR for physics and chemistry, and used the self-assessments in maths. He used it in his own time both at home and in school, although the cost of internet access meant that he only used it occasionally at home.

i) Case study 9

School type	Grammar (selective)
Ofsted information	Last report date: 2001 Teaching quality: Very good Performance Year 13: A (well above average)
Nature of visit	Discussion with three teachers and two students.
Month of visit	February 2005
Involved in second year of trial?	Probably not.

Summary of SCHOLAR use
A total of 88 of the 132 registered students used SCHOLAR at least once last year. Those that did so looked at an average of 33 pages of content online, most of which were in the subjects of physics and biology.

Seven of the 15 registered teachers used SCHOLAR at least once. Those that did looked at an average of 40 pages each. One physics teacher looked at 115 pages.

Teacher opinion
ICT teacher: This teacher felt that SCHOLAR wasn't completely relevant for his students because they only taught ICT at the school and not computer science. However he said that some topics were relevant and that this was one optional source of information out of several that he had mentioned to students, although he didn't think they were using it. His colleague wasn't interested in using SCHOLAR at all. He attended a CPD training event and had used the reporting facility. He would recommend SCHOLAR to other colleagues as a possible resource where relevant. He did mention that one student who had been absent quite frequently had used SCHOLAR to catch up on work.

Biology teacher: This teacher felt that students were unhappy with the lack of direct relevance to their Edexcel syllabus. He felt that SCHOLAR should be re-configured to match it exactly. He did use SCHOLAR sometimes for revision, telling students to logon individually and work through a particular section. He said that some staff had set work on SCHOLAR to cover their occasional absence from teaching. He did not attend a CPD training event but did coordinate the CPD for others. He hadn't used the reporting facility. He liked to use an alternative product called *Exam.net* for biology, which he said had very good visuals, interactive testing, back-up questions and a better overall structure. He felt that SCHOLAR sometimes didn't have enough detail in certain areas, especially for the more able students. He also felt that the navigation could be better, particularly the front end. He felt that students didn't think it was very user-friendly.

Physics teacher: This teacher said that she had looked at SCHOLAR briefly and liked the look of it, but had not had time to contemplate integrating it into her teaching. She had instead told students about it as an optional additional resource. She liked the animations but felt it was irritating to have to download plug-ins. She liked the self-assessments but felt they should be completely relevant to her syllabus because it was too difficult to tell students to only answer some questions – this affected the overall percentage marks gained and became demoralising. She didn't attend a CPD training event but had used the reporting facility. She would recommend SCHOLAR to other teachers.

Student opinion

Student # 1: This student was registered for biology and chemistry, and used SCHOLAR for revision outside of classes in the school computer room. She said that where teachers do use it they have to book out the computer room. In chemistry she had been set some homework on SCHOLAR, but it was frustrating that less than half of the questions on the self-assessment were relevant to Edexcel, which she said made her feel lazy about answering the other questions. She felt that the animations were the most use, and that the self-testing would be really great if it was completely relevant to the syllabus in question. She hadn't used the reporting facility but knew that the chemistry teacher had done so to check everyone's self-assessment marks for some homework. She would recommend SCHOLAR to other students as a revision aid, and she also used *Google*, *BBC Bitesize* and *ASGuru* for revision. She didn't use *Exam.net*, although a lot of her classmates did.

Student # 2: This student had used SCHOLAR in revision periods at school. He was registered for biology and IT on SCHOLAR, but found the IT resources to not be as relevant. He didn't like making revision notes in class because *"he couldn't keep still"* and so he mentioned that he liked to revise instead from computers. He therefore felt that computer resources like SCHOLAR were very useful to him.

j) Case study 10

School type	Further education college
Ofsted information	Last report date: 2003 *'Much poor teaching in science and maths'.* Ofsted report Graded unsatisfactory (grade 4) in this area. After the report funding was directed towards IT equipment for science. At the time of visiting there was a projector and computer in every classroom, and wireless internet connection in every lab.
Nature of visit	Discussion with science teachers Discussion with students (biology A2 and AS)
Month of visit	February 2005
Involved in second year of trial?	Yes, conditional on them paying 25% fee.

Summary of SCHOLAR use
A total of 89 of the 105 registered students used SCHOLAR last year. The 89 students who used SCHOLAR did so at a high rate, looking at an average of 122 pages of SCHOLAR content each. Highest use was in the subject of biology. Second highest use was in the subject of chemistry. This college received funding from the local LSC to continue to use SCHOLAR for a further year, dependent on them paying some of the cost of access. They are still unsure whether to invest the £600.00 necessary for them to continue.

Feedback on this information from the school:

> *"Staff overall were very positive about it. Its main use though seemed to be more of a revision tool. Staff set it as homework to complete end of unit tests etc. Many students used it as a revision tool and as a kind of textbook/reference point. Staff "cherry picked" out the online demonstrations and animations that they liked to use in classes, but this was probably the minority of them. Some had the students working on it in class time to help differentiated learning in the classroom. i.e. the more able student could work independently on SCHOLAR while the less able were being assisted by the tutor….*
>
> *What became clear … to me was that all the staff didn't realise the full potential of what it had to offer. First of all the staff didn't make full use of the tutor feedback feature* [reporting facility] *to learn about their students' abilities. They mainly just used it as a check that the students had done it, as opposed to learning anything about their ability e.g. how quick they did the tests how many times etc.*
>
> [Staff] *… also underrated its value to an extent because of a lack of IT skills. They wanted to use some of its features offline, but hadn't realised they could… I think extended staff development for all users would greatly improve its implementation.*
>
> *In maths specifically it was not of use. We simply use other IT packages for maths which are honestly much better. They don't have some of the features that SCHOLAR has but they suit our purpose much better.*

We have been exploring the opportunities of extending our use of IT in the curriculum and what we have found is that many packages we see are better. SCHOLAR however still has the advantage of being interactive for the staff and students… we felt that SCHOLAR looked a bit dated compared to newer products and perhaps needs revising.

So I personally feel SCHOLAR is a good product but like all new developments, our staff need time and training to maximise its potential. I also feel that it needs updating to bring some of its features in line with the quality of newer products on the market. I need to have a sound financial background to fund this project if I am going to commit my staff to its use. My budget is less this year and they have announced further funding cuts to FE. I am genuinely concerned about the viability of costs. No matter how good this is, I will not be able to purchase it if the price is too high." Curriculum Leader, Science & Maths

Teachers' opinions

Biology teacher: She commented that she used the reporting facility to track student progress.

Maths/physics teacher: This teacher commented that she had made an effort to use SCHOLAR despite the problems with it not matching the syllabus. She said that the short mapping document produced by SCHOLAR did help to find materials relevant to her syllabus. She felt SCHOLAR was very uninspiring in maths, with materials that just looked like an A-level textbook and with questions that needed answers that were too specific. She also commented that many of the maths questions required students to do the 'working out' on paper, so there was no use in including SCHOLAR. She felt that one or two of the maths answers were incorrect. She therefore preferred to use *Autograph* software – which she felt was excellent – to assist with teaching maths. She commented that it had a very logical system of inputting equations and that SCHOLAR should learn from them! She also used *mathsnet* and *waldomaths.com* to assist with teaching maths.

She used SCHOLAR in class every week in maths or physics, but avoided the self-assessments with maths because of the problems with inputting correct answers. In physics she used assessments and animations. Overall she felt that SCHOLAR was OK but nothing special.

She attended a CPD training day and felt it was useful. She used the online reporting facility for physics, where she set homework to answer questions.

Student opinion

Biology A2 class: Twenty biology A2 students were asked *en masse* for their opinions of SCHOLAR during their lesson. Students said that they didn't like SCHOLAR as much as using textbooks, but that it made a good additional resource. They got irritated with the fact that (1) they kept losing connection with SCHOLAR and were unable to log in again for 45 minutes, (2) the questions expected answers that were too specific (e.g. the plural was right but the singular was wrong) and where specific formatting was required, (3) some questions and content were not relevant to their syllabus.

Students used it as an additional resource outside of classes, and they commented that only one of the two biology teachers used SCHOLAR in class and for homework. In-class use was only occasional, and the teacher would sometimes go through an end-of-topic self-assessment on the projector with the class. Students felt that overall SCHOLAR was OK, but only some of them said they would recommend it to other students.

Biology AS class: Thirteen biology AS students were asked *en masse* for their opinions of SCHOLAR during their lesson. They said that one teacher used SCHOLAR often, always showing pages via the projector. That teacher used lots of online resources generally.

The students felt that SCHOLAR was useful because all of the information necessary for their A-level was in there 'on call' and available outside of college if required. They felt it was useful if they were absent and that it was a helpful second resource, but that the questions were irritating. They felt that the biology questions on SCHOLAR did not reflect the type of biology questions included in the exams. They also felt that the language used in SCHOLAR sometimes didn't reflect the way that they learnt things in their syllabus. Overall they felt frustrated with SCHOLAR because it was almost – but not quite – what they felt would be really useful.

8. Profiles of the high using students

a) Profile of the super-users

Super-users were defined as users that looked at 300 or more pages of SCHOLAR in a single subject including repeat visits to pages.

There were 69 super-users, comprising 64 different individuals. Seven (10.1%) were teachers and 62 (89.9%) were students.

Three individuals (all students) looked at over 300 pages in two separate subjects (i.e. each student was listed twice as a super-user), and one student looked at 300 pages in three different subjects (i.e. he was listed three times as a super-user).

Super-users therefore made up 2.2% of the 2,881 subject-students that used SCHOLAR at least once, and 3.2% of the 217 subject-teachers that used SCHOLAR at least once.

Super-users most commonly used SCHOLAR to access biology materials (N = 39), followed by chemistry (N = 14), computing (N = 7), physics (N = 6) and finally maths (N = 3).

Attainment data were only available for 31 of the 62 subject-students. The average AS grade of these super-users was a C (N = 12); the average A2 grade of a super-user was a D (N = 19). Their average GCSE point score per subject was 6.28, equating to a grade B.

Five of the seven (71.4%) subject-teacher super-users were female, whereas only 19 of the 62 (30.6%) subject-student super-users were female.

Twenty-nine percent of the subject-teachers involved in the trial were from selective schools, 56% were from non-selective schools, and 14% were from FE Colleges. In comparison, one (14%) super-user was from a selective school, three (43%) were from non-selective schools, and three (43%) were from FE Colleges. Subject-teacher super-users were therefore largely over-represented in FE Colleges, and under-represented in selective and non-selective schools.

Fifty-three percent of the subject-students that used SCHOLAR in the trial were from selective schools, 37% were from non-selective schools, and 10% were from FE Colleges (see page 70). In comparison, 55% of subject-student super-users were from selective schools, 32% from non-selective schools, and 13% from FE. Subject-student super-users were therefore represented in proportion amongst the school types.

b) Profiles of the ten highest-using subject-users

The top ten using subject-users were all male students, and three super-users were in fact the same individual who had looked at a very high number of pages of SCHOLAR in three different subjects. Seven completed AS exams in 2005, obtaining an average grade of a C (N = 7), and three completed A2 exams in 2005, obtaining an average grade of D (N = 3). It is interesting to note that even these top ten super-users only looked at between 29% and 57% of all of the unique pages of content available in a subject.

Feedback from teaching staff at each school suggested that of the eight individuals making up the ten highest subject-users, four did better than expected in their exams and two did as expected but without attending lessons. No data were available on whether JW or JS (in 4th and 7th place) did better than expected.

A profile of each student is given in the following pages. If the evaluation continues into 2005/6 it should be a priority to interview as many of these students as possible in order to discuss their 2005 attainment and ask whether they felt SCHOLAR contributed to it.

	Initials (gender)	**School type**	**Subject**	**No. pages accessed within subject including repeat visits (unique pages visited in brackets)**	**Grade in 2005 (level)**	**Attainment as expected?**
1	DW (m)	Selective	Biology	945 (376)	D (A2)	Retook A2 in 2005. Better than 2004, better than predicted by ALIS.
2	RM (m)	Non-selective	Computer science	938 (625)	B (A2)	As predicted although he achieved it with no teacher
3	RH (m)	Selective	Chemistry	885 (365)	D (A2)	Better
4	JW (m)	Further Education	Biology	828 (337)	A (AS)	Unknown
5	DL (m)*	Selective	Biology	809 (293)	C (AS)	Better
6	DH (m)	Non-selective	Computer science	758 (417)	A (AS)	Better, but unlikely to be SCHOLAR related?
7	JS (m)	Non-selective	Computer science	741 (312)	C (AS)	Unknown
8	DL (m)*	Selective	Physics	717 (214)	C (AS)	Better
9	DL (m)*	Selective	Chemistry	714 (214)	B (AS)	Better
10	OS (m)	Selective	Biology	690 (320)	U (AS)	As initially predicted, although student did not then attend school after March

Table a. Summary profiles of the ten highest subject-users. Note that * marks the same individual student who made the top ten for all three subjects for which he was registered to use SCHOLAR.

DW – 1st position
DW was the highest user of SCHOLAR in any one subject, looking at 945 pages of biology including repeat visits, or 376 unique pages (44% of all available biology pages). He did not use SCHOLAR for any other subjects. He first used SCHOLAR in January 2005, continuing through until June 2005. By far the highest use was in June, with quite high use in March. The highest number of repeat visits to a page was nine.

He was the only student in this top ten to have value-added predicted grades data available in the ALIS system. DW obtained an E in Biology A2 in 2004, and re-took it to obtain a D in 2005. ALIS predicted an E – U grade (25 UCAS points) based on past performance and value-added measures. He therefore achieved better than predicted.

> *"Last year DW was repeating year 13 because he made a mess of all of his A-levels the year before. In 2004 (the end of his Y13) he achieved at A2: Biology E, Business Studies C, Chemistry U, Computing E and General Studies E. Having repeated Y13, he achieved: Biology D, Business Studies C, Chemistry U and Computing U. He has gone to read Biology at University! He attended lessons in Biology and Business Studies only.*
>
> *"[Regarding our other 'super-users'] … AS [female, 370 pages of biology, obtained A2 grade B in 2005] … and PG [male, 335 pages of biology, obtained AS grade B in 2005] are able, conscientious students with good study skills, so I am not surprised at their high use of any resource. FS-L [female, 330 pages of biology, obtained AS grade A in 2005] is a very able but extremely disorganised student who breezed through GCSE without having to face up to her shortcomings as a student. In Y12 she began to have to address some of her poor study habits, so again, I am not surprised at her use of this resource. "* Head of Science

RM – 2nd position
RM was the second highest user in any one subject, looking at 938 pages of computer science materials. Of the top ten, he was by far the highest user of unique pages, looking at 625 unique pages (see table a, page 43) – 57% of the 1,090 available on SCHOLAR for computer science.

He decided to take this subject despite the school not having a teacher to teach it – hence all achievement was his own work with no lessons to support it. He started to use SCHOLAR in January 2005, and continued until June 2005. Approximately 800 pages were accessed in June alone, and the maximum number of repeat visits to a page was six. In 2005 he took Computing A2 and got a grade B. He also took physics, geography and maths, gaining an A, A and B respectively. Although he was also registered to use SCHOLAR physics and maths materials he only ever looked at ten pages of physics, and no maths materials.

> *"Other than RM, students using SCHOLAR have used it as a supplement to their main resources (teachers, textbooks). RM used Scholar as one of his main resources for his Computing studies because we did not as a school provide AS/A2 Computing [as a qualification]. It was obviously very successful as RM obtained a Grade B at A2. He was predicted a grade B, but he then achieved it all on his own. As a school we have found this worth investing in for a further year and have signed up for SCHOLAR again."* Head of ICT

RH – 3rd position
RH was the third highest user in any one subject nationally, looking at 885 pages of chemistry materials including repeat visits, or 365 unique pages (54% of all available

chemistry pages). He looked at an overall total of 1,250 pages of SCHOLAR across all three subjects for which he was registered (these being chemistry, physics and maths).

He first used SCHOLAR in January 2005, and continued until June 2005. Nearly all of his use (over 1,000 pages) was in June 2005. The highest number of repeat visits to any one page was 13.

In 2005 RH took three A2 exams with the following results: chemistry (D), mathematics (D) and physics (D). During his GCSEs (taken at a different school) he obtained two A* in Double Science, and an A in mathematics.

> *"RH performed above expected … although I am not sure to what extent."* Senior teacher

JW – 4th position

JW, a mature student, was the fourth highest user in any one subject, looking at 828 pages of biology materials (made up of 337 unique pages – 40% of all available biology pages). His teacher gave him the username and password of a female student who left the college after two weeks having never used SCHOLAR. It was only after trying to trace the female student for this section of the report that this came to light. JW had booked to complete an AS in biology as an evening class, but when this was cancelled he had to instead attend college in the day, fitting attendance around his day job at a hospital.

He first used SCHOLAR in October 2005 and continued until June 2005. Much of his use was in March and May and the highest number of repeat visits to a page was ten. Interestingly he was the only subject-user in the top ten to never use the self-assessments, which may have been due to him experiencing the access problems that some users had when trying to reach the self-assessment URLs from the main body of SCHOLAR materials. In 2005 he obtained an A in AS biology.

> *"JW was a Chemistry graduate 2.1 degree who was applying to do Medicine and needed the AS in Biology. He worked at the nearby hospital and fitted College in around his shifts, consequently his attendance wasn't great and he often came in late. This was fine by us as he was such a keen and committed class member and we felt we owed him as the evening class was cancelled. He gained an A at AS (just!) which was what he needed to get into St Thomas's in London."* Biology teacher

DL – 5th, 8th and 9th position

DL was the single highest user across the whole trial, looking at a total of 2,240 pages of SCHOLAR across three subjects for which he was registered, including repeat visits to pages. He looked at 809 pages of biology (293 unique pages, 35% of those available), 717 pages of physics (214 unique pages, 39% of those available), and 714 pages of chemistry materials (214 unique pages, 32% of those available).

To put this in context this total (including repeat visits to pages) was almost as much as the average total student use from any one school in the trial (an average of 2,578 pages per student population per school). His high use per subject placed him 5th, 8th and 9th in the list of top ten subject-users for biology, physics and chemistry respectively.

He first used SCHOLAR in November 2004, and continued until the end of the trial in June 2005. By far the highest use in any one month was in May 2005, when he looked at over 1,000 pages. The highest number of repeat visits to any one page was 15.

DL took four AS exams in 2005 with the following results: biology (C), chemistry (B), physics (C), and German (U). During his GCSEs (taken at the same school) he obtained an A* biology and physics, and an A in chemistry.

> *"DL has special learning needs and his performance was, I think, about a grade higher than teachers expected in all three subjects. He was also absent a lot."* Teacher

DH – 6th position

DH was the sixth highest user in any one subject, looking at 758 pages of computer science materials (417 unique pages, 38% of those available). He was also registered for maths and physics, although he looked at less than 30 pages of maths materials during the year, and only about 115 pages of physics.

He first used SCHOLAR in November 2004, and continued until June 2005. Highest use in any one month was during January, when he looked at nearly 500 pages. The next highest monthly use was May (approx. 200 pages). He completed four AS subjects in summer 2005, obtaining an A grade in all of them.

When the school was asked to provide feedback about a high-using student they immediately guessed correctly which student it was and in what subject. This is their feedback:

> *"DH is an exceptional student who has come into his own in the sixth form. I have spent 14 years teaching at A-level and I have never met a student more fascinated in learning. He therefore exceeded expectations in all of his exams, including maths in which he chose not to use Scholar.*
>
> *"He used Scholar for computer science because his teacher was off work for six weeks and set the class work to cover his absence during that time. DH was the only student in that class that bothered to complete all of the work – indeed he worked his way through everything he was asked to do. I don't think he therefore used SCHOLAR 'off his own back' – instead he did so because he is a very conscientious and hardworking student who did what his teacher had asked.*
>
> *"DH got 4 grade A at AS level in Use of Maths, Computing, Physics and Graphics. He also started catching up on maths units to transfer on to the full A level maths which is not at all an accepted route! It means studying 80% of the AS course by himself. But not with Scholar!!"* Maths Teacher

JS – 7th position

JS was the seventh highest user per subject, looking at 741 pages of computer science materials (312 unique pages, 29% of those available), and 1,227 pages over all of the subjects for which he was registered. This made him the third highest SCHOLAR user across all subjects (he was registered for biology, chemistry and physics). He first used SCHOLAR in October 2004 and continued until June 2005, with the highest use in November/December 2004 and May/June 2005. The highest number of repeat visits to a page was eleven.

> *"JS is a very quiet student. He is conscientious and strives to improve his grades. Last year he took AS Computing as an extra subject alongside his other 3 A level subjects. He struggled with it at first, but began to understand it more by using Scholar. In summer, he missed a grade B by something like 2%.*

“I did advise him about Scholar’s uses in some of the other subjects he is studying - Physics and Maths, for example, but I’m not sure if he used these as much, since our Physics course uses its own online resource and the match between Scholar Maths and A level Maths is not as useful as it could be.

“Last year, JS went on a Physics Study Visit to Cerne in Switzerland. I believe that resources like Scholar have allowed him to develop his knowledge and skills without having to ask the teacher for help as much - something which his quiet demeanour doesn’t always allow him to do.” Computer science teacher

OS – 10th position

OS was the tenth highest user in any one subject, looking at 690 pages of SCHOLAR biology materials (320 unique pages, 38% of those available). He also looked at 405 pages of chemistry resources. In total he therefore accessed 1,095 pages across all subjects, making him the fourth highest overall user in the whole trial.

He first used SCHOLAR in November 2004, continuing until June 2005. By far the highest use in any one month was approx. 500 pages in March. The maximum number of times that he re-visited the same page was fifteen.

"I am very surprised that this student was the highest user from our school! OS was a very lazy student who got into severe difficulties last year which resulted in him being asked to leave the school in March and go on extended study leave. He still took his exams, obtaining U grades (which were as predicted). He was certainly an immature student, and didn't respond to the class situation well.” Senior Teacher

9. General feedback regarding the strengths and weaknesses of SCHOLAR

This feedback is generic, and includes observations by the author and informal feedback from regional stakeholders such as LSC or LEA representatives as well as the schools themselves.

a) SCHOLAR strengths

- The regional steering groups were a useful component of this trial and assisted in successful integration of SCHOLAR into schools. Schools and colleges knew and trusted key local contacts, and these individuals therefore had far more leverage to bolster uptake within and between schools than an unknown e-learning provider would have had.
- The regional steering groups provided a forum for everyone to feedback on what was and was not working regarding the trial in local schools. It also allowed the evaluator to present updates on how each school was using SCHOLAR (in terms of actual pages accessed by X no. students and teachers etc). Where possible IU were often quick to act on feedback to tailor the SCHOLAR training and integration to reflect regional issues.
- The versatility of SCHOLAR was a strength – students could use it for self-directed learning, assessment or reference, and staff could use it as a demonstration tool. It could also be used to track usage and store self-assessment scores using the reporting facility.
- The fact that SCHOLAR could be accessed outside of school/college was a strength – several teachers commented that there were better multimedia products on the market but they were on CD and so students could not access them to revise concepts outside of class or at home.
- The completeness of SCHOLAR was a strength – all of the content relevant to a subject was in one place. Students commented that they didn't necessarily think SCHOLAR was very 'exciting', but it had everything there to go to as a reference when needed (although there were some problems with coverage for syllabi other than OCR).
- Teachers generally found the basic entry-level CPD staff training very useful because it gave them time to look at SCHOLAR and discuss ways to use it with their students.

b) SCHOLAR weaknesses

- Staff and students found the method of inputting equations to be extremely frustrating. Instead of an equation editor (present in some rival software) a SCHOLAR-specific way to input the equations was required and many users commented on how unintuitive and user-unfriendly this was. In addition, answers had to be correct to differing numbers of significant figures, and it was unclear whether units had to be included in the answer. Sometimes alternative spellings were not allowed. This problem related mainly to the maths and physics materials, although it is also an issue in the other subjects to varying degrees.
- Many staff and students mentioned that they would prefer exact mapping to their syllabus. Although they were usually happy to continue to use SCHOLAR to some degree, they often avoided self-assessments because so many questions were not relevant (see section 7 for comments). In the future it may well be worth creating syllabus-specific self-assessments instead of trying to convert all the material.
- The biggest practical irritants to uptake of SCHOLAR were the problems associated with administrative staff having to manually register large cohorts of students, and the inability to change usernames and passwords to something more personally memorable after registration. For this reason IU re-designed the registration system for users so that they could choose their own username and password. This new system is being used during the 2005/6 academic year.

- The site navigation was not as easy to understand as it could have been. Many teachers and students didn't know about the reporting facility, and the link to this was not obvious even though it was present on each page. SCHOLAR rarely mapped to a user's syllabus, so the mapping documents (with links to SCHOLAR topics under the structure of e.g. AQA Biology) should also have been made more prominent on the site.
- The maths materials were very unpopular. The fact that SCHOLAR only covered pure maths combined with any syllabus mismatch seemed to turn staff and students off to the possibility of using the maths SCHOLAR materials in particular.
- Teachers mentioned that they would like case studies, examples of lesson plans and practical information to assist them in understanding how to start to integrate SCHOLAR into their teaching.
- The advanced CPD training was disappointing for many teachers, mainly because it tended to go back over things covered in the basic training. It caused severe irritation to a handful of teachers, and possibly adversely affected their opinion of the materials because of it.

c) Feedback from ICT subject matter experts

Below are several quotes that reflect the feedback from two Becta Subject Mentors and nine teachers who work part-time as ICT Consultants for *Teachers evaluating educational multimedia Ltd* (TEEM, see http://www.teem.org.uk). TEEM are an organisation that evaluates educational software, and they were employed by the author of this report to evaluate SCHOLAR. A copy of their full report is available from the author on request.

Positive feedback

> *"*[Regarding biology] … *I am convinced that once students are introduced to this site, they will find it a comfortable environment in which to study and revise at their own pace. This alone makes it an extremely good resource."*

> *"*[Many] *... activities and links to external websites were well thought out and relevant."*

> *"The animated mechanisms for organic compound reactions [in chemistry] were good and delivered the topic much more effectively than drawing curly arrows on a board!"*

> *"When you re-visited a [maths] assessment exercise the site supplied a slightly different question with different numerical values. This would be particularly valuable as a teaching aid for weaker students."*

> *"The main strength to SCHOLAR is that it allows the students to work independently through various sections at their own pace. It could be used as a classroom resource but is probably best used for revision or independent study."*

> *"The website is extremely well thought out and has some very good features. The site was easy to navigate with clear pictures and links to other relevant areas."*

> *"The content is accurate, current, unbiased and relevant and the animations, pictures and diagrams used are all of very high quality."*

> *"SCHOLAR definitely complements the NLN materials. The NLN round 3 materials for Maths & Physics cover only certain topics and the styles are different. The NLN Biology material is paired with Sports Science and therefore just anatomy &*

physiology. The Chemistry NLN materials are level 2 and not appropriate for A Level. As the SCHOLAR materials cover the whole specifications they must compliment each other, plus SCHOLAR fills some large gaps in provision such as that of AS/A2 Chemistry."

"SCHOLAR is pedagogically sound and is a high quality resource so I think some colleges would stretch to say £200 per subject. Ideally though it would be like the NLN materials and freely available to all providers."

"Since the content covers all aspects of the subject at this level, it is really a 'standalone' resource so could be used either as an addition or instead of a classroom lesson."

"SCHOLAR has the advantage of covering the whole specifications, whereas other materials tend to just cover certain bits."

"The design is very professional, which is good as some resources aimed at this level can be a little patronising. The content is outstanding as it matches up perfectly with the Edexcel syllabuses and the mapping document makes it effortless to select the correct material. The material is presented in good-sized chunks..."

Negative feedback

"The reporting system would be more useful for pupils tracking their own revision than for teachers attempting to track progress, the navigation in this area is one of the weaker elements of the resource."

"Some good bits here and there [in chemistry] *but variable quality - some diagrams almost looked cut and pasted. Some of the animations didn't add much learning value. It was a bit of a jazzed up text book."*

"The factual component [in maths] *was fairly similar to that provided by a textbook with relatively few interactive parts that would enhance classroom use."*

"The assessment exercises require learners to type in mathematical answers as string equivalents. A less able student may find some aspects of this difficult."

"Some of the Biology on screen activities seemed a little simple for AS/A2 level …"

"[In biology] … *the questions don't have any feedback, which is a shame."*

"[In chemistry] … *labels such as the details of reaction and equations are often videoed on card rather than appearing on-screen. This makes them almost impossible to read and makes the activity look of poor quality."*

"[Regarding maths] … the content is appropriate for the target audience, if that audience is students taking an A-level in straight Pure Mathematics. However, the vast majority of students do NOT do this – most students taking A-level in June 06 will take 4 x Pure Maths units and 2 x applications. Just 4 of the 7 modules included in this are useful for these typical students, and they would need to be clearly warned that the Further Pure units were not for them."

"In order to enter complex mathematical solutions the software writers have created a set of conventions e.g. to enter $x^2 \div 3$ the user has to type x^2/3. It is important for users to familiarise themselves with these conventions before using the software.

“There are problems and inconsistencies with the appearance of mathematical formulae, fractions etc, and the graphs need a little work.“

10. Questionnaire returns from students and teachers

A summary of student and teacher responses to the questionnaire is given below. Please note that there is usually some positive bias involved with questionnaires, in that the people who decide to invest time and effort in completing and returning a questionnaire usually feel more favourably towards the issue in question. If teachers were not interested in completing the questionnaire they may also not have circulated it to their students, thus the questionnaire information in this section should be regarded with some caution.

Not every individual answered every question, therefore the sample sizes (N) vary slightly with each question. In addition it was not possible to tell whether respondents told the truth or lying about the feedback given. Where students had completed two questionnaires (for example in two different classes) only one was chosen randomly to enter into the analysis.

SUMMARY OF STUDENT REPLIES

a) Number of replies

A total of 530 individual students from 30 different schools answered some or all of the questionnaire. This represented 10% of the 5,179 individual student usernames registered to use SCHOLAR.

The respondents came from the following school types:

	No. schools where replies came from	**No. individual replies**
Selective school	5 (16.7%)	187 (35.3%)
Non-selective school	21 (70.0%)	260 (49.1%)
FE College	4 (13.3%)	76 (14.3%)
TOTAL	30	530

Table 1. The types of school in which students answering the questionnaire were studying.

b) Student profile

A total of 529 students provided information about their age, summarised in table 2. The average age was 17, with one 14-year-old student taking AS maths at one college, and eight students over the age of 20, all taking A-levels at FE Colleges. The oldest student was 45.

Table 3 summarises the number of SCHOLAR subjects (i.e. biology, chemistry, physics, maths and ICT) that students were taking. The average student that answered this part of the questionnaire (N = 519) was taking two subjects covered by the SCHOLAR materials. Thirty-five students (6.7%) were taking four AS or A2 subjects covered by SCHOLAR. (In addition some students were taking further maths, although this is not covered in SCHOLAR.)

Sixty-five percent of students (N = 490) said they were intending to study a science-related subject at university.

Age	No. students
Under 16	1
16	117
17	258
18	131
19	14
20	1
21	2
22+	5
TOTAL	529

Table 2. The ages of students that completed questionnaires

No. AS/A2 subjects being taken that are covered by SCHOLAR	No. students
1	135
2	160
3	189
4	35
5	0
TOTAL	519

Table 3. The number of SCHOLAR subjects that students answering the questionnaire were taking at AS or A2. Note that the five SCHOLAR subjects are biology, chemistry, computer science, maths and physics.

c) Online access

A total of 494 students provided information about the ease by which they could get online and access SCHOLAR at home and at school. The results are summarised in table 4.

The average student could *often* get online at home: 42% said they could *always* get online at home and 14% said they could *never* get online at home.

Interestingly, students reported that *always* getting online access was not as easy at school (only 26% could always get online), but it was more likely that there would at least be some access (only 6% said they could *never* get online at school). As with at home access, the average student said that they could *often* get online access.

The data were then analysed to investigate whether there was any relationship between school type (selective schools, non-selective schools and Further Education Colleges) and the ease at which students could gain online access either in school or at home. For example, we might hypothesise that selective school students would be more likely to have online access both at school (due to e.g. better facilities) and/or at home (due to e.g. better socioeconomic background of parents). However, there was no evidence to suggest any such relationship, either within schools ($N = 501$, $df = 2$, $H = 3.61$, $p = 0.17$) or in the home environment ($N = 494$, $df = 2$, $H = 3.01$, $p = 0.22$).

Ease of online access	At home	At school/college
Always	208 (42.1%)	128 (25.5%)
Often	110 (22.3%)	189 (37.7%)
Sometimes	106 (21.5%)	155 (30.9%)
Never	70 (14.2%)	29 (5.8%)
TOTAL	494	501

Table 4. A summary of student responses to the question *'How easy is it for you to get online and access SCHOLAR at home and at school/college?'*

d) Use of SCHOLAR

Only 8% (N = 41) of students had ever used the online reporting facility to track their use and assessment scores of SCHOLAR. In comparison, 61% (N = 325) had used the self-assessments.

A total of 20% (N = 106) of the 530 students who replied to the questionnaire had decided not to use SCHOLAR, although this underestimates the true number of non-users across the trial (see section 12b, page 67 for data) – probably because (1) many students who were not interested in using SCHOLAR were also uninterested in completing questionnaires relating to it, and (2) if teachers were not interested in SCHOLAR they may not have asked students to complete a questionnaire.

The explanations as to why students said they did not want to use SCHOLAR are listed below (note that many students gave more than one reason):

- I prefer to work on paper - to use textbooks and/or my notes (24 replies)
- SCHOLAR is too difficult/irritating to access or use once logged in (this included comments about questions that asked for answers that were too specific, or that users thought were wrong) (19 replies)
- I forgot about it / I didn't have time / I don't need it (16 replies)
- It does not fit my syllabus well enough / doesn't contain any content relevant to some things I am learning (15 replies)
- SCHOLAR is boring, I don't like it (12 replies)
- I don’t have internet access / website disconnects / pages don't load (9 replies)
- I don't know what it is (7 replies)
- I’ve lost my password / I never had a password (6 replies)
- I prefer other computer programs / internet sites and searches (5 replies)
- I haven't been bothered to look at SCHOLAR (5 replies)
- It doesn't suit my learning style as much as other methods (3 replies)
- I get headaches staring at a computer (1 reply)

Interestingly, the main reason that students gave for not using SCHOLAR was that they preferred to work using paper-based resources. This made up 20% of all comments. Nineteen students stated that SCHOLAR didn't work in the way that they expected once they were in it – they often stated that the questions seemed wrong or required answers that were too specific or too confusing to input correctly even if the answer was known. Some students also mentioned that it was difficult to navigate through the materials easily.

Only nine of the 122 comments (7.4%) stated lack of effective access to IT resources as the reason for not using SCHOLAR.

e) Opinions of SCHOLAR

Three hundred and seventy two students (77%, N = 482) said that they would recommend SCHOLAR to other students.

Students were then asked whether they agreed or disagreed with 13 statements relating to SCHOLAR. Between 391 and 471 students replied to each of the statements, and the average student responses to each are summarised in Figure 1 page 57.

On average students *agreed* with all statements except for their neutral opinions of the following four statements:

- *'SCHOLAR is enjoyable to use'*
- '*SCHOLAR is better than other e-learning I have seen that supports my science A-levels'*
- *'Teachers teach better when they use SCHOLAR'*
- *'I want to use SCHOLAR again'.*

When asked to give an overall mark out of ten for SCHOLAR, the average response from students who replied to this question (N = 459) was seven out of ten.

f) Other computer-based resources used

Table 5 provides a list of other computer software packages and resources that students said they used to assist their learning of A-level subjects. The most popular resource was the general use of internet search engines, rather than any specific named product.

The three most popular named packages were:

- *AS Guru* (23 replies) – A BBC website for students that provides diagrams, animations, activities and advice to support AS maths, English, general studies and biology
- *S Cool* (21 replies) – a website for students containing revision and teaching materials and advice for GCSE and A-levels
- *Mei-online* (13 replies) – online resources for maths and further maths AS and A levels

Interestingly, there was little overlap between the computer-based resources preferred by students and those preferred by teachers. Of the six most popular student resources, only two were shared in the top six teacher resources. These were general use of internet sites (most popular for students and teachers) and Autograph maths software (sixth most popular resource for students, second for teachers).

	NO. REPLIES	
	Students	**Teachers**
CD Roms – unspecified	1	6
My own subject web site / in-house resources - unspecified	2	2
Internet sites – unspecified (often using Google to search)	64	12
Exam board sites - unspecified	4	-
Absorb physics	-	1
AQA website	4	-
AS Guru	23	3
Ashfordman	1	-
Atain.co.uk	1	-
Autograph	8	10
Biz-ed	1	-
BBC Bitesize	11	3
Boardworks	-	6
BTL publishing resources	-	1
Chemguide	1	-
ChemIT	2	-
Control studio	-	1
Crocodile physics	-	1
Crocodile chemistry	-	1
Digital brain	-	2
Easitech	-	1
Encarta	2	-
Exampro	1	2
Forum	1	-
FOLDOC	1	-
Granada Learning	-	1
Granada secondary zone	-	2
GSP Fathom	-	1
Headstart	-	2
Holah (Psychology)	1	-
HyperPhysics	1	-
ICT Companion	1	-
Ikes.freeserve.co.uk/urls.htm	1	-
Kaleidos	-	1
KRUCIBLE	-	1
LabMouse	1	-
LGfL (London Grid for Learning intranet)	-	1
Maths Alive	-	1
Maths net	4	4
Mei-online	13	2
MMSS MultiMedia Science school	-	8
http://www.mrothery.co.uk/	3	-
NAS online teachers' guide	-	1
Omnigraph	-	3
Payne & Gallway Interactive resources	-	3
Powerscience	-	1
Promethian (Activ Studio)	-	1
The student room	1	-
The Teacher	4	3
The Times revision guides	1	-
The Virtual Textbook	-	1
S Cool	21	1
SAM Learning	7	9
Scirus scientific searches	1	-
Smart notebook	-	1
Sparknotes study guides	1	-
University of Exeter MEP site	-	1
Virtual image	1	2
Windows on life	-	1

Table 5. A list of computer-based resources used by teachers and students to assist teaching / learning.

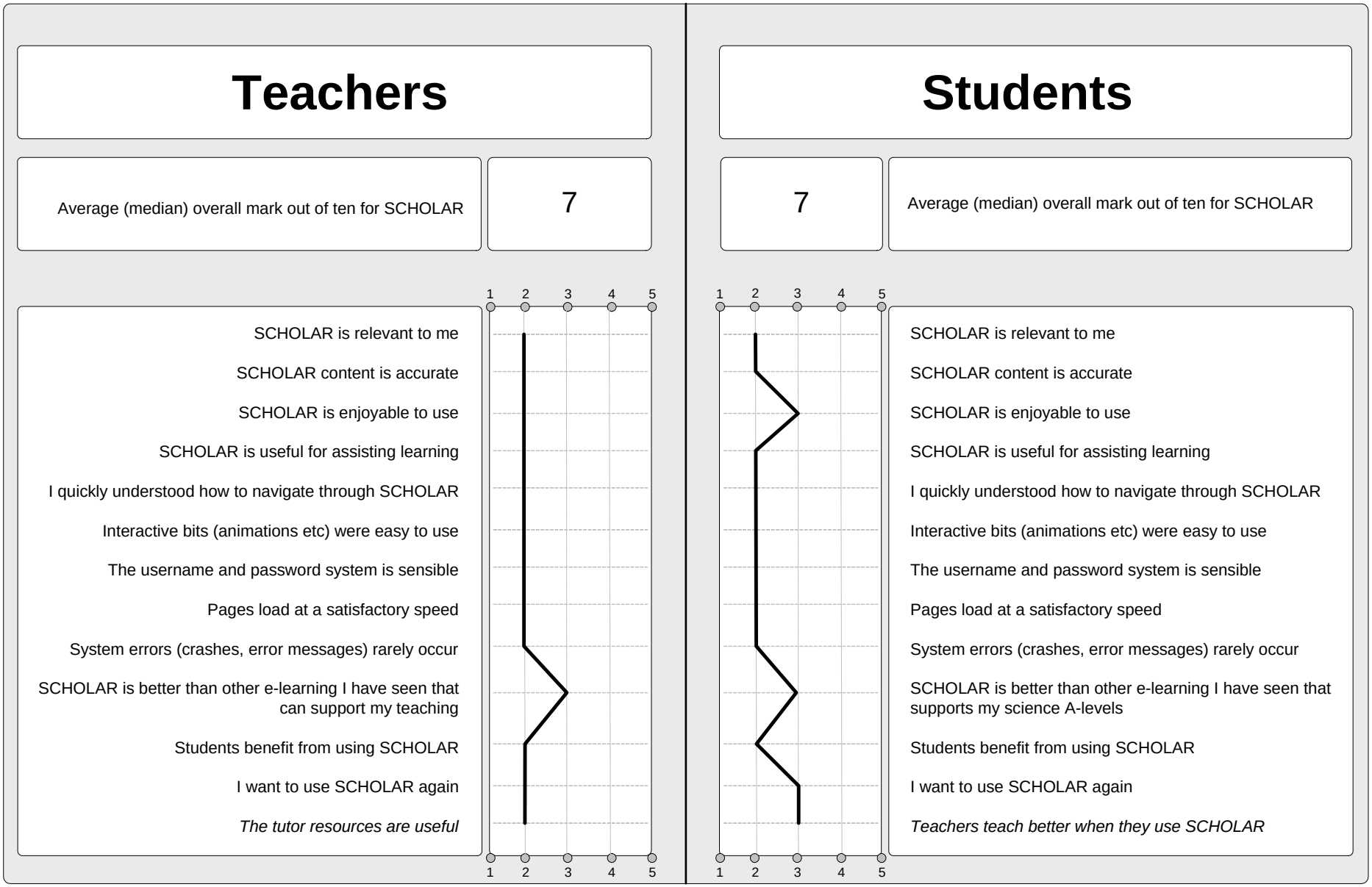


Figure 1. Teacher and student responses to questions relating to SCHOLAR. Note that all statements that students and teachers were asked to comment on are identical except for the last one on the lists (shown in italics).

SUMMARY OF TEACHER REPLIES

a) Number of replies

A total of 99 teachers from 34 different schools answered some or all of the questionnaire. This represented 19% of the 532 individual teacher usernames registered to use SCHOLAR.

The respondents came from the following school types:

	No. schools where replies came from	**No. individual replies**
Selective school	7 (20.6%)	36 (36.4%)
Non-selective school	23 (67.6%)	52 (52.5%)
FE College	4 (11.8%)	11 (11.1%)
TOTAL	34	99

Table 6. The types of school in which teachers answering the questionnaire were teaching.

b) Teacher profile

A total of 98 teachers provided information about the number of years that they had been teaching, as shown in table 7. A total of 45% of teachers had been teaching for 10 years or under, and 55% had been teaching for 11 or more years.

Ninety-four teachers provided information about the subjects they taught, summarised in table 8. A total of 83 (88%) teachers taught only one subject covered by the SCHOLAR materials, nine (10%) taught two subjects covered by SCHOLAR, and two (2%) taught three SCHOLAR subjects.

Teachers also provided information about the number of SCHOLAR CPD staff training events they had attended (see Table 9). Thirty-seven percent of teachers who replied to the questionnaire had never attended a SCHOLAR CPD event. In contrast, 4% of respondents had attended three events – in all cases these were coordinators who were attending different events corresponding to different skills they required to manage SCHOLAR in their school/college.

No. years spent teaching	**No. teachers**
0 - 5 years	22 (22.4%)
6 - 10 years	22 (22.4%)
11 – 15 years	20 (20.4%)
16+ years	34 (34.7%)
TOTAL	98

Table 7. A summary of the number of years that teachers answering the questionnaire had been teaching.

Subjects taught	No. teachers
Biology	24
Chemistry	14
ICT/Computing	7
Maths	23
Physics	12
AVCE Science	3
Biology and Chemistry	2
Chemistry and Physics	1
ICT and Maths	1
ICT and Physics	2
Maths and Physics	3
Biology, Chemistry and Physics	1
Biology, ICT and Maths	1
TOTAL	94

Table 8. The subjects taught by teachers who answered the questionnaire.

No. CPD events attended	No. teachers
0	34 (37.0%)
1	44 (47.8%)
2	10 (10.9%)
3	4 (4.3%)
TOTAL	92

Table 9. A summary of the number of SCHOLAR CPD training events attended by teachers who answered the questionnaire.

c) Classroom profile

Ninety-eight teachers provided information about the IT equipment available in their classroom, summarised in table 10. Only 4% of those that replied had no classroom access to a computer, and 41% had classroom access to a computer for every 1 - 3 students.

Several teachers also commented that they could book computer rooms, or that students had out-of-lessons access to computers, for example in a library. Two teachers replied they could book laptops for the classroom in advance, and six teachers mentioned that they had access to a data projector rather than an interactive whiteboard.

IT equipment in classroom	No. replies
1 – 4 desktop PCs	43
One desktop/laptop computer for every 1 - 3 students	40
Interactive whiteboard	49
Teacher laptop only	2
No computers in classroom	4

Table 10. A summary of the IT equipment available in the classrooms of teachers who answered the questionnaire.

d) Use of SCHOLAR

All 99 teachers provided information about their use of SCHOLAR in the classroom, as summarised in Table 11. Only 12% of teachers who replied to the questionnaire had decided not to use SCHOLAR, although this underestimates the true number of non-users (see section 12c, page 68 for data) – probably because many of those who were not interested in using SCHOLAR were also uninterested in completing questionnaires relating to it. (Note that this shows the importance of collecting quantitative data in addition to only asking for feedback, e.g. via questionnaires). A further 21 teachers (21%) who replied said that they allowed students to use SCHOLAR in their own time but that they never used it in class.

Teachers were asked whether or not they had ever used the online reporting facility to track their students' use (and self-assessment scores) of SCHOLAR. Fifty of the 92 that replied (54%) had ever used the reporting facility. Several commented that they were not aware that it existed.

Seventy-one teachers provided information about how they often used SCHOLAR. Seventy-five percent of these said they often used the self-assessments, and 38% said they often used the reporting facility.

A total of 28 (28%) of the 99 teachers that completed the questionnaire gave reasons for why they had decided not to use SCHOLAR themselves. These explanations are listed below (note that several teachers gave more than one reason):

- It does not fit my syllabus well enough / doesn't contain any content relevant to some things I am teaching (12 replies)
- I forgot about it / I didn't have time (5 replies)
- Pupils gave negative feedback, e.g. they cannot seem to enter in answers in correct format so often get low scores and feel discouraged, or they found the navigation is confusing (4 replies)
- I prefer to use pen and paper / I think traditional methods are better (3 replies)
- I'm not impressed / it isn't an improvement on what I do at the moment (2 replies)
- Too many aspects are like textbooks / there are not enough questions (2 replies)
- Poor access to IT resources hampered use (1 reply)
- There are better resources elsewhere (1 reply)
- I consider it to only be an optional extra for students to decide whether or not to use (1 reply)
- There are too many other software packages to get the hang of (1 reply)

The main reason for not using SCHOLAR was that the content that was available did not match the syllabus that the teacher in question was using, or that there was no content available for some aspects of a course (e.g. only pure maths materials were available in SCHOLAR). The other main reasons were that teachers forgot or did not have time, or that pupils didn't like it. Interestingly, only one of the 32 replies (3%) stated lack of access to IT resources as the reason for not using SCHOLAR.

	No. replies
I show SCHOLAR in lessons via a PC or interactive whiteboard	41 (41.4%)
Students access SCHOLAR from individual PCs in class	41 (41.4%)
I set homework using SCHOLAR	43 (43.4%)
Students use SCHOLAR in their own time	80 (80.8%)
I have decided not to use SCHOLAR	12 (12.1%)

Table 11. A summary of the ways in which teachers that answered the questionnaire used SCHOLAR.

e) Opinions of SCHOLAR

Seventy-six teachers (86%, N = 87) said that they would recommend SCHOLAR to colleagues, although two teachers said this assumed that SCHOLAR would change to better reflect their syllabus.

Teachers were asked whether they agreed or disagreed with several statements relating to SCHOLAR. Between 79 and 90 individuals replied to each statement, and the average teacher responses to each are summarised in Figure 1. On average teachers agreed with all statements except for their neutral opinion of the following statement: '*SCHOLAR is better than other e-learning I have seen that supports my teaching*'.

When asked to give an overall mark out of ten for SCHOLAR, the average response from teachers who replied to this question (N = 84) was, was with students, seven out of ten.

f) Other computer-based resources used

Table 5 provides a list of other computer software packages and resources that teachers used to assist their teaching. The three most popular named packages were:

- *Autograph* (10 replies) – maths software used for teaching calculus, geometry, statistics and probability
- *SAM Learning* (nine replies) – an exam revision service for all the main subjects, spanning all levels from KS1 to A-level
- *MMSS Multimedia Science school* (eight replies) – the edition for 16-18 year olds contains interactive multimedia teaching resources for post-16 biology, chemistry and physics

g) The relationship between years teaching, school type and opinion of SCHOLAR

The non-parametric Kruskal-Wallis statistical analysis was used to investigate the relationships between years spent teaching, school type and opinion of SCHOLAR.

Teachers' replies to the *'marks out of ten for SCHOLAR'* (see section 10e above) were averaged across each teaching category. Teachers who had been teaching for 5 years or less gave an average score of 8/10, whereas teachers that had been teaching for 6-10, 11-15 or 16+ years all gave a lower average of 7/10. However, when analysed statistically no significant difference was found ($N = 81$, $df = 3$, $H = 3.03$, $p = 0.39$).

In terms of school type, there was a trend for teachers from non-selective schools to give a higher mark out of ten than teachers from other school types, the average being 8/10 from teachers at non-selective schools, and only 7/10 from teachers in FE Colleges and selective

schools. However, although this was close to the significance level of $p < 0.05$ it was not significant ($N = 81$, $df = 2$, $H = 5.17$, $p = 0.08$).

Finally, the responses to *'use in class via a PC or whiteboard'* and *'students use in class via individual PCs'* were combined to provide data on whether or not teachers used SCHOLAR in class. There was no significant difference in likelihood of classroom use in different school types ($N = 99$, $df = 2$, $H = 3.43$, $p = 0.18$).

PART B: QUANTITATIVE DATA (*Facts and figures)*

11. SCHOLAR structure

a) The number of SCHOLAR pages available

	Static pages	Interactive pages	Self-assessments	TOTAL
Biology	478	333	35	846
Chemistry	434	186	53	673
Computer science	755	310	25	1,090
Maths (MAT)	478	430	316	1,224
Maths (MTH)	463	417	311	1,191
Physics	317	168	68	553
All subjects	2,925	1,844	808	5,577
Average per subject	488 (52%)	307 (33%)	135 (15%)	930

Table 12. The total number of static pages, interactive pages and self-assessments available in the SCHOLAR system. Note that there are two versions of maths materials available to reflect two syllabi variations, with very similar page counts. Approximately 80% of the maths pages in MAT and MTH are identical.

	AS pages	A2 pages	TOTAL
Biology	452	394	846
Chemistry	353	320	673
Computer science	713	377	1,090
Maths (MAT)	1,274	1,141	2,415
Physics	299	254	553

Table 13. Proportion of SCHOLAR pages that are dedicated to AS and A2 content.

Comments

Table 12 provides a breakdown of the number of static pages, interactive pages and self-assessments available per subject in SCHOLAR. There are just over 5,300 pages of content available across five subjects, although this includes two versions of the maths content where 80% of the maths pages in the MTH version are identical or nearly identical to the pages in the original MAT content. The two versions cater for the normal maths OCR syllabus (MAT), and the Pure Mathematics OCR 3891 (2004) syllabus alternative (MTH).

There is a big difference in the number of pages available in each subject, with the largest content available in the MAT version of the maths materials (1,229 pages). In comparison there are relatively few pages available in chemistry and physics (673 and 553 respectively). MAT materials were the first materials produced by IU. Where use of maths materials is analysed in this report, this represents an amalgamation of MAT and MTH use because most users dipped into both.

Typically a subject in SCHOLAR was made up of 52% static pages, 33% interactive pages, and 15% self-assessments (see page 4 for definitions of these types of content).

Table 13 provides a breakdown of the number of pages of SCHOLAR partitioned off as AS versus A2. This split is determined by the content of the OCR syllabi per subject, and so is not representative of the split for other syllabi, notably AQA and Edexcel.

12. Uptake of SCHOLAR into schools and colleges

a) Schools and colleges involved in the trial

	Bexley	Black Country	Cumbria	Kent	Medway	TOTAL
No. schools registered	11	8	17	18	6	60
No. schools with some SCHOLAR use (%)	11 (100%)	8 (100%)	14 (82%)	17 (94%)	6 (100%)	56 (93%)

Table 14. The number of schools that joined the 2004/5 SCHOLAR trial broken down into each of the geographical regions that were asked to participate.

Comments

Table 14 provides a breakdown of the number of schools involved in the SCHOLAR trial within each geographical region area during the 2004/5 academic year. A total of sixty schools were registered, but only 56 of these ever had a student or teacher that logged on to the SCHOLAR online site at least once. The data and statistics found throughout this report relate only to these 56 schools.

Schools signed up throughout the year, hence some had access to SCHOLAR for longer than others. A list of the schools, the number of days that each school was registered to use SCHOLAR (from date of first user logon), and the number of teachers and students with usernames and passwords for the SCHOLAR system is given in Table 15 (page 66).

The total number of students registered by a school should be taken with some caution. Difficulties with the 2004/5 registration process meant that some schools many have just sent a list of all of their sixth form students to IU for registration, even if those students were not completing A-levels in SCHOLAR subjects. The author was aware of this occurring in one school.

Twelve (21%) of the schools involved in the trial were selective schools, 39 (70%) were non-selective, and five (9%) were FE Colleges.

In Cumbria there were three schools which registered but which never used SCHOLAR, these being Barrow FE College, Caldew School and St. Benedict's Catholic High School. It is unknown why they did not engage with the resources, although two of the schools (Barrow and St. Benedict's) trialled SCHOLAR during the tail end of the 2004/5 academic year and may have felt that it wasn't suitable for them to use again.

Between December 2003 and June 2004, 18 schools in Cumbria trialled SCHOLAR ahead of the main trial in 2004/5. Data concerning their use of SCHOLAR during that time is available in the SCHOLAR evaluation interim report, written by the author of this report on behalf of the LSC, and dated 1st March 2005.

In Kent one school never used SCHOLAR. This was almost certainly because they registered very late in the year (May 2005).

LEA	ESTABLISHMENT	TEACHERS	STUDENTS	DAYS
Bexley	Beths Grammar School (s)	20 (+7)	210 (+9)	265
Bexley	Bexley Grammar School (s)	19 (+1)	164 (+22)	253
Bexley	Bexleyheath School (ns)	11 (+2)	89 (+9)	237
Bexley	Blackfen School for Girls (ns)	7 (+2)	38 (+8)	231
Bexley	Chislehurst&Sidcup Grammar School (ns)	17 (+1)	166 (+19)	199
Bexley	Cleeve Park School (ns)	5 (+4)	14 (+4)	253
Bexley	Erith School (ns)	16 (+1)	89 (+10)	215
Bexley	St Luke's 6th Form College (ns)	7 (+1)	140 (+14)	198
Bexley	Townley Grammar School (ns)	17 (+1)	134 (+18)	198
Bexley	Trinity School (Belvedere) (ns)	2 (+1)	15 (+3)	227
Bexley	Welling School (ns)	5 (+1)	38 (+6)	231
Black Country	Heath Park High School (ns)	2 (+1)	26 (+2)	194
Black Country	Highfields Science Specialist School (ns)	15 (+24)	84 (+13)	203
Black Country	Our Lady & St. Chad Catholic School (ns)	0 (+8)	12 (+7)	81
Black Country	Shire Oak School (ns)	13 (+2)	61 (+14)	212
Black Country	Shireland Language College (ns)	0 (+4)	31 (+3)	227
Black Country	St Francis of Assisi (ns)	14 (+5)	50 (+10)	249
Black Country	St Thomas More Catholic School (ns)	10 (+2)	58 (+11)	154
Black Country	The Northicote School (ns)	0 (+2)	34 (+1)	52
Cumbria	Appleby Grammar School (ns)	5 (+1)	27 (+3)	252
Cumbria	Dallam School (ns)	9 (+1)	107 (+10)	255
Cumbria	Keswick School (ns)	11 (+8)	101 (+9)	242
Cumbria	Kirkbie Kendal School (ns)	14 (+1)	131 (+10)	260
Cumbria	Nelson Thomlinson School (ns)	10 (+1)	67 (+6)	232
Cumbria	Netherhall School (ns)	9 (+1)	23 (+7)	261
Cumbria	Queen Katherine School (ns)	4 (2)	65 (+6)	238
Cumbria	St Aidan's County High School (ns)	19 (+2)	85 (+7)	240
Cumbria	Ullswater Community College (ns)	10 (+2)	45 (+7)	258
Cumbria	Ulverston Victoria High School (ns)	17 (+3)	117 (+14)	255
Cumbria	Whitehaven School (ns)	0 (+18)	115 (+17)	276
Cumbria	William Howard School (ns)	13 (+1)	141 (+14)	274
Cumbria	Workington 6th Form Centre (ns)	22 (+2)	134 (+22)	282
Cumbria	Wyndham School (ns)	0 (+5)	85 (+4)	79
Kent	Canterbury College (fe)	10 (+1)	105 (+4)	261
Kent	Clarendon House Grammar School (s)	0 (+12)	95 (+11)	230
Kent	Dartford Grammar School (s)	23 (+65)	383 (+100)	252
Kent	Dartford Grammar School for Girls (s)	6 (+2)	132 (+10)	267
Kent	Gravesend Grammar School for Girls (s)	0 (+21)	150 (+20)	273
Kent	Hartsdown Technology College (ns)	7 (+1)	26 (+4)	258
Kent	Hugh Christie Technology College (ns)	4 (+2)	17 (+4)	255
Kent	Maidstone Grammar School (s)	18 (+4)	222 (+26)	122
Kent	Maplesden Noakes School (ns)	11 (+1)	48 (+7)	202
Kent	Queen Elizabeth's Grammar School (s)	15 (+2)	132 (+22)	261
Kent	South Kent College (fe)	17 (+2)	105 (+9)	275
Kent	St Edmund's Catholic School (ns)	11 (+3)	39 (+7)	265
Kent	Thanet College (fe)	12 (+11)	124 (+11)	269
Kent	The Folkestone School for Girls (s)	5 (+1)	76 (+8)	202
Kent	Ursuline College (Westgate-on-Sea) (ns)	0 (+4)	29 (+3)	126
Kent	West Kent College (fe)	8 (+2)	107 (+9)	196
Kent	Wilmington Grammar School for Boys (s)	0 (+15)	126 (+14)	261
Medway	Chapter School (ns)	7 (+7)	25 (+6)	260
Medway	Mid Kent College of FE & HE (fe)	9 (+16)	175 (+15)	265
Medway	Sir Joseph Williamson's Mathematical School (s)	17 (+1)	170 (+5)	280
Medway	St. John Fisher Catholic Comprehensive School (ns)	6 (+1)	35 (+6)	126
Medway	The Hundred of Hoo Comprehensive School (ns)	7 (+1)	25 (+2)	238
Medway	The Rochester Grammar School for Girls (s)	18 (+4)	138 (+25)	267

Table 15. The 56 establishments that used SCHOLAR in the 2004/5 academic year. The number of registered teachers and students in each establishment is provided. Numbers in brackets represent additional temporary accounts not limited to one person. The number of days that the school had been logging into SCHOLAR materials is also provided.

S = selective school, ns = non-selective, fe = FE College

b) Number of individual students registered to use SCHOLAR

	Bexley	Black Country	Cumbria	Kent	Medway	TOTAL
No. schools/colleges	11	8	14	17	6	56
No. individual students registered	1,097	356	1,243	1,916	568	5,180
No. temporary student accounts	122	61	136	269	59	647

Table 16. The number of schools, individual student, and temporary student accounts registered in each geographical region

Comments

Table 16 provides information on the number of individual students registered to use SCHOLAR in each LSC region (i.e. individuals that had been given a unique username and password). In addition, many schools were provided with temporary student accounts that could be used generically across students, and which therefore could have been used by more than one student during the trial project.

Because many students were registered to use more than one subject in SCHOLAR, much of this report has had to analyse use of SCHOLAR on a per subject basis, with the number of 'subject-users' as the sample size rather than the number of individuals. Table 16 is therefore included to allow readers to know how many *individual* students were registered to use SCHOLAR.

In order to ensure valid results, much of the data involved in this report removes temporary accounts from the analysis. This ensures that the usage relating to one SCHOLAR username and password truly reflects one individual's interactions with the resource.

The average school/college had 93 registered students and 12 temporary student usernames. Across all schools, 11% of the student accounts were temporary accounts – that is they were available for use by more than one individual.

As explained in the previous section, the number of students registered by a school should be taken with some caution because it may have incorporated students for which SCHOLAR was not relevant (for example because they were completing A-levels in subjects not covered by SCHOLAR).

Of the 5,180 individual students registered to use SCHOLAR there were 1,974 (38%) who used SCHOLAR at least once in at least one of the subjects they were registered to access (Table 18).

c) Number of individual teachers registered to use SCHOLAR

	Bexley	Black Country	Cumbria	Kent	Medway	TOTAL
No. schools/colleges	11	8	14	17	6	56
No. individual teachers registered	125	53	143	147	64	532
No. temporary teacher accounts	23	49	48	149	30	299

Table 17. The number of schools, individual teacher, and temporary teacher accounts registered in each geographical region

Comments
Table 17 provides information on the number of individual teachers registered to use SCHOLAR in each geographical region (i.e. individuals that had been given a unique username and password). In addition, many schools were provided with temporary teacher accounts that could be used generically, and which therefore could have been used by more than one student during the trial project.

There were far more temporary teacher accounts allocated to schools in comparison with temporary student accounts. This was probably due to the fact that many teachers were not given unique accounts in 2004/5, and instead were allocated generic temporary accounts on an *ad hoc* basis. Although it was more likely that usage belonging to each temporary teacher account (in comparison to temporary student accounts) was from one person, to ensure valid results much of the data involved in this report removes temporary accounts from the analysis in case a temporary teacher account was shared between individual teachers or with students.

A few teachers were registered to use more than one subject in SCHOLAR, thus much of this report has had to analyse use of SCHOLAR on a per subject basis, with the number of 'subject-users' as the sample size rather than the number of individuals. Table 17 is therefore included to allow readers to know how many *individual* teachers were registered to use SCHOLAR.

In this trial the average school/college had 10 registered teachers and 5 temporary teachers usernames. Across all schools, 36% of the teachers' accounts were temporary accounts – that is they were available for use by more than one individual.

Of the 532 individual teachers registered to use SCHOLAR there were 209 (39%) who used SCHOLAR at least once.

d) Number of students registered versus using SCHOLAR

	No. students registered for each subject	No. students who accessed one SCHOLAR page (%)	No. students who accessed 20+ unique SCHOLAR pages (%)	No. students who accessed 50+ unique SCHOLAR pages (%)	Highest no. unique pages accessed by any one student
Biology	2,505	958 (38.2%)	515 (20.5%)	260 (10.4%)	376
Chemistry	1,573	636 (40.4%)	293 (18.6%)	124 (7.9%)	365
Computer science	747	156 (20.9%)	80 (10.7%)	46 (6.2%)	625
Maths (MTH or MAT)	2,222	664 (29.9%)	150 (6.8%)	38 (1.7%)	187
Physics	1,173	467 (39.8%)	195 (16.6%)	57 (4.9%)	248
TOTAL	8,220	2,881			

Table 18. The number of student users registered to access each subject in SCHOLAR (termed 'student subject-users'), and the number of these subject-users that accessed one page, 20+ unique pages and 50+ unique pages of SCHOLAR per subject. The highest number of unique pages accessed per subject is also given.

	No. students registered for each subject	No. students who accessed one SCHOLAR page (%)	No. students who accessed 20+ SCHOLAR pages (%)	No. students who accessed 50+ SCHOLAR pages (%)	Highest no. pages accessed by any one student
Biology	2,505	As above	600 (24.0%)	365 (14.6%)	925
Chemistry	1,573	*As above*	353 (22.4%)	201 (12.8%)	866
Computer science	747	*As above*	96 (12.9%)	63 (8.4%)	924
Maths (MTH or MAT)	2,222	*As above*	198 (8.9%)	86 (3.9%)	311
Physics	1,173	*As above*	241 (20.5%)	98 (8.4%)	680
TOTAL	8,220				

Table 19. The number of student users registered to access each subject in SCHOLAR (termed 'student subject-users'), and the number of these subject-users that accessed one page, 20+ pages and 50+ pages of SCHOLAR per subject. Unlike table 18, these access counts include repeat visits to pages. The highest number of pages accessed per subject including repeat visits to pages is also given.

Comments

Within this report 'subject-users' are often mentioned when analysis was carried out across more than one subject. This term relates to the number of students or teachers using or registered to use SCHOLAR *on a per subject basis*, and acts as a reminder that any individual may be represented several times as a subject-user if he or she is registered to use more than one subject. In this way there are 5,179 individual students in the trial, making up a total of 8,220 student subject-users (table 18).

A total of 2,881 student subject-users used SCHOLAR at least once (35%), although some caution must be employed regarding the sample size of registered students because this

may have contained students for which SCHOLAR wasn't relevant hence they wouldn't have used it anyway).

The number of student subject-users that logged on at least once was compared with those that never used SCHOLAR. This analysis showed that there were significantly fewer student subject-users even logging on to look once at the maths and computer science materials than expected given the proportion registered ($\chi^2 = 134.8$, df = 4, $p < 0.01$).

Given the feedback from teachers and students regarding the maths materials it is likely that the relative disinterest regarding logging on to maths was mainly because, in addition to syllabus mismatch issues (unless completing OCR) SCHOLAR maths also only covered pure maths content, and students in England very rarely only study pure maths. Regarding computer science, as well as possible syllabus mismatch issues, many students in England complete an ICT qualification, which contains a lot of content that is different to that in the computer science qualification. ICT students registered to use SCHOLAR may have therefore been put off by the lack of relevance to much of their course.

	Student subject-users that used SCHOLAR at least once		
	… from selective schools	**… from non-selective schools**	**… from FE colleges**
Biology	445	421	92
Chemistry	324	228	84
Computer science	92	51	13
Maths (MTH or MAT)	398	204	62
Physics	270	157	40
Total no. subject-users	1,529 (53%)	1,061 (37%)	291 (10%)

Table 20. The number of student subject-users from each school type that used SCHOLAR at least once in each subject.

The effect of school type

Table 20 summarises the number of student subject-users from each school type that used SCHOLAR. Chi square analysis showed a consistent picture – across all five subjects there were significantly more student subject-users than you would expect that used SCHOLAR at least once who were from selective schools, and fewer users than you would expect from non-selective schools (biology $\chi^2 = 75.4$, df = 2, $p < 0.01$; chemistry $\chi^2 = 108.3$, df = 2, $p < 0.01$; computer science $\chi^2 = 132.8$, df = 2, $p < 0.01$; maths $\chi^2 = 43.8$, df = 2, $p < 0.01$; physics $\chi^2 = 96.6$, df = 2, $p < 0.01$). The ratio of users: on-users was as you would expect for students from FE colleges except for in chemistry, where FE students used SCHOLAR more than expected.

Three suggestions might explain why selective schools students logged in once more often than non-selective students:

(a) Teachers in selective schools used SCHOLAR more and therefore influenced the students to use it more
(b) Students in selective schools had more access to IT resources
(c) The type of student attending a selective school was more self-motivated to learn

(d) A consequence of a more organised system of distributing usernames and passwords in selective schools in comparison to non-selective schools.

Using the data available collected in other areas of this report it was possible to weigh up the evidence for each of these suggestions.

Regarding suggestion (a), data from section 12e, page 73 shows that there was a significant difference in teacher engagement with SCHOLAR in two of the five subjects, but that this wasn't exclusively related to selective school teachers.

Physics teachers within selective schools were indeed more likely to engage with SCHOLAR than teachers from FE or non-selective schools. However, in the subject of Chemistry it was FE teachers who were more likely to engage with SCHOLAR than teachers from selective or non-selective schools. In addition, analysis of the questionnaire data showed no difference in the likelihood of classroom use of SCHOLAR between school types, or in how much teachers from different school types 'liked' SCHOLAR (see section 10e, page 61). This evidence therefore doesn't explain the higher first time use of SCHOLAR by selective school students across all subjects as shown above.

Alternatively, as per suggestion (b), the general environment of selective schools might afford students with more opportunity to engage with computers (e.g. because there are proportionally more available to use). However, analysis of the questionnaire data (Section 10) provided no evidence to suggest that selective school students were significantly more likely to have better online to access SCHOLAR either at school or at home.

The third and fourth suggestions above could not be investigated with the available data. However because of the nature of selective schools, the general academic aptitude of students would be higher than in the general population of students nationally. It may have been that this academic aptitude, and/or the teaching style used in selective schools, promoted a stronger culture of investigation and self-learning, resulting in students that were more self-motivated and therefore more likely to investigate novel resources such as SCHOLAR at least once.

This bias for more students from selective schools to login once was not found when the focus shifted to look at frequent users of SCHOLAR. For example, regarding super-users there was no difference in the proportion of students from each school type (see page 42).

e) Number of teachers registered versus using SCHOLAR

	No. teachers registered for each subject	No. teachers who accessed one SCHOLAR page (%)	No. teachers who accessed 20+ unique SCHOLAR pages (%)	No. teachers who accessed 50+ unique SCHOLAR pages (%)	Highest no. unique pages accessed by any one teachers
Biology	142	65 (45.8%)	34 (23.9%)	10 (7.0%)	188
Chemistry	112	40 (35.7%)	23 (20.5%)	9 (8.0%)	251
Computer science	55	14 (25.5%)	9 (16.4%)	3 (5.5%)	141
Maths (MTH or MAT)	163	57 (35.0%)	14 (8.6%)	3 (1.8%)	81
Physics	91	41 (45.1%)	20 (22.0%	8 (8.8%)	270
TOTAL	563	217			

Table 21. The number of teacher users registered to access each subject in SCHOLAR (termed 'teacher subject-users'), and the number of these subject-users that accessed one page, 20+ unique pages and 50+ unique pages of SCHOLAR per subject. The highest number of unique pages accessed per subject is also given.

	No. teachers registered for each subject	No. teachers who accessed one SCHOLAR page (%)	No. teachers who accessed 20+ SCHOLAR pages (%)	No. teachers who accessed 50+ SCHOLAR pages (%)	Highest no. pages accessed by any one teacher
Biology	142	*As above*	39 (27.5%)	21 (14.8%)	348
Chemistry	112	*As above*	26 (23.2%)	12 (10.7%)	529
Computer science	55	*As above*	10 (18.2%)	5 (9.1%)	213
Maths (MTH or MAT)	163	*As above*	23 (14.1%)	8 (4.9%)	160
Physics	91	*As above*	24 (26.4%)	13 (14.3%)	313
TOTAL	563				

Table 22. The number of teacher users registered to access each subject in SCHOLAR (termed 'teacher subject-users'), and the number of these subject-users that accessed one page, 20+ pages and 50+ pages of SCHOLAR per subject. Unlike table 21, these access counts include repeat visits to pages. The highest number of pages accessed per subject including repeat visits to pages is also given.

Comments

There were 563 teacher subject-users of which 217 (38.5%) used SCHOLAR at least once (Table 21).

The number of teacher subject-users that logged on at least once was compared with those that never used SCHOLAR. This analysis showed that there were significantly fewer teacher subject-users of computer science than expected given the number registered. In contrast there were significantly more teacher users of biology than expected given the number registered ($\chi^2 = 10.0$, df = 4, $p < 0.05$).

	Teacher subject-users that used SCHOLAR		
	… from selective schools	**… from non-selective schools**	**… from FE colleges**
Biology	13	45	7
Chemistry	10	22	8
Computer science	4	5	5
Maths (MTH or MAT)	22	28	7
Physics	15	22	4
Total no. subject-users	64 (29%)	122 (56%)	31 (14%)

Table 23. The number of teacher subject-users from each school type that used SCHOLAR at least once in each subject.

The effect of school type

Unlike the students (where selective school students consistently engaged with SCHOLAR more than expected and non-selective school students engaged less than expected) for biology, computer science and maths there was no significant difference in teacher engagement in different school types (biology $\chi^2 = 1.6$, df = 2, $p > 0.05$; computer science $\chi^2 = 4.3$, df = 2 $p > 0.05$; maths $\chi^2 = 4.9$, df = 2, $p > 0.05$). (Note that here 'engagement' refers to looking at SCHOLAR once – i.e. first time access).

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However in chemistry FE teachers were significantly more likely than expected to engage with SCHOLAR – a trend reflected in students, suggesting that FE teachers may have had some influence on student use (chemistry $\chi^2 = 10.1$, df = 2, $p<0.01$).

There were a total of eight chemistry teacher subject-users from FE (Table 23), four of whom from one college, and two of whom were from another (see case studies 1 and 10 respectively). Both of these colleges were recently subject to Ofsted inspection and were actively implementing increased use of ILT resources across the board in 2004/5. This engagement was reflected in student use in the trial: there were five FE colleges with 84 students who engaged with SCHOLAR – 68 of these students (80.9%) were from these two colleges. This provides strong evidence to suggest that teacher engagement with e-learning such as SCHOLAR did influence student engagement.

In physics there was a significant difference in the observed versus expected engagement with SCHOLAR between teacher subject-users from different school types, although the breakdown of this result showed a comparatively weak trend for selective school teachers to engage more than expected (physics $\chi^2 = 7.2$, df = 2, $p < 0.05$).

f) Number of teachers attending training events

Training and awareness events started in September 2003 in Cumbria, April 2004 in Kent/Medway/Bexley, and October 2004 in the Black Country.

Types of course
Teachers could attend one of the following courses:

Basic training:
- Awareness raising event (half day)
- Entry-level (full day)

More advanced training:
- SCHOLAR in the classroom (full day)
- Promoting independent learning (half day, run in Cumbria only)
- The SCHOLAR coordinator (half day)
- Reporting and revision (half day)

The Awareness raising event was exactly that – a brief introduction to allow school representatives to decide whether they would be interested in having SCHOLAR in their school or college.

The most commonly run course, and the course that most teachers attended, was the Entry-level course. All other courses were suitable only once a teacher had attended the Entry-level course (although in practice some teachers attended more advanced courses without first having attended the entry-level course).

As of the end of June 2005 the following number of training events had been held within each area:
- Cumbria: 17 events
- Kent/Medway/Bexley: 29 events
- Black Country: 5 events

Training events were usually held in a centrally located school with good IT facilities, with staff from nearby schools travelling to attend.

In addition to these events an IU trainer made individual visits to 16 schools/colleges during the 2004/5 academic year.

There were 289 visits to training events by 259 teachers from the 56 schools; this represented 49% of the 532 teachers who were registered to use SCHOLAR. Twenty-two teachers (8%) attended more than one event, with a maximum of four events attended by any one person.

13. The effect of SCHOLAR use on student A-level achievement and attainment

a) Background regarding the statistical analysis involved

Statistical analyses were carried out using the statistical package Minitab V13.3. Normally the level of significance for statistical tests should be taken to be $p \leq 0.05$ (i.e. 'there is a less than or equal to 5% likelihood that the result is due to chance alone'). However it was sometimes necessary to repeat the same analysis a number of times, for example when analyzing data on each of the five SCHOLAR subjects. When this occurs the likelihood of obtaining a significant result 'by chance alone' increases with the number of tests carried out. For this reason the level of significance (the p value) must be lowered to ensure continued validity. Therefore in this report the Dunn-Šidák method of correcting for multiple tests was applied where necessary.

Every individual's page count (i.e. number of SCHOLAR pages accessed) included repeat visits to pages and was for the subject in question only.

There is a crucial difference between the terms 'attainment' and 'achievement'. Attainment only relates to the grade obtained by the student, whereas achievement includes a control for factors such as school type, gender, or age (see glossary page 118 for full definitions). In this way the ALIS data therefore measured achievement, which was a more robust measure of student success than grade alone.

b) Achievement of SCHOLAR students versus non-SCHOLAR matched students (using ALIS data)

Methodology
In order to objectively compare the achievement of students involved in the SCHOLAR trial with those not exposed to SCHOLAR it was necessary to obtain comparative data on a set of students from schools and colleges outside of the trial. In order to see how well the SCHOLAR students and their matched pairs did in AS or A2 exams it was then necessary to have a grasp of what was expected of each individual in each subject versus what they then obtained.

The A-level Information Service (ALIS) provided a means to acquire these data. ALIS are paid by schools and colleges to produce a predicted grade per subject for each student prior to their exams. This predicted grade is calculated from an equation that relates to their previous GCSE grades.

ALIS held data on a total of 13 of the 56 schools/colleges involved in the SCHOLAR trial, so creating a subset of 437 individual students that were both registered to use SCHOLAR and that were included in the ALIS national data.

ALIS were then able to generate a 'matched pair' student who was taking the same subject at the same level somewhere else in the country who had not been exposed to SCHOLAR. The criteria for matching to each SCHOLAR student were as follows:

- Gender
- Age (only students born in 1986-1988 were matched)
- Average GCSE score to one decimal place (i.e. there was no significant difference between the average GCSE grades for SCHOLAR students and their matches)
- Institution type (categories in ALIS being: FE College, Foundation, GM Secondary Comprehensive, GM Secondary Selective, Independent, International, LEA Secondary Comprehensive, LEA Secondary Selective, Secondary, Service Childrens Education, Sixth Form College, Tertiary College, Voluntary Aided, Voluntary Grammar)

The 437 individual students included in the ALIS data provided a total of 859 student subject-user rows of data, each with its own matched pair. A total of 252 individuals had more than one row of data, either because their AS and A2 grades were both available in one subject (where this occurred the AS row was deleted in favour of the more recent A2 data) or because they did several SCHOLAR subjects. Analysis therefore had to be carried out either on a per-subject basis or by randomly selecting only one individual's subject-user data to ensure each data row was independent (i.e. that the same individual wasn't included twice in the same analysis).

In maths, some students had completed an AS or A2 in both maths and further maths – here the record for further maths was removed because SCHOLAR content did not cover this subject.

A total of 686 student-subject rows of data represented students who had never looked at SCHOLAR in that subject (i.e. their page count was zero), thus these students could not be used in the analyses. Only 173 student subject-users representing 127 individual students had looked at one or more pages of SCHOLAR.

The difference between the predicted grade and the actual grade was compared between SCHOLAR subject-users and their matched pair to see whether use of SCHOLAR affected student attainment. The hypothesis was therefore:

> *"SCHOLAR student subject-users will have a significantly larger positive difference between their predicted and actual grades than their matched pair".*

The actual values that were used to test between students were the 'value-added differences' between the actual and predicted grades. These residuals were calculated by ALIS and were the variable that ALIS use to compare actual versus predicted achievement of students. These residuals are of particular use because they standardize between the differences in the point score range applicable to AS versus A2 grades (0 – 60 possible at AS, 0 – 120 at A2). Thus the analyses that used the ALIS data could legitimately group AS and A2 students together, running just one analysis per subject and so keeping sample sizes as large as possible.

Results

Analyses were initially carried out on a per-subject basis, using only those students who had looked at one or more pages of SCHOLAR in that subject. Data were parametric, thus paired T-tests were used. Analysis of all five subjects showed that, once corrected for multiple testing, there was no significant difference between the achievement between students who had used SCHOLAR versus those that had with the exception of chemistry, where data suggested that SCHOLAR users did significantly worse than predicted in comparison to their matched pairs. The results of these analyses are summarized in Table 24.

Whilst the result for chemistry initially seemed interesting, further investigation revealed that if just one data row from one student was removed the result was no longer significant ($N = 39$; $T = -2.53$; $p = 0.016$ where $p \leq 0.010$ to correct for multiple tests). In addition, when the subjects were combined to provide a larger dataset (ensuring random removal of repeats of a student across two or more subjects) there was no significant difference between users of SCHOLAR and their matched pair ($N = 127$; $T = -0.88$; $p = 0.378$).

This strongly suggests that there was no relationship between student achievement and SCHOLAR use within the ALIS dataset.

Regarding the chemistry student who held a lot of leverage in the chemistry-only analysis, this female student completed her A2 in chemistry in 2005. She looked at 233 pages of SCHOLAR chemistry materials, and was an outlier because she obtained A grades in Science Double Award A and B, and a B in maths at GCSE, giving her a predicted C grade at A2. However, she in fact only obtained a U grade, and the large difference in predicted and actual grade was enough to influence the analysis. In 2004 she didn't sit the AS exam, and in 2005 she was the only student in her school that took chemistry at A2. When her teacher was asked about this student she provided the following feedback:

> *"While gradually building her confidence in the class, she often failed to revise the work. She did have a part time job as well which I think is never a good idea when you are studying for A levels. Since she was the only student, she decided not to go on a one day revision course run by Philip Allan updates which is often beneficial to students."*

Subject	Sample size (N)	Mean ± SD no. SCHOLAR pages accessed	T-value	P value
Biology	88	27.3 ± 84.2	0.34	0.735
Chemistry	40	52.0 ± 69.9	-2.78	0.008
Computer science	5	45.8 ± 97.9	-3.02	0.039
Maths	27	17.2 ± 24.9	-0.72	0.478
Physics	13	132.0 ± 159.7	-0.91	0.383

Table 24. Results of the paired T-tests carried out to compare the achievement of students that used SCHOLAR with matched students who did not. Note that to be significant the p value must be 0.010 or less, bearing in mind the correction for multiple tests.

c) Actual versus predicted grades of SCHOLAR students and their use of SCHOLAR (using ALIS data)

Methodology
This analysis focused only on the SCHOLAR students and their ALIS predicted grades, and did not include the matched pair students also provided by ALIS.

Data were available for 127 students that had used SCHOLAR at least once and that had a predicted grade from ALIS. This set of students included students taking one of any of the five SCHOLAR subjects. Where a student was taking more than one SCHOLAR subject (i.e. was included two or more times), the single row with the subject relating to highest SCHOLAR usage had been chosen.

It was then possible to compare how much students used SCHOLAR against their attainment at A-level. The hypotheses being tested were therefore:

> *"There will be a positive correlation between the amount a student used SCHOLAR and the student's A-level grade'*
>
> *"There will be a positive correlation between the amount a student used SCHOLAR and the student's attainment in comparison to what was predicted"*

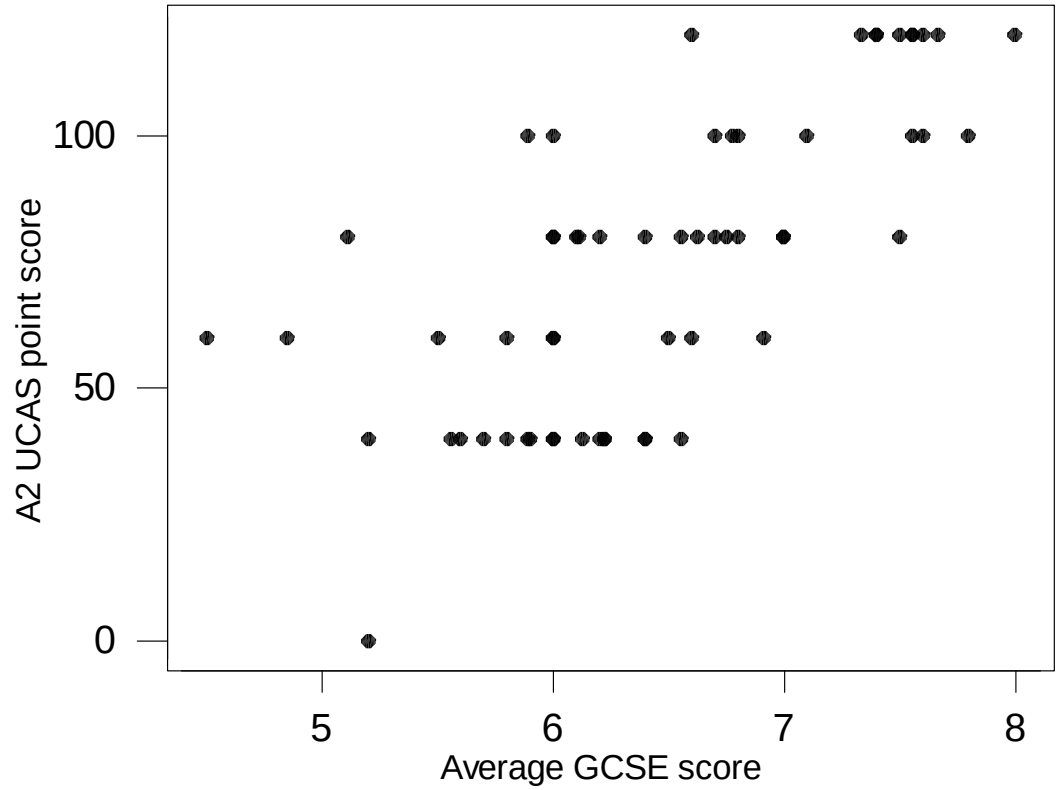
Because the data were non-parametric, data were first ranked as per the Spearman's Rank methodology before running the Pearson's correlation analysis.

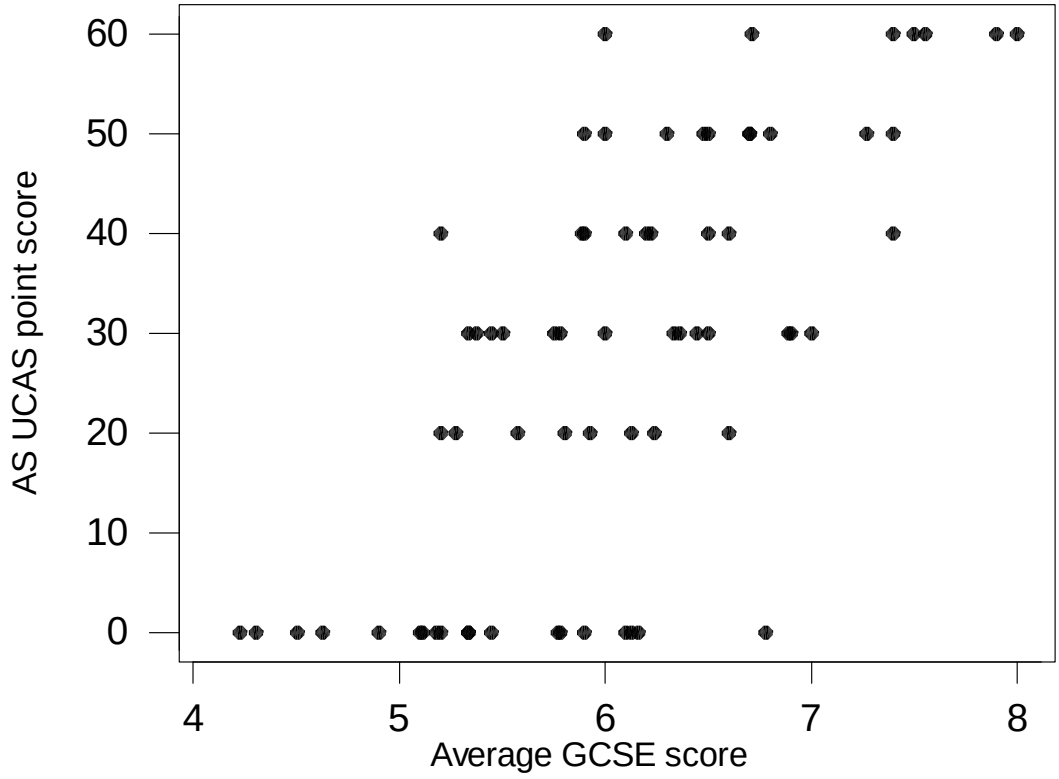
Results
The relationship between students' average GCSE grade versus their A-level grade was first analysed to investigate whether there was a relationship between average attainment at GCSE and attainment in one of the SCHOLAR subjects at A-level. The data are plotted visually in Figures 2 and 3 (page 79). There was a strong correlation at both AS (Pearson = 0.695; $p < 0.001$) and A2 (Pearson = 0.709; $p < 0.001$), showing that students' average attainment at GCSE level was a very good indicator of how well they then did in their A-level exam.

The A-level UCAS scores were then compared with SCHOLAR use (Figures 4 and 5, page 80). There was no correlation between the amount that a student used SCHOLAR and their A2 grade (Pearson = -0.075; $p = 0.567$) or AS grade (Pearson = 0.028; $p = 0.821$). This suggests that students who attain higher A-level grades do not use SCHOLAR more than those that attain lower grades.

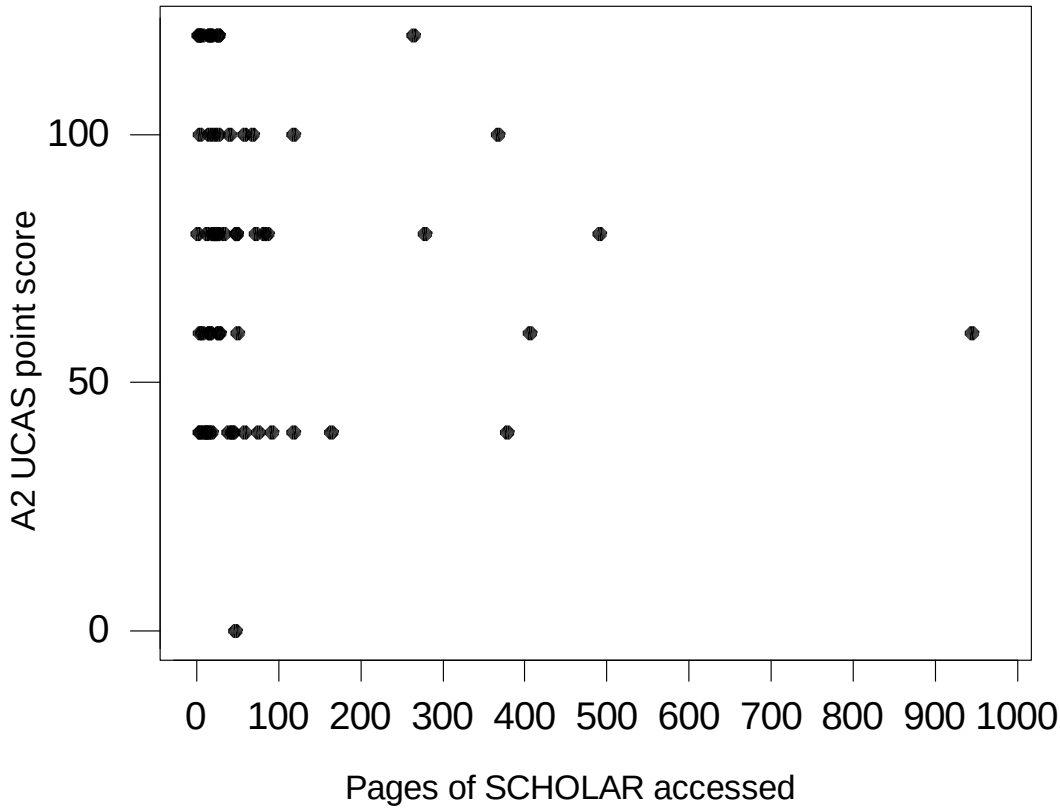
Finally, the ALIS-generated differences between the actual and predicted A2 and AS grades were compared with students' use of SCHOLAR (Figures 6 and 7, page 81). There was no correlation between the amount that a student used SCHOLAR and their attainment at A2 (Pearson = 0.186; $p = 0.155$) or AS (Pearson = 0.027; $p = 0.829$). This shows that for this dataset, increasing student use of SCHOLAR had no affect on the difference between their actual and predicted grade.

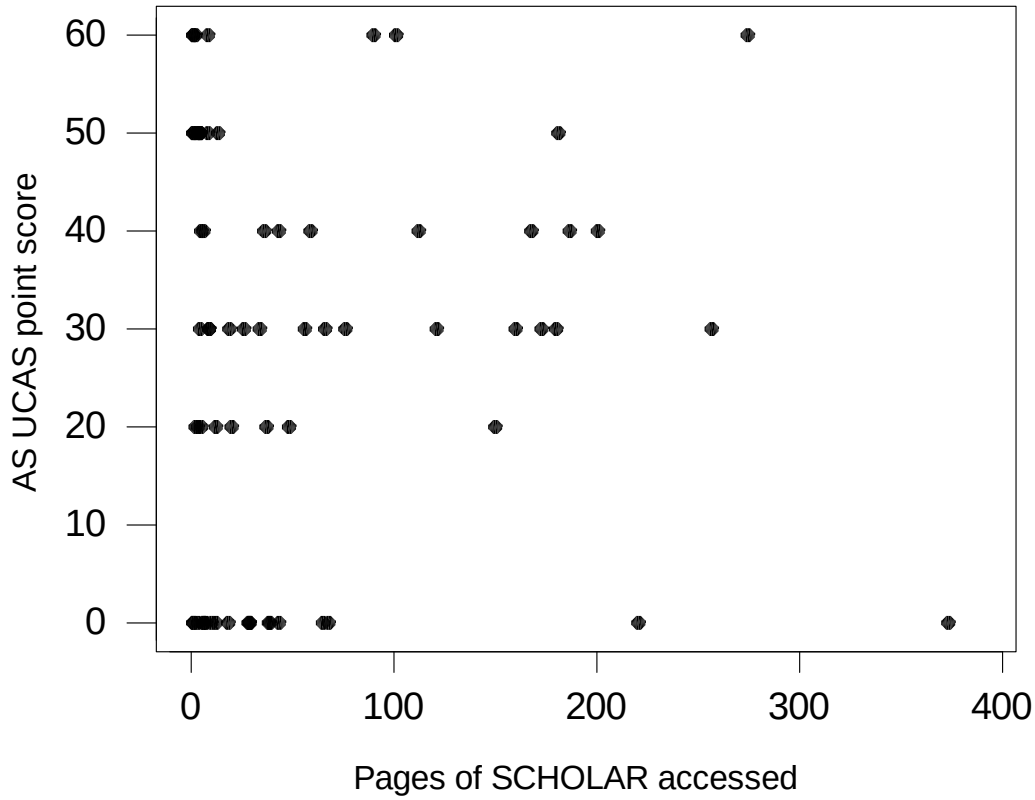
Figures 2 and 3. The relationship between SCHOLAR student average GCSE score and attainment at A2 and AS.



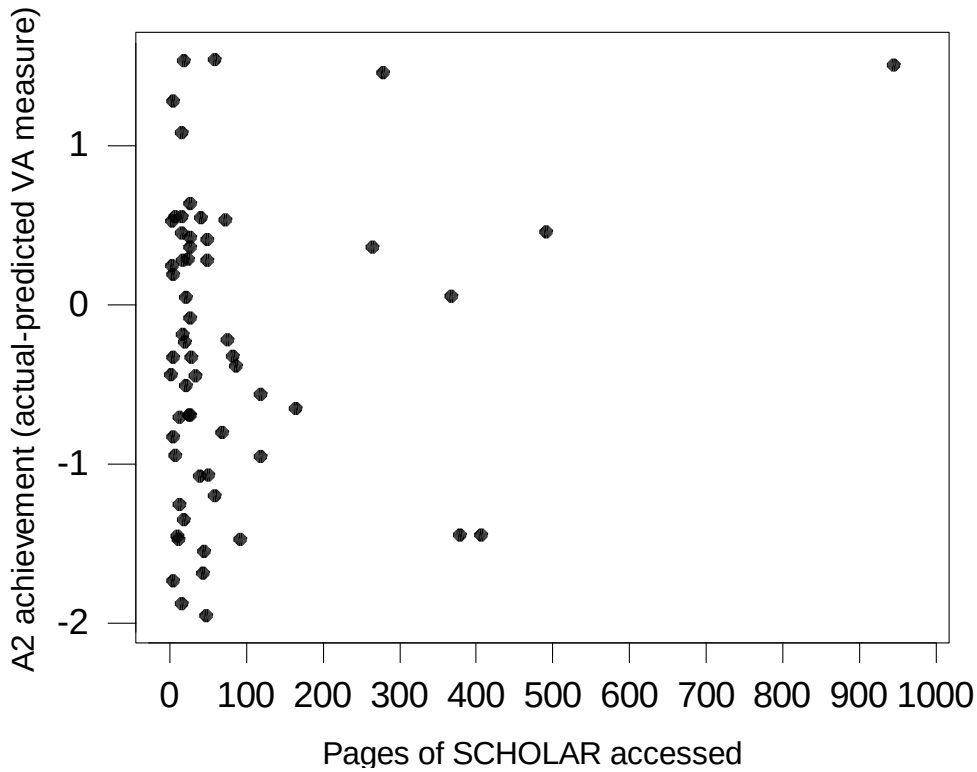


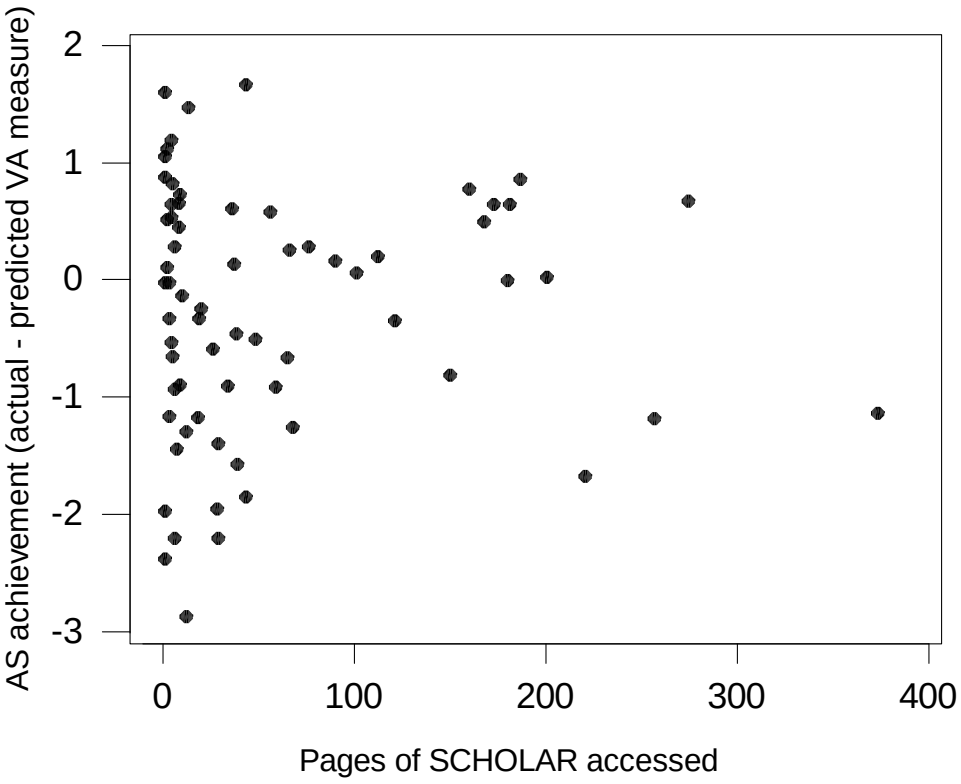
Figures 4 and 5. The relationship between the amount of SCHOLAR use and students' A2 and AS grades (represented by UCAS points where A=120, B=100, C=80 etc for A2, and A=60, B=50, C=40 for AS)





Figures 6 and 7. The relationship between the amount of SCHOLAR usage and students' achievement at A2 and AS (achievement calculated as a value-added index of actual minus predicted grade)





d) Conclusion regarding ALIS data

There was no significant relationship found between exam attainment and SCHOLAR use using the data available from ALIS.

It is important to note that the ALIS dataset included only 6 of the 55 individuals who were student super-users and only 19 of the 331 individuals who were student high-users. On average students with data in ALIS and with SCHOLAR usage data looked only at an average of 70.4 pages of SCHOLAR (i.e. they were medium users).

It would have been far more valid to run this analysis on high and super-users, but unfortunately the data were unavailable because most schools involved in the trial had not employed ALIS to produce predicted grades for them. If the evaluation continues in 2005/6 it should be a priority to obtain access to the predicted grades information for all students participating in the SCHOLAR trial.

e) The relationship between the difference in attainment between AS and A2 and SCHOLAR use (LEA data)

Methodology

This dataset focused on a subset of students who didn't have access to SCHOLAR in 2003/4 when they completed their AS exam, but who did have access to SCHOLAR in 2005, when they completed their A2 exam. The aim here was to see whether students who used SCHOLAR a lot during their A2 year had a significantly bigger positive difference between their AS and A2 exam grade in comparison to students who had access to SCHOLAR in their A2 year but decided not to use it.

The hypothesis tested was therefore:

> *"There will be a significant and positive relationship between use of SCHOLAR and the difference between students' AS and A2 attainment"*

This attainment information, gathered from each LEA, differed to that from ALIS because the focus was on attainment at A2 versus AS, rather than the ALIS data which compared GCSE attainment with A2/AS attainment. Data from the LEAs provided a larger sample size than ALIS (330 students were involved in this analysis), which incorporated more super-users and high-users of SCHOLAR, but it could not provide the predicted grade information or the matched pair student with no exposure to SCHOLAR. However the methodology within this analysis was still very robust because it used a matched pairs methodology – here matching the same individual before the option of choosing to use SCHOLAR (during year 12 and their AS studies) and after SCHOLAR became available (during year 13 and their A2 studies).

Data were obtained from each LEA regarding the A2 exam results of students at the end of 2005, with information about their attainment history at GCSE and AS in previous years. All students from Cumbria were removed from the dataset because they may have had access to SCHOLAR during the trial between December 2004 and June 2005, before this trial began. Only students with an AS grade taken in 2003/4 (in practice over 90% were from 2004) and who also had an A2 grade in 2005 were included.

For part of the analysis users were split into three groups:

- High use of SCHOLAR (combining high and super-users)
- Low use of SCHOLAR (combining low and medium users)
- No use of SCHOLAR (students registered to use SCHOLAR who never logged on)

Because the data were non-parametric, averages are given using the median value. For the correlation, data were first ranked as per the Spearman's Rank methodology before running the Pearson's correlation analysis. Analysis of high versus low versus no users used a Kruskal-Wallis test.

Results

There was a positive correlation between the number of SCHOLAR pages accessed by a student and the difference between their AS and A2 grade (Pearson = 0.117; p = 0.03). The more pages of SCHOLAR accessed by a student, the more likely they were to improve a grade between AS and A2 (Figure 8).

Table 25 provides a summary of the sample sizes and descriptive statistics produced when the dataset was split into high, low and non-user groups. There was a significant difference between high, low and non-users of SCHOLAR in terms of the variation in A2-AS grade (H = 9.65; df = 2; p = 0.008). This significant difference was driven by the high users group, which had a higher average rank in the analysis (at position 227) in comparison with the non and

low-user groups (at positions 165.7 and 154.7 respectively). Figure 9 shows the differences between the median and range of the data in the no low and high-user groups.

These data provide evidence for a relationship between higher SCHOLAR use and improvement in attainment between AS and A2, thus the hypothesis above was supported. However these results must be read with caution – whilst we can say there is a relationship, we cannot say whether SCHOLAR **caused** the higher attainment or whether this result instead reflects other factors at work. For example, the high-using students may have become more motivated in their second year, which positively affected their attainment. Thus it could have been their motivation that caused them to engage more with optional resources such as SCHOLAR.

These data also do not take into account any possible influence created by teachers using SCHOLAR in class via their own username and password. However, interview and questionnaire data show that teacher use in class was so low in 2004/5 that it was unlikely to have been a major contributing factor.

These results are intriguing, and it would be invaluable to follow-up immediately on this research, notably in two ways.

First it would be of use to obtain a complete dataset from ALIS for all students involved in the trial. This would provide an unrelated set of data to the LEA information – if a difference in achievement were also found from this information it would certainly be compelling evidence to suggest that something positive happens to students who are also high users of SCHOLAR.

Second, it would be valuable to interview high-using and low-using students who are now in their A2 year to ask them about SCHOLAR and their AS attainment. This would give an indication of whether they feel that SCHOLAR is an attributing factor in their attainment.

	N	**Average A2 grade**	**Average AS grade**	**Average difference between A2 and AS grade**	**Average rank**
High (100+ pages accessed)	17	C	C	0	227.0
Low (0 – 99 pages accessed)	101	C	B	0	154.7
Non-user (0 pages accessed)	212	C	C	0	165.7

Table 25. A summary of the sample sizes, descriptive statistics and average rank from the Kruskal-Wallis analysis that were produced when the dataset was split into high, low and non-user groups.

Figure 8. The relationship between the number of SCHOLAR pages accessed by students and the variation in their grade between AS and A2, where –1 means they went down one grade (for example from a C at AS to a D at A2) and +1 means they improved one grade (for example from a C at AS to a B at A2).

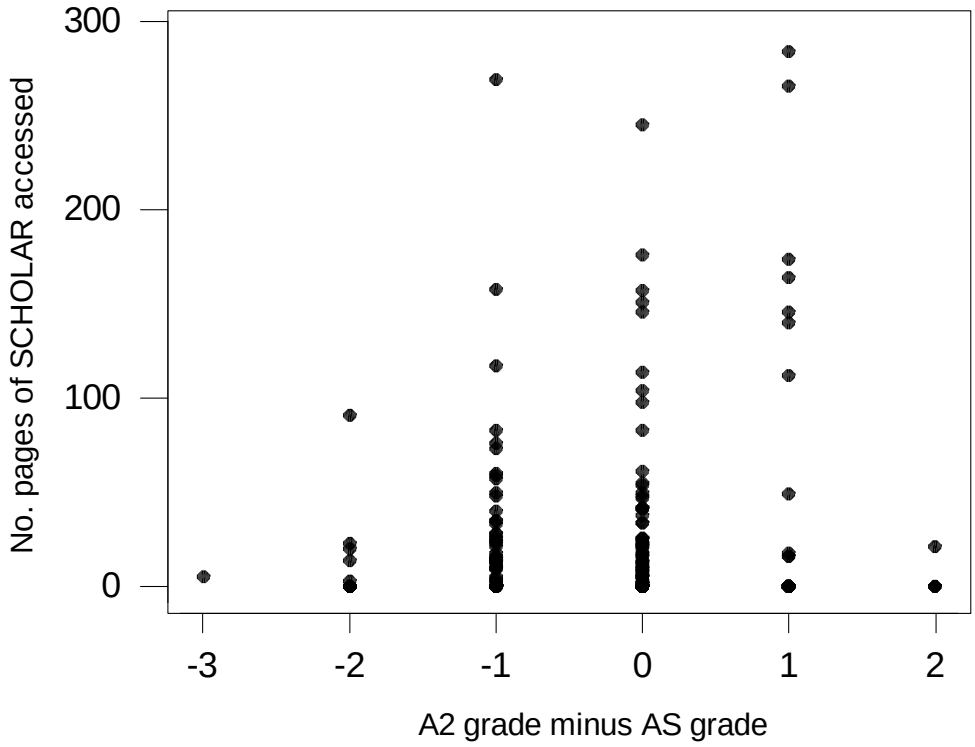
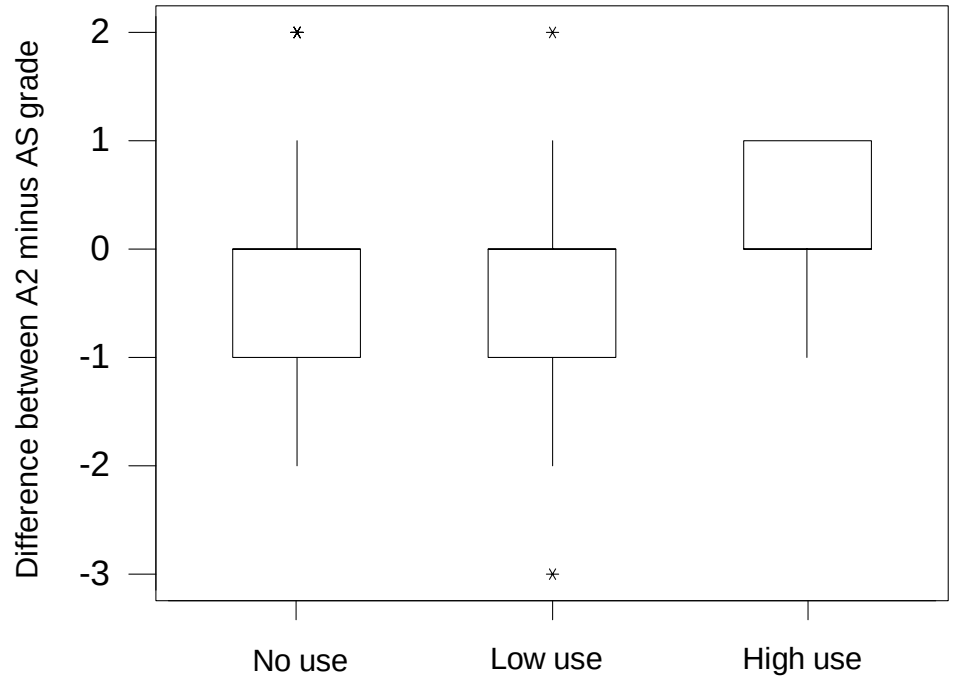


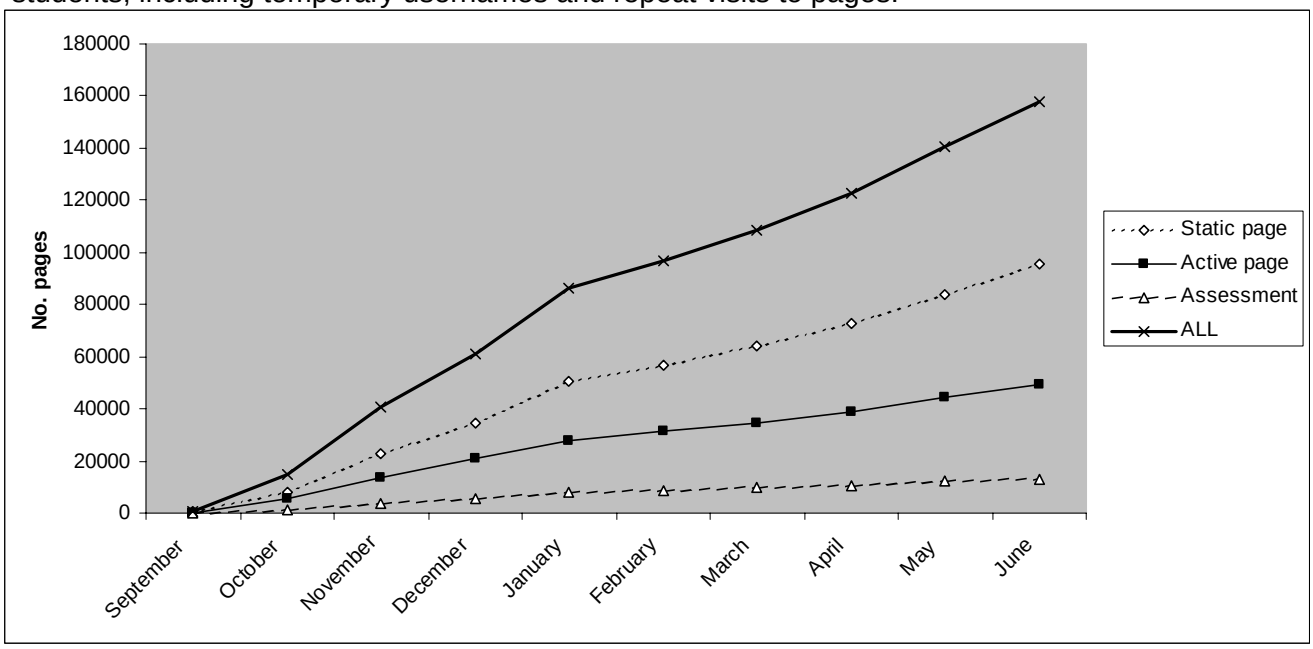
Figure 9. A box and whisker plot illustrating the median (i.e. the average) and inter-quartile ranges of the data for student SCHOLAR use versus the difference in student attainment between AS and A2. In this plot a line is drawn across the box at the median (in this case the median was zero for all three user groups). By default, the bottom of the box is at the first quartile value of the data (Q1), and the top is located at the third quartile (Q3) value. The whiskers are the lines that extend from the top and bottom of the box to the adjacent values. The adjacent values are the lowest and highest observations that are still inside the region defined by Q1 - 1.5 (lower limit) and Q3 + 1.5 (upper limit). Outliers are points outside of the lower and upper limits and are plotted with *.



14. Patterns of SCHOLAR use

a) Monthly (cumulative) use of SCHOLAR by students

Figure 10. Total cumulative SCHOLAR use between September 2004 and June 2005 by students, including temporary usernames and repeat visits to pages.



		Cumulative no. static pages	Cumulative No. interactive pages	Cumulative No. self-assessments	TOTAL
2004/5 school year	Sept	573	267	45	885
	Oct	8,016	5,599	1,396	15,011
	Nov	23,026	13,793	3,997	40,816
	Dec	34,505	20,797	5,766	61,068
	Jan	50,781	27,974	7,752	86,507
	Feb	56,857	31,288	8,899	97,044
	Mar	63,934	34,700	9,578	108,212
	Apr	72,915	39,113	10,617	122,645
	May	83,807	44,473	12,093	140,373
	Jun	95,306	49,062	13,227	157,595

Table 26. Cumulative use of SCHOLAR static pages, interactive pages and self-assessments by students between September 2004 and June 2005 including temporary accounts and repeat visits to pages.

Comments

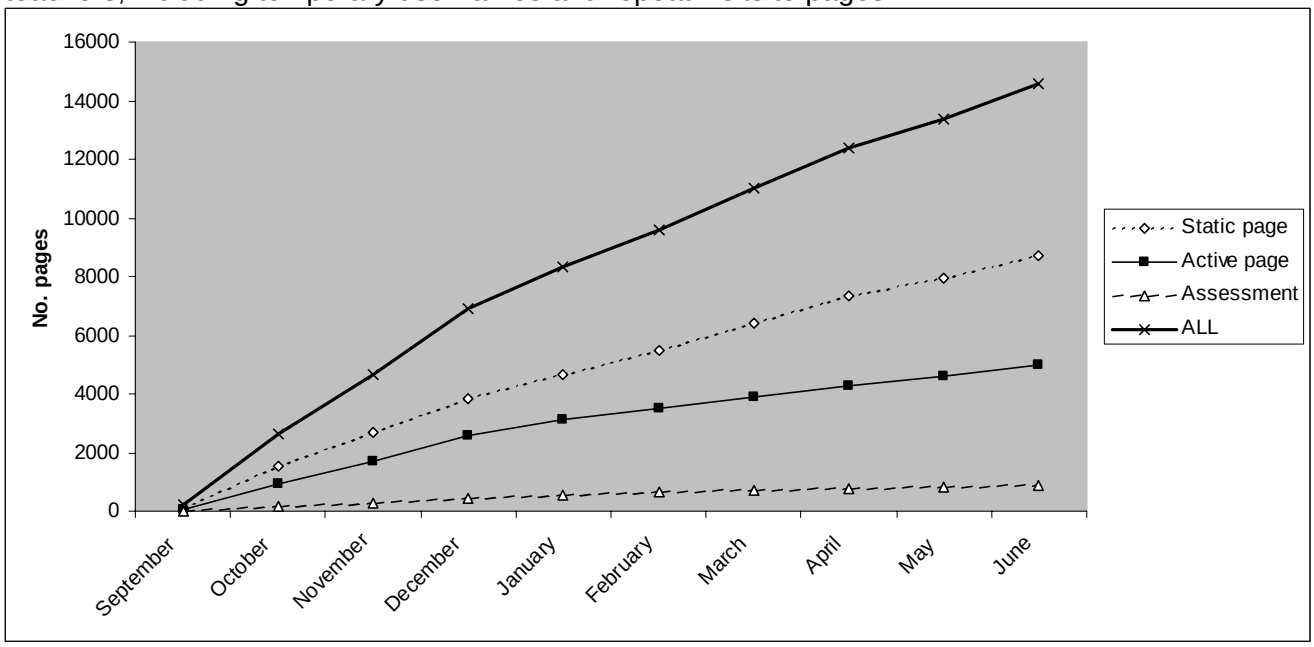
Figure 10 and Table 26 summarise the total number of pages of SCHOLAR accessed by students during the trial, including repeat visits to pages by individuals, and including the use of temporary student usernames. Students accessed a total of 157,595 pages of SCHOLAR during the trial.

It is important to bear in mind that schools joined the trial throughout the year, hence these figures are not controlled for the number of students with access to SCHOLAR in any one

month (hence see section 14e, page 91). In addition, in many cases interactive pages and self-assessment pages were often accessed via a static page, which may have artificially inflated the numbers of static pages accessed (i.e. users were using them as a stepping stone and not necessarily reading the content on them).

b) Monthly (cumulative) use of SCHOLAR by teachers

Figure 11. Total cumulative SCHOLAR use between September 2004 and June 2005 by teachers, including temporary usernames and repeat visits to pages.



		Cumulative no. static pages	Cumulative No. interactive pages	Cumulative No. self-assessments	TOTAL
2004/5 school year	Sept	118	65	10	193
	Oct	1,534	943	137	2,614
	Nov	2,690	1,681	298	4,669
	Dec	3,832	2,599	456	6,887
	Jan	4,664	3,114	563	8,341
	Feb	5,461	3,486	638	9,585
	Mar	6,411	3,896	703	11,010
	Apr	7,359	4,267	762	12,388
	May	7,949	4,593	809	13,351
	Jun	8,721	5,000	864	14,585

Table 27. Cumulative use of SCHOLAR static pages, interactive pages and self-assessments by teachers between September 2004 and June 2005 including temporary accounts and repeat visits to pages.

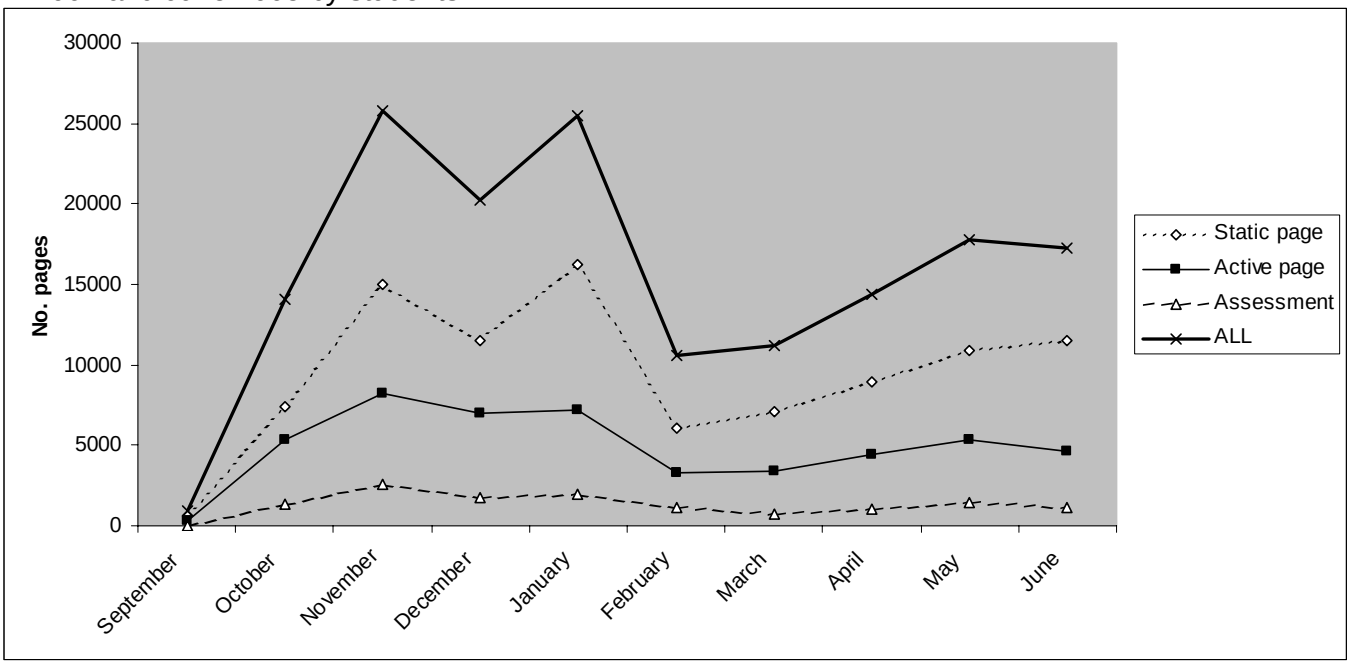
Comments

Figure 11 and table 27 summarise the total number of pages of SCHOLAR accessed by teachers during the trial, including repeat visits to pages by individuals, and including the use of temporary teacher usernames. Teachers accessed a total of 14,585 pages of SCHOLAR during the trial.

It is important to bear in mind that schools joined the trial throughout the year, hence these figures were not controlled for the number of teachers with access to SCHOLAR in any one month (hence see section 14e, page 91). In addition, in many cases interactive pages and self-assessments were often accessed via a static page, which may have artificially inflated the numbers of static pages accessed (i.e. users were using them as a stepping stone and not necessarily reading the content on them).

c) Per month use of SCHOLAR by students

Figure 12. The total number of SCHOLAR pages accessed each month between September 2004 and June 2005 by students.



		Cumulative no. static pages	Cumulative No. interactive pages	Cumulative No. self-assessments	TOTAL
2004/5 school year	Sept	573	267	45	885
	Oct	7,443	5,332	1,351	14,126
	Nov	15,010	8,194	2,601	25,805
	Dec	11,479	7,004	1,769	20,252
	Jan	16,276	7,177	1,986	25,439
	Feb	6,076	3,314	1,147	10,537
	Mar	7,077	3,412	679	11,168
	Apr	8,981	4,413	1,039	14,433
	May	10,892	5,360	1,476	17,728
	Jun	11,499	4,589	1,134	17,222

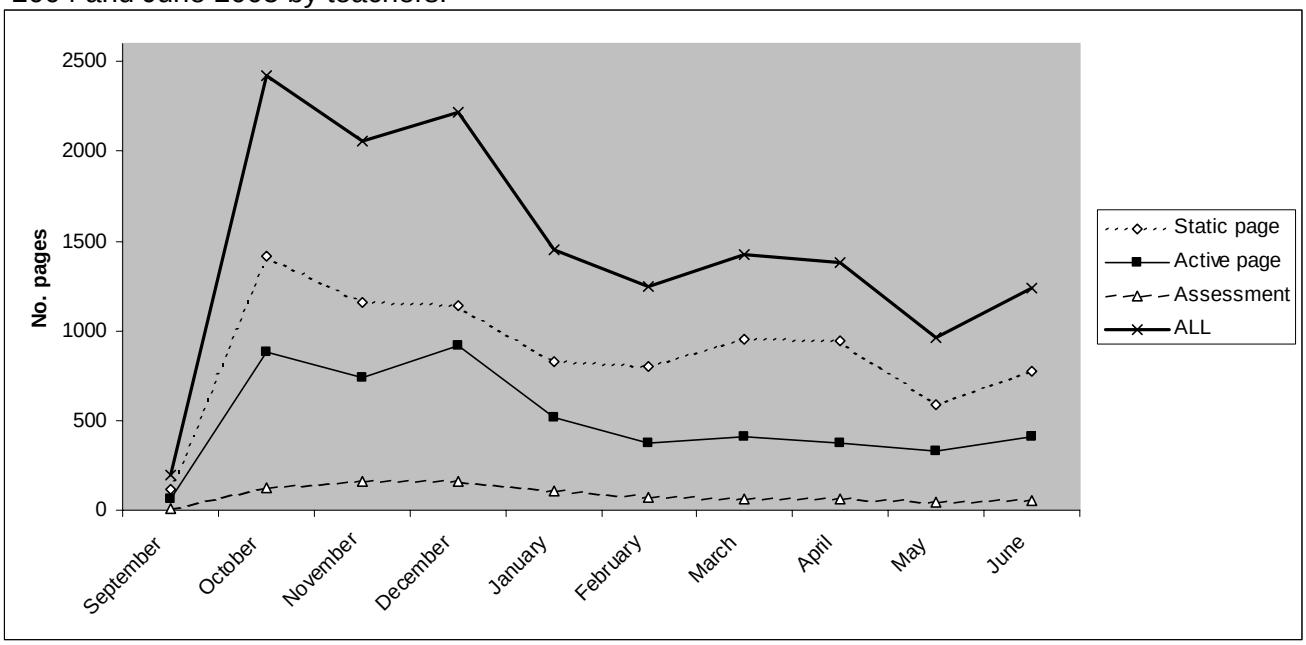
Table 28. The number of pages of SCHOLAR static pages, interactive pages and self-assessments accessed by students each month between September 2004 and June 2005 including temporary accounts.

Comments

Figure 12 illustrates the monthly number of pages of SCHOLAR accessed by students during the trial, including repeat visits to pages by individuals, and including the use of temporary student usernames. The months of November and January showed the highest use of SCHOLAR during the trial, which may correlate to initial interest in a new resource (November) and revision around the January exams. There is a lesser peak in May that corresponds to the final exams, but it is interesting to note that usage is lower here than at the beginning of the academic year (despite the fact that new schools were joining up throughout the year). This suggests that after the novelty faded SCHOLAR was only been used by a smaller group of persistent users. Lowest use was in February.

d) Per month use of SCHOLAR by teachers

Figure 13. The total number of SCHOLAR pages accessed each month between September 2004 and June 2005 by teachers.



		Cumulative no. static pages	Cumulative No. interactive pages	Cumulative No. self-assessments	TOTAL
2004/5	Sept	118	65	10	193
school	Oct	1,416	878	127	2,421
year	Nov	1,156	738	161	2,055
	Dec	1,142	918	158	2,218
	Jan	832	515	107	1,454
	Feb	797	372	75	1,244
	Mar	950	410	65	1,425
	Apr	948	371	59	1,378
	May	590	326	47	963
	Jun	772	407	55	1,234

Table 29. The number of pages of SCHOLAR static pages, interactive pages and self-assessments accessed by teachers each month between September 2004 and June 2005 including temporary accounts.

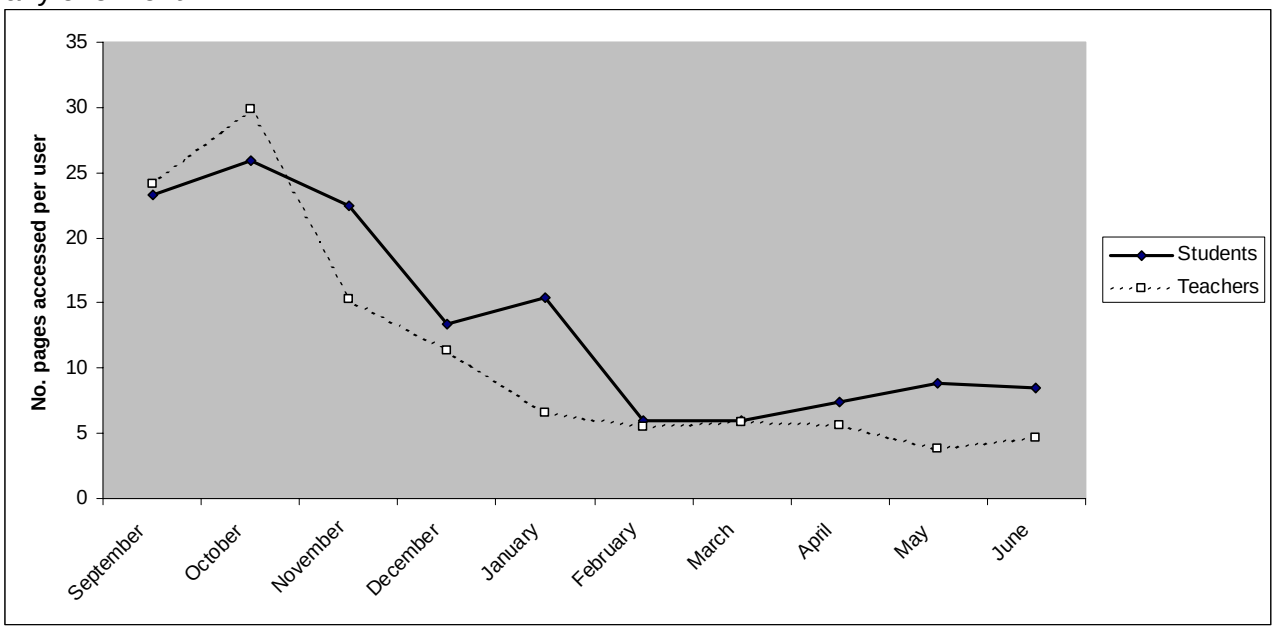
Comments

Figure 13 illustrates the monthly number of pages of SCHOLAR accessed by teachers during the trial, including repeat visits to pages by individuals, and including the use of temporary teacher usernames. Unlike the monthly student pattern, teachers used SCHOLAR most in October 2004, followed by December 2004. These peaks are both one month before the student peaks, suggesting that teachers' use may have reminded students about SCHOLAR and triggered them to use it themselves. Lowest use was in May, unlike students' lowest use in February.

As with students, use was highest in the first half of the year, suggesting that after the novelty faded SCHOLAR may have mainly been used by a smaller group of persistent users.

e) Monthly use of SCHOLAR corrected for the number of students and teachers with access to SCHOLAR each month

Figure 14. The total number of SCHOLAR pages accessed per month between September 2004 - June 2005 by students and teachers, as corrected for the number who had access in any one month.



		No. schools with access to SCHOLAR	No. students that had started to use SCHOLAR	No. SCHOLAR pages accessed by students per month	Monthly use of SCHOLAR (pages accessed per student)
2004/5 school year	Sept	5	38	885	23.3
	Oct	28	545	14,126	25.9
	Nov	40	1,147	25,805	22.5
	Dec	49	1,510	20,252	13.4
	Jan	50	1,652	25,439	15.4
	Feb	52	1,762	10,537	6.0
	Mar	53	1,857	11,168	6.0
	Apr	55	1,941	14,433	7.4
	May	56	1,995	17,728	8.9
	Jun	56	2,018	17,222	8.5

Table 30. The number of schools and students that had started to use SCHOLAR in each month, and the average number of pages accessed per student per month.

		No. schools with access to SCHOLAR	No. teachers that had started to use SCHOLAR	No. SCHOLAR pages accessed by teachers per month	Monthly use of SCHOLAR (pages per teacher)
2004/5	Sept	5	8	193	24.1
school	Oct	28	81	2,421	29.9
year	Nov	40	134	2,055	15.3
	Dec	49	196	2,218	11.3
	Jan	50	220	1,454	6.6
	Feb	52	227	1,244	5.5
	Mar	53	245	1,425	5.8
	Apr	55	248	1,378	5.6
	May	56	254	963	3.8
	Jun	56	262	1234	4.7

Table 31. The number of schools and teachers that had started to use SCHOLAR each month, and the average number of pages accessed per teacher per month.

Comments

The data presented in sections 14a to d provide overall trend information but are subject to some bias because the number of schools (and therefore users) increased throughout the year as new schools joined the trial. Tables 30 and 31 and Figure 14 illustrate the data for the student and teacher population corrected for the number of users that had access to SCHOLAR in any one month. Access was defined here as the point at which that used first logged on – it was presumed that from that moment onwards the user had the option of going back to use SCHOLAR again at any time during the trial.

It is interesting to note that, despite the large difference in the number of students and teachers involved and between number of pages accessed by teachers and students, when corrected for the number of students/teachers the usage per person per month was very similar.

Broadly speaking both the student and teacher populations showed a decreasing use of SCHOLAR throughout the year, from around 27 pages accessed per user in October 2004 to about 7 pages per user in June 2005.

There are some notable differences between the two populations. There was a peak in October for teachers, probably representing the time when only 28 schools had joined the trial, only 81 teachers had logged on, and they were curious to find out what SCHOLAR contained.

In contrast there were peaks in use for students in January and May/June, both around the exam periods. Use per student was quite a lot higher in January than in May despite the fact that there were only 343 more student users in May. Again this suggests fatigue after a novel resource has been introduced. It would be very interesting to investigate the trends in use that continue into 2005/6 for those schools that are carrying on for a second year: does usage continue to decline, level off, or increase with student/teacher confidence?

Users of SCHOLAR looked at an average of between 5 and 30 pages per month (depending on the month and whether they were students or teachers). Overall this showed that average use of SCHOLAR was low across the whole population, with a trend for it to decrease throughout the year as the novelty faded. Continued and high level use did occur (see section 8, page 42) but this was in the minority. This paints a realistic picture of what might be expected to happen when something novel is introduced to a population – some had a look out of curiosity, but only those that felt it had relevance and use to them continued to use it.

f) Proportional use by subject and level for students

	AS pages		A2 pages	
	Page count (not including repeat visits)	**Page count (including repeat visits)**	**Page count (not including repeat visits)**	**Page count (including repeat visits)**
Biology	29,899	48,897	13,498	21,949
Chemistry	15,996	27,538	5,049	8,023
Computer science	6,149	10,555	957	1,475
Maths	10,998	17,348	700	961
Physics	7,346	12,005	4,684	7,131
TOTAL	70,388	116,343	24,888	39,539

Table 32. The proportion of overall student use that was for A2 materials (rather than A2) in the 2004/5 academic year.

	All pages accessed (not including repeat visits)	**All pages accessed (including repeat visits)**
Biology	43,397 (46%)	70,846 (45%)
Chemistry	21,045 (22%)	35,561 (23%)
Computer science	7,106 (7%)	12,030 (8%)
Maths	11,698 (12%)	18,309 (12%)
Physics	12,030 (13%)	19,136 (12%)
TOTAL	95,276 (100%)	155,882 (100%)

Table 33. The proportion of overall student use that was for each of the five subjects in the 2004/5 academic year. Note totals do not exactly match with monthly data because monthly trends included temporary accounts (not included in these data).

Comments

Table 32 shows student use in each subject split into AS and A2 materials. The structure of SCHOLAR partitions off the AS and A2 materials for each subject at the top level in the navigation structure. However this partitioning was only relevant to the OCR syllabus. In the AQA and Edexcel syllabi many topics of AS content are actually found in SCHOLAR's A2 materials and visa versa. This has caused some problems for users not taking OCR (see section 7 for comments).

Whilst bearing in mind the lack of validity between the AS and A2 partitions it is of interest to note that the AS materials were used roughly three times more often than A2 materials even though their proportions were roughly similar (see page 64, table 13).

Table 33 shows how much each subject contributed to the overall student use of SCHOLAR. The most commonly accessed subject was biology, with 46% of all pages accessed once. Computer science was the least used, with 7% of all pages accessed once. Previous data have shown that there were a total of 2,881 student subject-users who used SCHOLAR at least once (see section 12d, page 69), 33% of them in biology and 5% of them in computer science. So the proportion in which these subjects were used was higher than the proportion of one-time subject-users, suggesting that biology and computer science subject-users used SCHOLAR more following their first access to them comparison with the other subject-users.

In contrast, only 12% of all materials accessed were maths related, even though 23% of student subject-users using SCHOLAR once were maths users. This suggests that users did not use maths materials much after their initial look at the materials.

g) Proportional use by subject and level for teachers

	AS pages		A2 pages	
	Page count (not including repeat visits)	**Page count (including repeat visits)**	**Page count (not including repeat visits)**	**Page count (including repeat visits)**
Biology	1,220	2,003	855	1,381
Chemistry	985	2,061	697	1,364
Computer science	369	532	184	260
Maths	985	1,475	127	173
Physics	885	1,364	641	1,086
TOTAL	4,444	7,435	504	4,264

Table 34. The proportion of overall teacher use that was for AS materials (rather than A2) in the first half of the 2004/5 academic year.

	Total (not including repeat visits)	**Total (including repeat visits)**
Biology	2,075 (30%)	3,384 (29%)
Chemistry	1,682 (24%)	3,425 (29%)
Computer science	553 (8%)	792 (7%)
Maths	1,112 (16%)	1,648 (14%)
Physics	1,526 (22%)	2,450 (21%)
TOTAL	6,948 (100%)	11,699 (100%)

Table 35. The proportion of overall student use that was for each of the five subjects in the first half of the 2004/5 academic year. Note totals do not exactly match with monthly data because monthly trends included temporary accounts (not included in these data).

Comments

Table 34 shows teacher use in each subject split into AS and A2 materials. As explained in the previous section, this split into AS and A2 is not valid for syllabi other than OCR and so these data should be viewed with caution.

Table 35 shows how much each subject contributed to the overall teacher use of SCHOLAR. As with students the most commonly accessed subject was biology, with 30% of all pages accessed once. Again as with students, computer science was the smallest contributor, with 8% of all pages accessed once. Physics materials made up a greater proportion of the overall subject material accessed by teachers (22%) than by students (13%).

Whilst bearing in mind the lack of validity between the AS and A2 partitions it is of interest to note that the AS materials were used roughly nine times more often than A2 materials even though their proportions were roughly similar (see page 64, table 13).

Previous data have shown that there were a total of 217 teacher subject-users who used SCHOLAR at least once (see section 12e, page 72), As with students there was a smaller proportion of maths materials accessed by teachers at the end of the trial (16%) than the proportion of teachers that accessed maths materials once (26.3%), again suggesting that users did not use maths materials much after their initial look at the materials.

h) Quantity of available materials that were accessed by the student and teacher population during the trial

		No. different pages available	No. different pages accessed by all students	No. different pages accessed by all teachers
Biology	Static pages	478	471 (98.5%)	367 (76.8%)
	Interactive pages	333	333 (100%)	270 (81.1%)
	Assessments	35	27 (77.1%)	24 (68.6%)
	TOTAL	*846*	*831 (98.2%)*	*661 (78.1%)*
Chemistry	Static pages	434	426 (98.2%)	381 (87.8%)
	Interactive pages	186	183 (98.4%)	166 (89.2%)
	Assessments	53	47 (88.7%)	36 (67.9%)
	TOTAL	*673*	*656 (97.5%)*	*583 (86.6%)*
Computer science	Static pages	755	735 (97.4%)	305 (40.4%)
	Interactive pages	310	248 (80.0%)	93 (30.0%)
	Assessments	25	23 (92.0%)	8 (32.0%)
	TOTAL	*1090*	*1006 (92.3%)*	*406 (37.2%)*
Maths	Static pages	941	672 (71.4%)	259 (27.5%)
	Interactive pages	847	526 (62.1%)	268 (31.6%)
	Assessments	627	346 (55.2%)	149 (23.8%)
	TOTAL	*2415*	*1544 (63.9%)*	*676 (28.0%)*
Physics	Static pages	317	310 (97.8%)	295 (93.1%)
	Interactive pages	168	168 (100%)	132 (78.6%)
	Assessments	68	62 (91.2%)	34 (50.0%)
	TOTAL	*553*	*540 (97.6%)*	*461 (83.4%)*
ALL SUBJECTS	Static pages	2925	2614 (89%)	1607 (55%)
	Interactive pages	1844	1458 (79%)	929 (50%)
	Assessments	808	505 (63%)	251 (31%)
	TOTAL	5577	4577	2787

Table 36. The amount and percentage of the total available SCHOLAR content that was accessed by students and teachers during the trial.

Comments

Table 36 provides information about the proportions of each subject's pages that were accessed by students and teachers during the trial. The student population looked at between 64% (maths) and 98% (biology) of all the pages available. The teacher population looked at between 28% (maths) and 87% (chemistry) of the available pages. Maths was therefore the least explored of the subject materials (although it should be noted that it also had the most content available, especially because of the two versions of maths available).

There was a very big difference in the quantity of computer science materials accessed by students (92.3%) and teachers (37.2%) and this was probably due at least in part to the students that studied computer science without a teacher in 2005 (see section 8b, page 44 for a profile of one of these students).

i) Frequency of super, high, medium and low student subject-users

	No. super-users	No. high users	No. medium users	No. low users	Total No. student users per subject
Biology	38 (4.0%)	160 (16.7%)	167 (17.4%)	593 (61.9%)	958
Chemistry	9 (1.4%)	86 (13.5%)	106 (16.7%)	435 (68.4%)	636
Computer science	7 (4.5%)	27 (17.3%)	29 (18.6%)	93 (59.6%)	156
Maths (MTH or MAT)	3 (0.5%)	18 (2.7%)	65 (9.8%)	578 (87.0%)	664
Physics	5 (1.1%)	33 (7.1%)	60 (12.8%)	369 (79.0%)	467

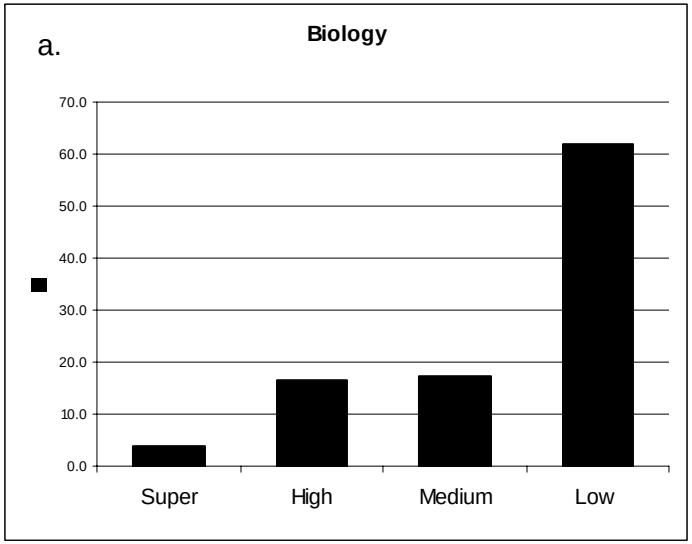
Table 37. The number and proportion of super, high, medium and low student users per subject.

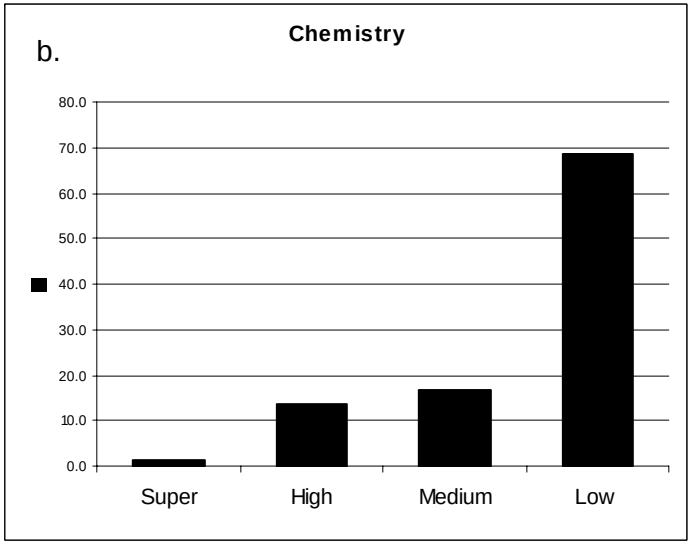
Comments

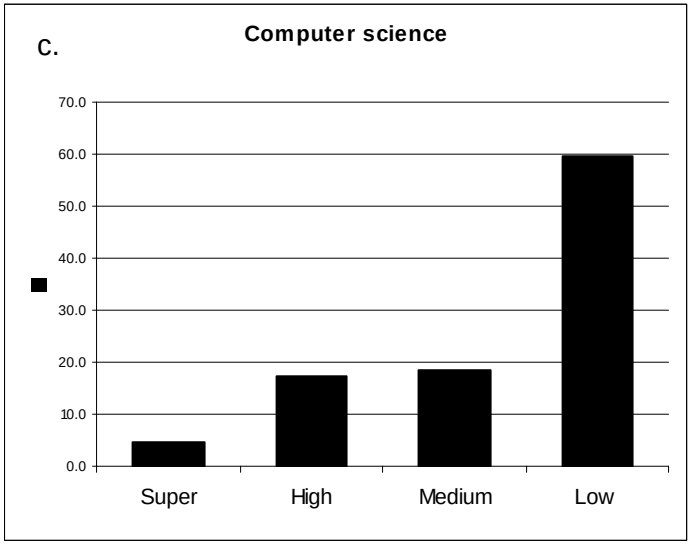
Table 37 shows the number and proportion of super, high, medium and low student users per subject. Super-users looked at 300+ pages, high users at 100-299 pages, medium users at 50-99 pages and low users at 1-49 pages.

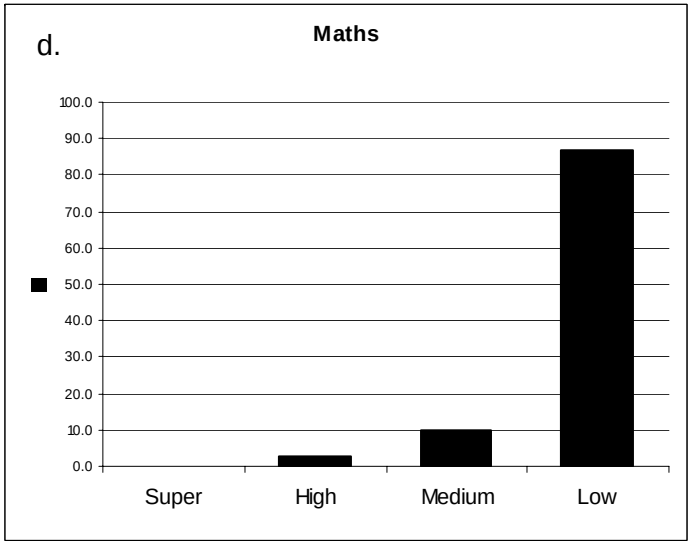
On average 2% of student subject-users were super-users, 11% were high users, 15% were medium users and 72% were low users. This is broken down on a per subject basis in figure 15a-e.

Computer science and biology were the most frequently used subject materials, with 22% of computer science users and 21% of biology users looking at over 100 pages. In contrast maths was extremely unpopular, with only 3% of users looking at over 100 pages.









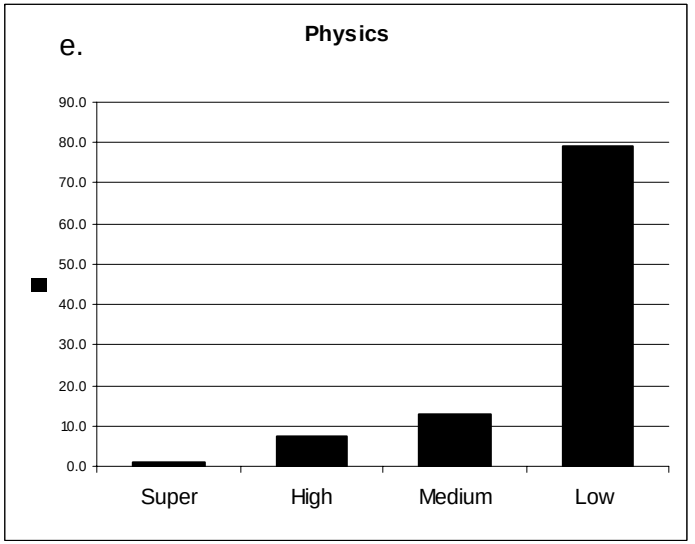


Figure 15a-e. Frequency histograms for student use in each subject.

j) Frequency of super, high, medium and low teacher subject-users

	No. super-users	No. high users	No. medium users	No. low users	Total No. teacher users per subject
Biology	1 (1.5%)	8 (12.3%)	12 (18.5%)	44 (67.7%)	65
Chemistry	5 (12.5%)	3 (7.5%)	4 (10.0%)	28 (70.0%)	40
Computer science	0 (0%)	3 (21.4%)	2 (14.3%)	9 (64.3%)	14
Maths (MTH or MAT)	0 (0%)	1 (1.8%)	7 (12.3%)	49 (86.0%)	57
Physics	1 (2.4%)	5 (12.2%)	7 (17.1%)	28 (68.3%)	41

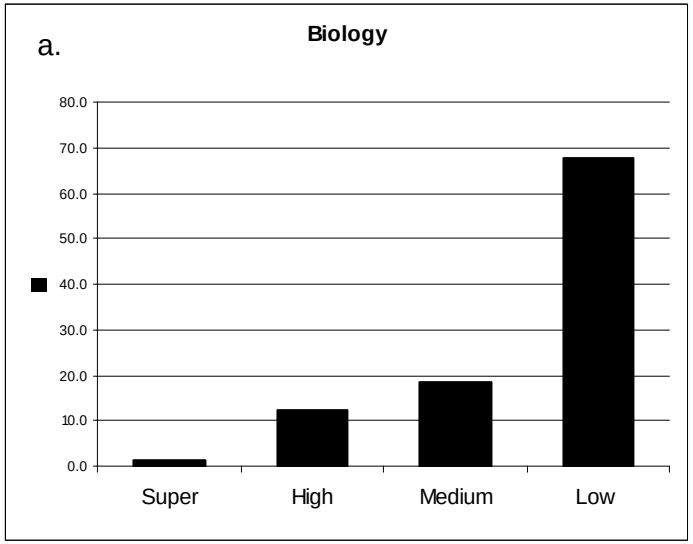
Table 38. The number and proportion of super, high, medium and low teacher users per subject.

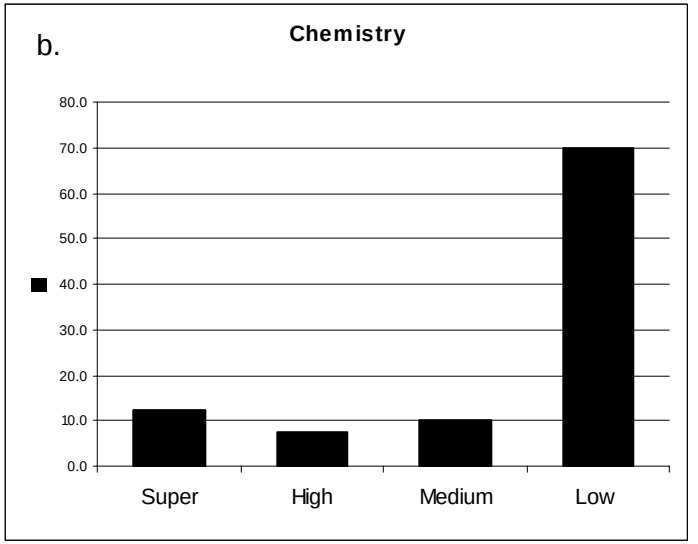
Comments

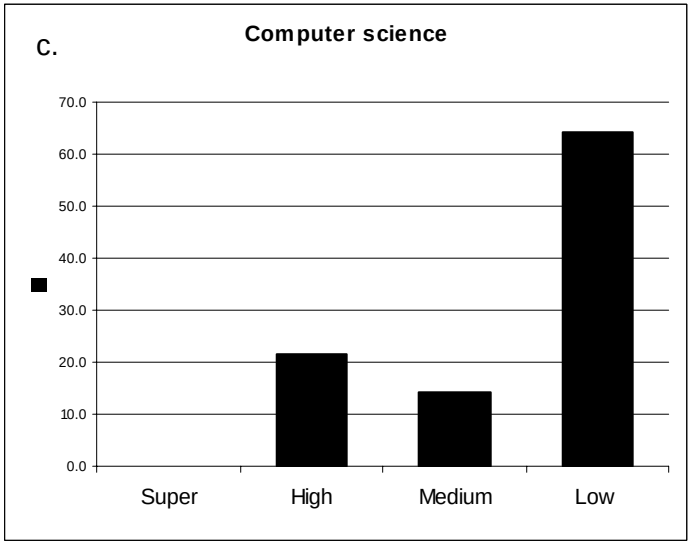
Table 38 shows the number and proportion of super, high, medium and low teacher users per subject. Super-users looked at 300+ pages, high users at 100-299 pages, medium users at 50-99 pages and low users at 1-49 pages.

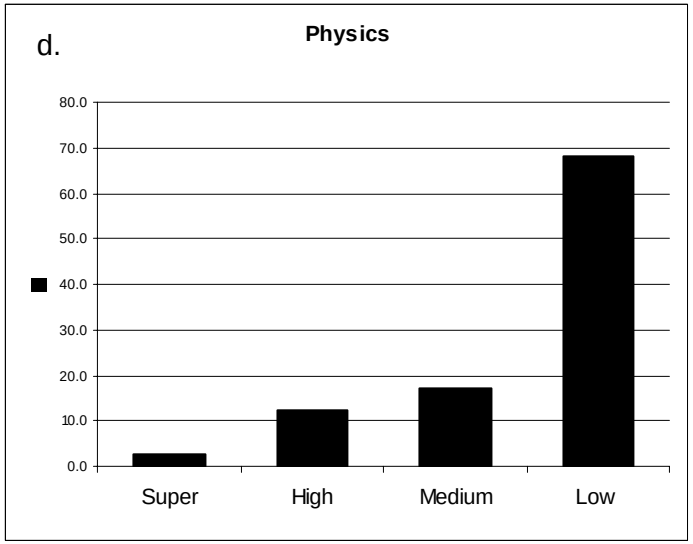
On average 3% of teacher subject-users were super-users, 9% were high users, 15% were medium users and 73% were low users. This is almost identical to the student data. Teacher data per subject are illustrated in figure 16a-e.

Computer science and chemistry were by far the most frequently used subject materials, with 21% of computer science and 20% of all chemistry teacher subject-users looking at over 100 pages. In contrast maths was, as with students, extremely unpopular – only 2% of users looked at over 100 pages.









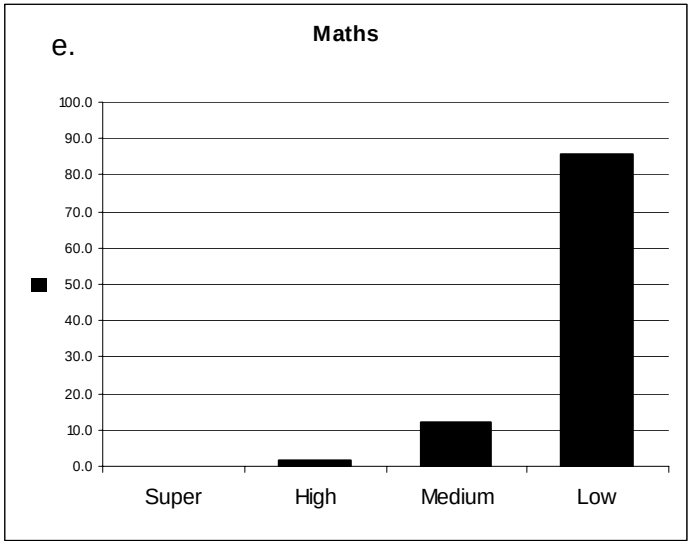


Figure 16a-e. Frequency histograms for teacher use in each subject.

k) Highest number of different SCHOLAR pages accessed by students

	Highest number of pages accessed by any one student (as % of total available)		
	Static pages	**Interactive pages**	**Self-assessments**
Biology	218 (45.6%)	158 (47.4%)	26 (74.3%)
Chemistry	273 (62.9%)	92 (49.5%)	16 (30.2%)
Computer science	572 (75.8%)	86 (27.4%)	22 (88.0%)
Maths	126 (13.4%)	61 (7.2%)	43 (6.9%)
Physics	233 (73.5%)	79 (47.0%)	21 (30.9%)

Table 39. The highest number of static and interactive pages and self-assessments accessed by any one student. Note this is the total number of *unique* pages accessed per subject – it therefore does not include repeat visits to a page.

Comments

Table 39 provides information on the highest number of unique SCHOLAR pages accessed by any one student. These are the maximum number of each page type accessed, thus for example it may well have been a different users that looked at the highest number of static pages to the user that looked at the highest number of interactive pages in biology.

The highest users of each page type looked at 76% of static pages in computer science, 50% of interactive pages in chemistry and 88% of self-assessment pages in computer science.

These data again illustrate how little maths materials were used – the highest maths users still only looked at 13% of static pages, 7% of interactive pages and 7% of self-assessment pages. Even though maths has many more pages of content available these totals are still very low.

I) Highest number of different SCHOLAR pages accessed by teachers

	Highest number of pages accessed by any one teacher (as % of total available)		
	Static pages	**Interactive pages**	**Self-assessments**
Biology	100 (20.9%)	88 (26.4%)	6 (17.1%)
Chemistry	167 (38.5%)	84 (50.6%)	12 (22.6%)
Computer science	105 (13.9%)	36 (11.6%)	3 (12.0%)
Maths	38 (4.0%)	69 (8.1%)	42 (6.7%)
Physics	82 (25.9%)	39 (23.2%)	8 (11.8%)

Table 40. The highest number of static pages, interactive pages and self-assessments accessed by any one teacher. Note this is the total number of *unique* pages accessed per subject – it therefore does not include repeat visits to a page.

Comments

Table 40 provides information on the highest number of unique SCHOLAR pages accessed by any one teacher. These are the maximum number of each page type accessed, thus for example it may well have been a different users that looked at the highest number of static pages to the user that looked at the highest number of interactive pages in biology.

The highest teacher users looked at less of the overall number of pages available in a subject in comparison to the highest student users. However, unlike students the highest use of each page type was all in the same subject, this being chemistry. The highest teacher users looked at 39% of static pages, 51% of interactive pages and 23% of self-assessment pages of chemistry materials. Chemistry was therefore particularly popular with teachers, which correlates with some known high use of chemistry by teachers in one school (case study 2) and one college (case study 1 – see section 7).

These data again illustrate how little maths materials were used – the highest maths teacher users still only looked at 4% of static pages, 8% of interactive pages and 7% of self-assessment pages. Even though maths has many more pages of content available these totals are still very low.

m) Multiple visits to the same page by students

	Highest number of visits to pages accessed by any one student		
	Static pages	**Interactive pages**	**Self-assessments**
Biology	23	22	27
Chemistry	23	24	16
Computer science	21	9	8
Maths	13	13	13
Physics	26	46	19

Table 41. The highest number of times that any one student repeatedly accessed a static page, interactive page or self-assessment.

	Average number of visits to pages accessed by a student		
	Static pages	**Interactive pages**	**Self-assessments**
Biology	1.6	1.6	1.9
Chemistry	1.7	1.5	1.7
Computer science	1.8	1.3	2.0
Maths	1.5	1.7	1.6
Physics	1.6	1.5	1.8

Table 42. The average number of times that students repeatedly accessed a static page, interactive page or self-assessment.

Comments

Students sometimes re-visited a page many times, the maximum being 46 for a physics interactive page (Table 41). These results have been checked and are not outliers within the data – high repeat visits were quite often seen. However the data should be viewed with some caution because high counts may have been caused by

a. A user sharing their username and password with another user (although feedback suggests this is very unlikely)
b. A user going through that page repeatedly to get to other content
c. Problems with the user's computer keyboard, resulting in for example the 'refresh' button sticking (known to occur on at least two occasions).

It does seem unlikely that a student, however keen, would re-read content or repeat an activity 46 times.

The average number of times that a page was visited by an individual student was 1.65 times (Table 42).

The averages for self-assessments were slightly higher than for static and interactive pages, which might suggest that students re-visited self-assessments to re-test themselves. However, there was no dramatic difference here. Indeed, analysis revealed that, based on the proportion of self-assessments available, they were often actually used less than expected (see section 14o, page 105).

n) Multiple visits to the same page by teachers

	Highest number of visits to pages accessed by any one teacher		
	Static pages	**Interactive pages**	**Self-assessments**
Biology	11	15	4
Chemistry	11	10	11
Computer science	7	3	4
Maths	10	10	5
Physics	10	31	10

Table 43. The highest number of times that any one teacher repeatedly accessed a static page, interactive page or self-assessment.

	Average number of visits to pages accessed by a teacher		
	Static pages	**Interactive pages**	**Self-assessments**
Biology	1.7	1.6	1.6
Chemistry	2.2	1.7	1.9
Computer science	1.5	1.1	1.6
Maths	1.5	1.6	1.3
Physics	1.5	1.8	1.7

Table 44. The average number of times that teachers repeatedly accessed a static page, interactive page, or self-assessment.

Comments

Teachers also often re-visited pages, sometimes up to 31 times (Table 43). However, as with the student data in the previous section these results should be viewed with some caution.

The average number of times that each page was visited was 1.62 times (Table 44), almost identical to the student average.

o) Student preference for static, interactive, or self-assessment pages

		AVAILABLE	OBSERVED	EXPECTED	COMMENT ON WHAT CAUSED THE SIGNIFICANT DIFFERENCE
Biology	Static	478	38,365	40,029	**Using** assessments **significantly** more **than expected**
	Interactive	333	27,264	27,886	
	Assessment	35	5,217	2,931	
Chemistry	Static	434	26,016	22,932	**Using** interactivities **significantly** less **than expected**
	Interactive	186	6,842	9,828	
	Assessment	53	2,703	2,800	
Computer science	Static	755	9,937	8,333	**Using** interactivities **significantly** less **than expected**
	Interactive	310	1,642	3,421	
	Assessment	25	451	276	
Maths (MAT + MTH)	Static	941	8,051	7,134	**Using** assessments **significantly** less **than expected**
	Interactive	847	6,719	6,421	
	Assessment	627	3,539	4,754	
Physics	Static	317	11,882	9,481	**Using** assessments **significantly** less **than expected**
	Interactive	168	4,001	5,025	
	Assessment	68	656	2,034	

Table 45. The observed versus the expected use of SCHOLAR static pages, interactive pages and self-assessments by students for each subject. Expected values were calculated by reflecting the proportion of static pages, interactive pages and assessments that were available in each subject. If there was no preference for any one type of resource then each page type should have been used in proportion to its availability.

Comments

Chi square analysis was used to investigate how often each page type was used by students in comparison to the page type availability (i.e. the proportion of static to interactive to assessment pages – see Table 45). This showed that students did not use the pages in proportion to their availability in any of the five subjects (biology $\chi^2 = 1866$, df = 2, $p < 0.01$; chemistry $\chi^2 = 1325$, df = 2, $p < 0.01$; computer science $\chi^2 = 1345$, df = 2, $p < 0.01$; maths $\chi^2 = 442$, df = 2, $p < 0.01$; physics $\chi^2 = 1750$, df = 2, $p< 0.01$). The largest contributing factor to each subject's analysis was identified and is explained in the last column of table 45.

A diverse picture emerges between subjects. For all subjects except biology one type of page was used less often than expected – for chemistry and computer science these were the interactivity pages, for maths and physics these were the assessment pages. This result supports feedback from users relating to the irritation involved with using self-assessments in maths and physics due to the criteria for inputting answers. It is unknown why computer science interactivity pages were used less than expected, although this may have been due to the proportionally high use of static pages by students that were completing a computer science qualification without the help of a teacher.

In only one subject – biology – was a page type used more than predicted given its availability. These were the self-assessments.

p) Teacher preference for static, interactive, or self-assessment pages

		AVAILABLE	OBSERVED	EXPECTED	COMMENT ON WHAT CAUSED THE SIGNIFICANT DIFFERENCE
Biology	Static	478	1,787	1,912	**Using** interactivities **significantly** more **than expected**
	Interactive	333	1,467	1,332	
	Assessment	35	130	140	
Chemistry	Static	434	2,383	2,209	**Using** assessments **significantly** less **than expected**
	Interactive	186	894	947	
	Assessment	53	148	270	
Computer science	Static	755	639	549	**Using** interactivities **significantly** less **than expected**
	Interactive	310	137	225	
	Assessment	25	16	18	
Maths (MAT + MTH)	Static	941	639	642	**Using** assessments **significantly** less **than expected**
	Interactive	847	714	578	
	Assessment	627	295	428	
Physics	Static	317	1,472	1,404	**Using** assessments **significantly** less **than expected**
	Interactive	168	831	744	
	Assessment	68	147	301	

Table 46. The observed versus the expected use of SCHOLAR static pages, interactive pages and self-assessments by teachers for each subject. Expected values were calculated by reflecting the proportion of static, interactive and assessment pages that were available in each subject. If there was no preference for any one type of resource then each page type should have been used in proportion to its availability.

Comments

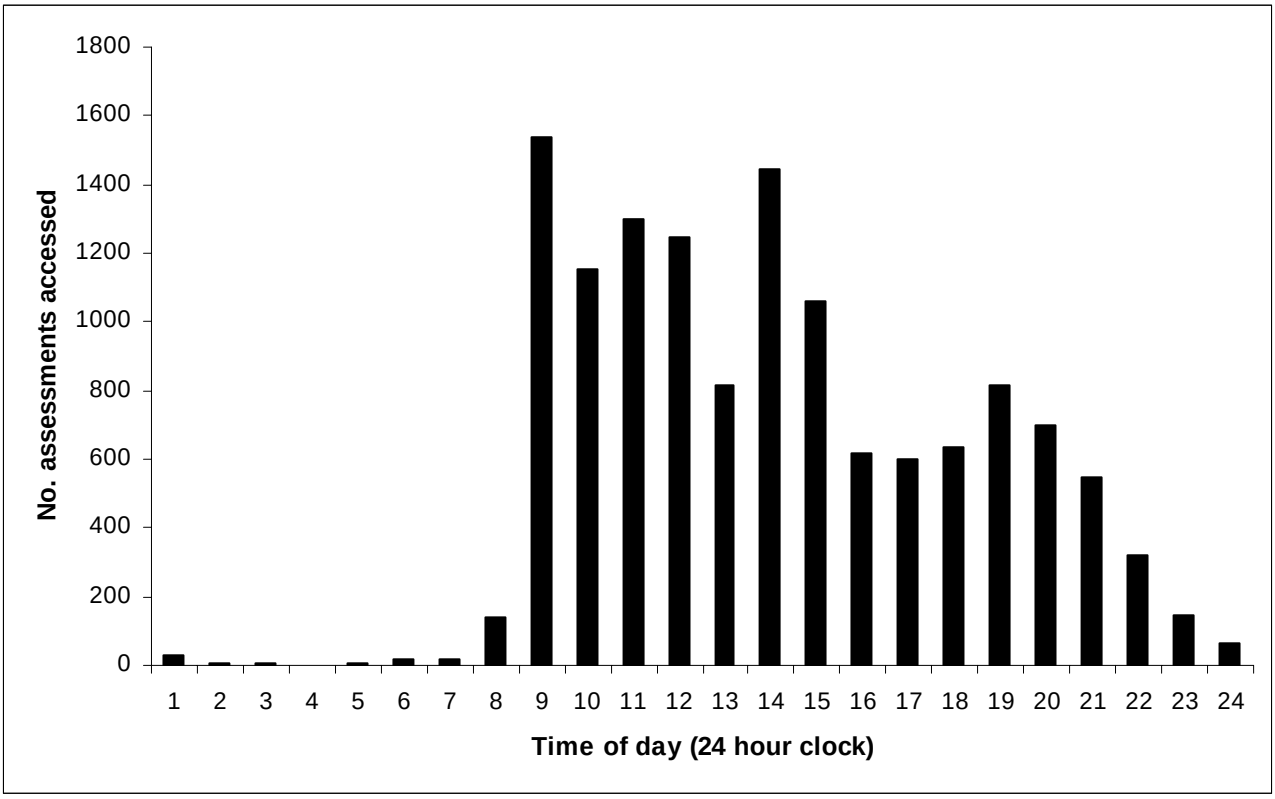
Chi square analysis was used to investigate how often each page type was used by teachers in comparison to page type availability (i.e. the proportion of static to interactive to assessment pages – see Table 46). This showed that, as with students, teachers did not use the pages in proportion to their availability in any of the five subjects (biology $\chi^2 = 22.6$, df = 2, $p < 0.01$; chemistry $\chi^2 = 71.6$, df = 2, $p < 0.01$; computer science $\chi^2 = 49.7$, df = 2, $p < 0.01$; maths $\chi^2 = 73.3$, df = 2, $p < 0.01$; physics $\chi^2 = 92.3$, df = 2, $p < 0.01$). The largest contributing factor to each subject's analysis was identified and is explained in the last column of table 46.

As with students a diverse picture emerges between subjects. Again, as with students, for all subjects except biology one type of page was used less often than expected – for computer science these were the interactivity pages, for chemistry, maths and physics these were the assessment pages. Again this supports feedback from users relating to the irritation involved with using self-assessments in maths and physics due to the criteria for inputting answers.

Finally, as with students, it was the biology materials where a page type was used more than predicted given its availability. Students used biology self-assessments more than expected, whereas teachers used the interactivity pages more than expected. This may have been an indicator of teachers focussing on the interactivities to show their class certain concepts visually.

q) Time of day, and number of different days that SCHOLAR was accessed by students

Figure 17. Time of day at which students accessed self-assessments. Note that this does include temporary username data



	Maximum number of days that assessments were accessed	Average number of days that assessments were accessed
Students	35	3.6 (N = 1337)

Table 47. The maximum and average number of days across which students accessed SCHOLAR self-assessments. Note that this includes repeat visits to a page but does not include temporary username data.

Comments

Figure 17 and table 47 relate to the time at which self-assessments were accessed by students, and the number of days over which a student accessed them. It was not possible to calculate these data for the static or interactive pages due to the database set-up that recorded use of these page types. Therefore the self-assessment data above act as an indicator of the likely overall pattern of use of SCHOLAR throughout the 24-hour clock.

At some point during the trial students used SCHOLAR in every hour of the 24-hour clock, which highlights the importance of students having out-of-school access to online resources.

The least popular hour to use SCHOLAR was between 4am and 4.59am (when 2 self-assessment pages (0.02%) were accessed). The most popular hour to use SCHOLAR was between 9am and 9.59am (when 1,539 (11.6%) of self-assessment pages were accessed).

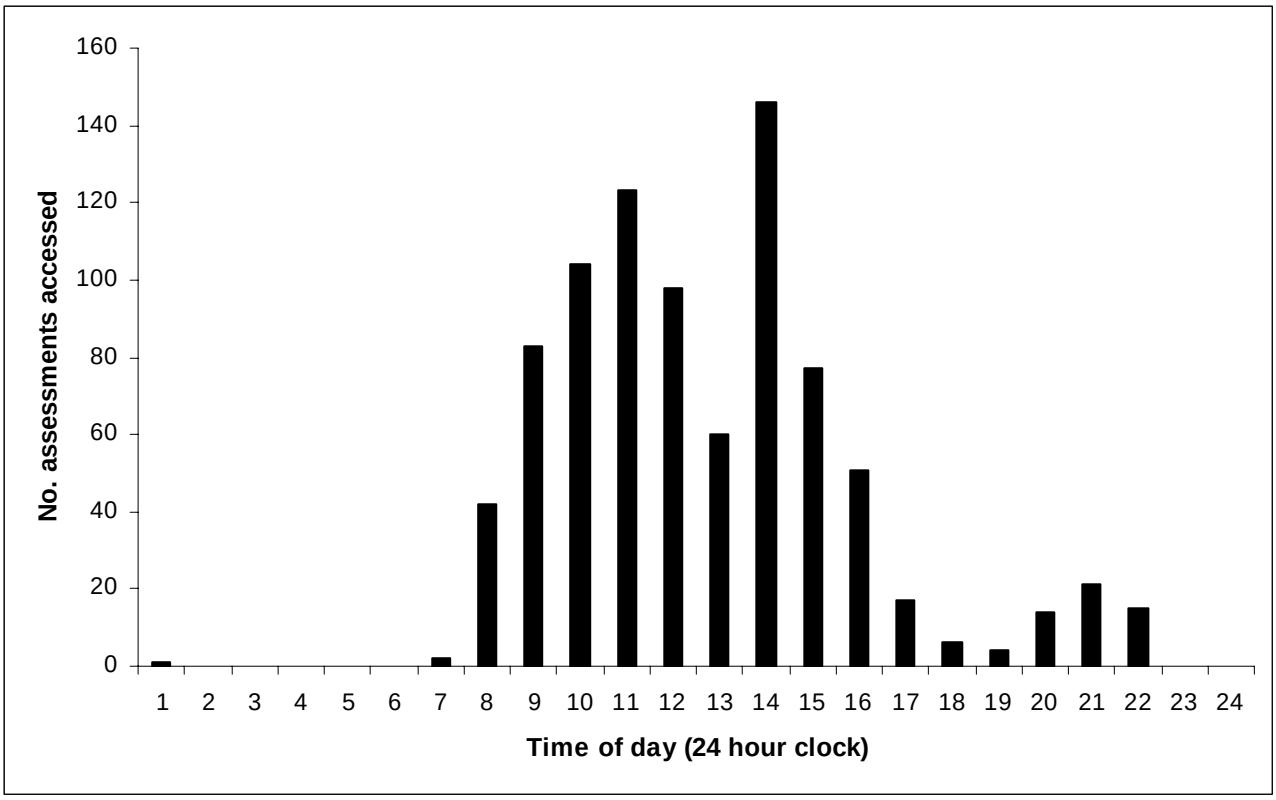
A total of 69.4% of all assessments were accessed between 9am and 4.59pm. This should not be considered to only be school hours because these data include weekend use. It is interesting to note that 30.6% of use was therefore during the evenings and early mornings.

The maximum number of different days that an individual student accessed self-assessments was 35. This total may have been higher for static and interactive pages because more content was available for these page types. However these data were unavailable.

The average number of days over which a student accessed SCHOLAR self-assessments was 3.6 days.

r) Time of day, and number of different days that SCHOLAR was accessed by teachers

Figure 18. Time of day at which teachers accessed self-assessments. Note that this does include temporary username data



	Maximum number of days that assessments were accessed	Average number of days that assessments were accessed
Teachers	15	2.1 (N = 146)

Table 48. The maximum and average number of days across which teachers accessed SCHOLAR self-assessments. Note that this includes repeat visits to a page but does not include temporary username data.

Comments

Figure 18 and table 48 relate to the time at which self-assessment pages were accessed by teachers, and the number of days over which a teacher accessed them. It was not possible to calculate these data for the static or interactive pages due to the database set-up that recorded use of these page types. Therefore the data above act as an indicator of the likely overall pattern of use of SCHOLAR throughout the 24-hour clock.

During the trial the teacher population did not use SCHOLAR at all between 11pm and 12.59pm, or between 2am and 6.59am. The highest use in any one hour was between 2pm and 2.59pm, when 16.9% of all self-assessment pages were accessed. A total of 85.9% of all the assessments were accessed by teachers occurred between 9am and 4.59pm. Students therefore used SCHOLAR more often in the evenings and early mornings, which supports the suggestion that they used it as an additional resource for revision or homework support.

The maximum number of different days that an individual teacher accessed self-assessment pages was 15, much lower than the figure for students. Again, this total may have been higher for static and interactive pages because more content was available for these page types. However these data were unavailable.

The average number of days over which a teacher accessed SCHOLAR self-assessments was 2.1 days.

s) Most visited page names accessed by students

	Page type	Name of page	Page code (where page name is not unique)	No. visits by students (including repeat visits)	No. different students accessing it	Average No. repeat visits
Biology	Link to assessment	-	bd00b317-43ed-ee42-0fe9-14de16934eec	1,106	356	3.1
	Assessment	-	as_bio1_1et1	784	345	2.3
	Link to assessment	-	0cdb40b8-8aae-af66-05bc-a2fb4bb68df4	677	239	2.8
	Link to assessment	-	449fc36d-2b0e-baa2-efe4-c0d38293d5c0	647	185	3.5
	Link to assessment	-	57710880-2902-73d0-1aba-43f9e6206168	512	191	2.7
	Static	Introduction	80950fa5-4ed2-9f15-9027-d070dee5885c	470	228	2.1
	Static	The study of cell ultrastructure	-	440	252	1.7
	Assessment	-	as_bio1_2et1	437	234	1.9
	Assessment	-	a2_bio4_1et1	427	182	2.3
	Link to assessment	-	ad96a315-6f98-6446-5a74-e333637c5601	414	159	2.6

Table 49. The ten pages of biology materials most frequently visited by students, the number of visits made to each and the number of different students that visited them. The average number of repeat visits per student is also given. Note that a 'link to an assessment' page is exactly that – a launch page, often (but not always) without any content on it other than a hyperlink to the assessment itself.

	Page type	Name of page	Page code (where page name is not unique)	No. visits by students (including repeat visits)	No. different students accessing it	Average No. repeat visits
Chemistry	Link to assessment	-	82fc8cfa-7163-fe1a-cc88-367d8cb29442	367	150	2.4
	Link to assessment	-	342d1174-ec62-2c04-cd5a-fe1f5f485a99	355	125	2.8
	Static	Relative masses	-	314	150	2.1
	Link to assessment	-	502e8324-1479-9b75-8983-90c280867670	311	129	2.4
	Assessment	-	as_che1_2et1	283	140	2.0
	Static	Alkanes	-	268	105	2.6
	Static	Shapes of molecules		259	89	2.9
	Link to assessment	-	-	257	114	2.3
	Static	Introduction	97e32216-7973-b4f3-d0e5-316f85a84c33	240	113	2.1
	Assessment	-	as_che1_3et1	239	122	2.0

Table 50. The ten pages of chemistry materials most frequently visited by students, the number of visits made to each and the number of different students that visited them. The average number of repeat visits per student is also given. Note that a 'link to an assessment' page is exactly that – a launch page, often (but not always) without any content on it other than a hyperlink to the assessment itself.

	Page type	Name of page	Page code (where page name is not unique)	No. visits by students (including repeat visits)	No. different students accessing it	Average No. repeat visits
Computer science	Static	Review questions 2	91eb15b5-5722-e439-292b-d0541f2a9b3e	130	34	3.8
	Static	Traditional method: an overview	-	108	35	3.1
	Static	The analysis stage in closer detail	-	105	34	3.1
	Static	Components of a computer system	-	104	56	1.9
	Link to assessment	-	98829258-e4a6-10af-d205-6a7a2ee1db31	98	33	3.0
	Link to assessment		b7600dd7-5a91-bc0f-4011-d50afe3c24ab	91	25	3.6
	Static	Phase zero - the feasibility study	-	85	30	2.8
	Static	Input, storage and output devices	-	81	44	1.8
	Static	Types of software	-	80	41	2.0
	Static	Operating systems	-	80	43	1.9

Table 51. The ten pages of computer science materials most frequently visited by students, the number of visits made to each and the number of different students that visited them. The average number of repeat visits per student is also given. Note that a 'link to an assessment' page is exactly that – a launch page, often (but not always) without any content on it other than a hyperlink to the assessment itself.

	Page type	Name of page	Page code (where page name is not unique)	No. visits by students (including repeat visits)	No. different students accessing it	Average No. repeat visits
Maths	Link to assessment	-	44f761ae-8352-eadc-63b8-4ce6e0ae683f	203	68	3.0
	Assessment	-	as_mat1_1ex1	153	64	2.4
	Link to assessment	-	e346d74a-5456-cbfa-dd0c-4545bf5866f2	133	57	2.3
	Static	Familiar rules for indices	5c7943c7-b8ea-a6bc-25cc-4548782f4ac4	128	89	1.4
	Link to assessment	-	869674e5-a9ed-ccb1-b0ce-c28c324de92e	124	53	2.3
	Static	Negative indices rule	263f00e8-e005-ed8e-6cb5-241ef192579b	124	62	2.0
	Static	Negative indices rule	075d6b09-11e7-b178-cad5-cc73c4aa134c	122	79	1.5
	Link to assessment	-	df68c2e1-ee01-a097-60e0-74bab658e805	112	64	1.8
	Static	Familiar rules for indices	fcf2cc0b-53cd-a953-5b4f-4095729ae8d4	109	57	1.9
	Static	Mathematical Formulae	62497457-eb14-2588-ced8-6e9c61e41219	107	68	1.6

Table 52. The ten pages of maths materials most frequently visited by students, the number of visits made to each and the number of different students that visited them. The average number of repeat visits per student is also given. Note that a 'link to an assessment' page is exactly that – a launch page, often (but not always) without any content on it other than a hyperlink to the assessment itself.

	Page type	Name of page	Page code (where page name is not unique)	No. visits by students (including repeat visits)	No. different students accessing it	Average No. repeat visits
Physics	Static	Current and change	-	180	81	2.2
	Static	Scalars and vectors	361c3396-d324-3292-33e3-93acc4373187	166	102	1.6
	Static	Resistance and resistivity	-	160	59	2.7
	Static	Distance and displacement	-	160	94	1.7
	Static	Potential difference and the volt	-	142	70	2.0
	Link to assessment	-	7ac46399-46f5-964e-0699-95b809701b91	127	61	2.1
	Static	The photoelectric effect	-	125	66	1.9
	Static	Introduction	a00e9795-5a1e-b0a1-eee5-04dc9d9804cf	122	87	1.4
	Static	Definitions	-	112	53	2.1
	Static	Angular displacement and radians	-	112	51	2.2

Table 53. The ten pages of physics materials most frequently visited by students, the number of visits made to each and the number of different students that visited them. The average number of repeat visits per student is also given. Note that a 'link to an assessment' page is exactly that – a launch page, often (but not always) without any content on it other than a hyperlink to the assessment itself.

Comments

Tables 49 to 53 list the top ten most accessed pages by students for each subject. A page called 'link to assessment' was exactly that – a launch page, often (but not always) without any content on it other than a hyperlink to the self-assessment itself. An example of a link page can be found on page 8. There were not multiple links to the same self-assessment throughout the content – rather the assessment was only accessible from one place within the content.

It is interesting to notice that the link page was often visited a lot more often than the assessment itself. For example in biology (table 49) the single most popular page was a link page, with 1,106 visits. The assessment itself was the second most popular page, with 784 visits. This suggests either that:

- Some users have problems reaching the assessment itself (there was certainly some feedback about the difficulty accessing the self-assessment URLs by a small number of schools)
- Users visited the link and remembered that they had been there already, hence they left before going back through the assessment again

Whilst biology and maths had a mix of the different page types in the top ten, the chemistry, computer science and physics top ten was almost exclusively – if not completely – made up of static pages. Certainly evidence from feedback and from page type use (section 14o, page 105) shows that students used self-assessment pages less than expected in physics and maths.

t) Most visited page names accessed by teachers

	Page type	Name of page	Page code (where page name is not unique)	No. visits by teachers (including repeat visits)	No. different teachers accessing it	Average No. repeat visits
Biology	Interactive	Internal structure of the heart	-	41	11	3.7
	Link to assessment	-	bd00b317-43ed-ee42-0fe9-14de16934eec	36	12	3.0
	Static	Internal structure of the heart	-	33	10	3.3
	Interactive	Glycolysis	-	24	8	3.0
	Interactive	Natural selection	-	20	5	4.0
	Static	Structure and function of the mammalian heart	-	19	7	2.7
	Link to assessment	-	ea014934-4f69-3572-c532-2240baa91e7a	18	6	3.0
	Static	Structure and function of arteries, veins and capillaries	-	18	10	1.8
	Static	The mammalian circulatory system	-	18	7	2.6
	Assessment	-	as_bio1_1et1	17	11	1.5

Table 54. The ten pages of biology materials most frequently visited by teachers, the number of visits made to each and the number of different teachers that visited them. The average number of repeat visits per teacher is also given. Note that a 'link to an assessment' page is exactly that – a launch page, often (but not always) without any content on it other than a hyperlink to the assessment itself.

	Page type	Name of page	Page code (where page name is not unique)	No. visits by teachers (including repeat visits)	No. different teachers accessing it	Average No. repeat visits
Chemistry	Static	Bond enthalpies	-	29	7	4.1
	Static	Electrode potential	-	26	7	3.7
	Assessment	-	as_che3_1et1	24	6	4.0
	Static	Reversible reactions	-	23	7	3.3
	Static	The Haber Process	-	23	6	3.8
	Interactive	Mass spectrometer animation	-	22	13	1.7
	Static	Catalysts and energy	-	22	5	4.4
	Static	Ionic bonds	-	22	6	3.7
	Static	Enthalpy of combustion	-	22	7	3.1
	Static	Catalytic converters	-	22	4	5.5

Table 55. The ten pages of chemistry materials most frequently visited by teachers, the number of visits made to each and the number of different teachers that visited them. The average number of repeat visits per teacher is also given. Note that a 'link to an assessment' page is exactly that – a launch page, often (but not always) without any content on it other than a hyperlink to the assessment itself.

	Page type	Name of page	Page code (where page name is not unique)	No. visits by teachers (including repeat visits)	No. different teachers accessing it	Average No. repeat visits
Computer science	Static	Components of a computer system	-	11	6	1.8
	Static	Input, storage and output devices	-	10	5	2.0
	Static	Review questions - components of a computer system	-	9	4	2.3
	Static	Systems development life cycle	-	7	1	7.0
	Static	Types of software	-	7	4	1.8
	Static	Database concepts	-	7	2	3.5
	Link to assessment	-	98829258-e4a6-10af-d205-6a7a2ee1db31	7	2	3.5
	Static	Processing modes in Windows	-	6	2	3.0
	Static	Review questions - compilers and interpreters	-	6	3	2.0
	Interactive	Identifying categories of computer	-	6	4	1.5

Table 56. The ten pages of computer science materials most frequently visited by teachers, the number of visits made to each and the number of different teachers that visited them. The average number of repeat visits per teacher is also given. Note that a 'link to an assessment' page is exactly that – a launch page, often (but not always) without any content on it other than a hyperlink to the assessment itself.

	Page type	Name of page	Page code (where page name is not unique)	No. visits by teachers (including repeat visits)	No. different teachers accessing it	Average No. repeat visits
Maths	Static	Coordinate Geometry and Graphs	9424f3c1-d0a4-71c2-7c31-d5accabe9115	19	4	4.8
	Link to assessment	-	a3a6d5c3-2877-0276-d670-cd4785f49b0d	17	4	4.3
	Link to assessment	-	-	15	5	3.0
	Link to assessment	-	efa296b7-ce74-2d9b-e45a-9a41022fd457	14	6	2.3
	Static	Gradients and Mid Points of Straight Lines	-	13	4	3.3
	Interactive	Gradient Activity	c9384f2d-aba3-491f-c1c0-b03707d39f11	12	5	2.4
	Link to assessment	-	df68c2e1-ee01-a097-60e0-74bab658e805	12	4	3.0
	Interactive	Indices exercise on rule 7	e346d74a-5456-cbfa-dd0c-4545bf5866f2	12	6	2.0
	Link to assessment	-	869674e5-a9ed-ccb1-b0ce-c28c324de92e	11	6	1.8
	Link to assessment	-	c908c974-e576-fe93-d4ad-8b73588d23af	10	4	2.5

Table 57. The ten pages of maths materials most frequently visited by teachers, the number of visits made to each and the number of different teachers that visited them. The average number of repeat visits per teacher is also given. Note that a 'link to an assessment' page is exactly that – a launch page, often (but not always) without any content on it other than a hyperlink to the assessment itself.

	Page type	Name of page	Page code (where page name is not unique)	No. visits by teachers (including repeat visits)	No. different teachers accessing it	Average No. repeat visits
Physics	Link to assessment	-	32bd387f-08c0-a02b-982b-5cc1f3cdf5b4	42	5	8.4
	Link to assessment	-	eabe8c2c-88e7-3ef8-0e1b-71d9b33f5461	34	8	4.3
	Interactive	Crossing the river	-	29	13	2.2
	Interactive	Mass oscillating on a spring	-	24	5	4.8
	Interactive	Kinetic model of a gas	-	22	9	2.4
	Interactive	Horizontal Motion	-	20	10	2.0
	Interactive	Constant volume gas thermometer	-	19	9	2.1
	Static	Work and energy	-	18	12	1.5
	Link to assessment	-	7ac46399-46f5-964e-0699-95b809701b91	18	7	2.6
	Interactive	Addition of vectors	-	17	12	1.4

Table 58. The ten pages of physics materials most frequently visited by teachers, the number of visits made to each and the number of different teachers that visited them. The average number of repeat visits per teacher is also given. Note that a 'link to an assessment' page is exactly that – a launch page, often (but not always) without any content on it other than a hyperlink to the assessment itself.

Comments

Tables 54 to 58 list the top ten most accessed pages by teachers for each subject. A page called 'link to assessment' was exactly that – a launch page, often (but not always) without any content on it other than a hyperlink to the assessment itself. An example of a link page can be found on page 8. There were not multiple links to the same assessment throughout the content – rather the assessment was only accessible from one place within the content.

As with students, the teacher top ten showed a mix of the different page types in biology and maths, and in computer science the top ten was almost exclusively – if not completely – made up of static pages.

Unlike students, in chemistry the teacher top ten pages were almost exclusively static pages, and in physics teachers focused on accessing interactive pages rather than static ones.

Interactive pages made the top ten 13 times across the subjects for teachers, but no times for students. This may indicate a preference for teachers using interaction pages such as animations to show concepts to a class. Alternatively teachers may have just singled out the more interesting non-text pages when investigating SCHOLAR (interactive pages are labelled as such from the content index in each SCHOLAR subject – see Figure c, page 6).

u) Use of SCHOLAR by students registered for two subjects

Methodology
Most students were registered to use SCHOLAR in more than one subject, so it was of use to know whether they used all subjects for which they were registered equally.

It was not practical to compare the use of every subject against every other subject, so two pairs were chosen as a comparison: users registered for both biology and chemistry, and users registered for both maths and physics. The non-parametric Wilcoxon Matched Pairs test was used, as data were not normally distributed.

Results
Students registered to use biology and chemistry did not use SCHOLAR equally for both subjects ($T = 89169$; $df = 1$; $p < 0.001$). The average difference between use of biology and chemistry was 26 pages, but this ranged from zero to 492 pages. Students were most likely to look at more pages of biology in comparison with chemistry.

Similarly, students registered to use maths and physics did not use SCHOLAR equally for both subjects ($T = 10752$; $df = 1$; $p < 0.001$). The average difference between use of maths and physics was 18 pages, but this ranged from zero to 359 pages. Students were most likely to look at more pages of physics in comparison with maths.

Both these results were highly significant, suggesting that students did not use SCHOLAR equally for all of the subjects they were registered to use. Feedback from interviews (see section 7) suggests that students may be more likely to use SCHOLAR in the subjects where their teachers also use it.

v) Gender differences in SCHOLAR use

Methodology
A record of gender was not stored in the SCHOLAR database, so it had to be taken from the LEA data where available. Chi square analysis was carried out to compare use of SCHOLAR by males versus females.

Results
There were data available on gender for 3,106 students registered to use SCHOLAR. Of these, 51% (N = 1,640) were male. Of the 3,106 students registered to use SCHOLAR, 33% (N = 1,030) had used it at least once.

There was no difference in the sex ratio of students that had decided to use SCHOLAR at least once ($\chi^2 = 2.07$, $df = 1$, $p > 0.05$) – as with the number registered to use it, 51% (N = 525) of the students that did use at least once it were male.

There was also no difference in the sex ratio of students that were super (300+ pages), high (100-299 pages) and medium/low (less than 100 pages) SCHOLAR users ($\chi^2 = 2.11$, $df = 3$, $p > 0.05$). A total of 51% (N = 101) of students looking at 100 or more pages and 67% (N = 33) of students looking at 300 or more pages were male.

Despite the lack of a significant difference here it is of interest to note that the ten highest subject-users across the trial were all male (see section 8b, page 43).

15. Glossary

Word	Definition
Achievement	A measure of the student's exam success in the context of that individual, for example by taking account of their previous attainment, the school at which they are studying, their age, gender etc (contrast with 'attainment').
ALIS	The A-level Information service. ALIS are paid by schools and colleges to produce a predicted grade per subject for each student prior to their exams. This predicted grade is calculated from an equation that relates to the individuals' GCSE grades.
Attainment	The grade that a student gets in an exam (contrast with 'achievement').
AQA	One of the three main exam boards providing a syllabus for subjects at A-level (also see Edexcel and OCR).
Becta	The British Educational Communication and Technology Association
CPD	Continuing Professional Development. The SCHOLAR staff training days were often called CPD events because this is what the schools viewed them as.
CPD password	A generic password given to schools and colleges to allow them to access SCHOLAR before they registered staff and students.
df	This stands for the statistical term 'degrees of freedom'. The figure is calculated from the size of the sample and must be quoted with the results of the statistical analysis to ensure that the correct level for statistical significance has been compared to the p value results of the analysis.
Edexcel	One of the three main exam boards providing a syllabus for subjects at A-level (also see AQA and OCR).
FE College	Further Education College
IB	International Baccalaureate – an alternative qualification to the English A-levels that was offered by several selective grammar schools involved in the SCHOLAR trial.
H	The test statistic quoted by the MINITAB statistical analysis software when the non-parametric Kruskal-Wallis analysis was carried out.
High user	A user that looked at between 100 and 299 pages of SCHOLAR content in any one subject.
IU	Interactive University, distributors of the SCHOLAR system.
LEA	Local Education Authority. There were eight LEAs involved in this project: Bexley, Cumbria, Dudley, Kent, Medway, Sandwell, Walsall and Wolverhampton.
Low user	A used that looked at 1 – 49 pages of SCHOLAR content in any one subject.
LSC	Learning and Skills Council. There were four regional LSCs involved in this project: The Black Country, Cumbria, London East, and Kent & Medway.
Medium user	A user that looked at between 50 and 99 pages of SCHOLAR content in one subject.
N	The sample size. So for example the questionnaire data had different sample sizes for every question depending on how many people answered each (often people skip some questions).
NILTA	National Information and Learning Technologies Association
OCR	One of the three main exam boards providing a syllabus for subjects at A-level (also see AQA and Edexcel).
P	The p value is a statistical term that stands for 'probability'. To be statistically significant the p value obtained in an analysis must usually be equal to or less than $p = 0.05$, although where multiple analyses have occurred the p value may have to be smaller (see 'statistical significance' below).

Registration	Schools and colleges underwent a process of registering staff and students in order that people could obtain their own unique username and password for the system. In practice this involved the school/college sending IU a list of the names of staff and students, together with information about the subjects that each individual needed to be registered to access. IU then returned a list of usernames and passwords to the school/college for manual distribution to staff and students.
Schools	A generic term used in this report to mean both 'schools and colleges'.
School types	This report differentiates between three school types: selective schools (admission to school based on previous attainment), non-selective schools and Further Education (FE) Colleges.
Significant difference	In this report the term 'significant difference' is only used when a statistical test has been carried out on some data and the result is found to be of statistical significance, i.e. the p value was $p = 0.05$ or less. This means that there was a 5% or less chance that the difference found was due to chance alone.
Subject-user	This report refers to both student subject-users and teacher subject-users. Data on a subject-user was specific to the subject in question, for example this might be the number of pages of SCHOLAR accessed by that subject-user. A student subject-user differed from an individual student because one individual was often represented several times across several subjects, for example one individual student might have been a subject-user in both biology and chemistry.
Super-user	A user that looked at 300 or more pages of SCHOLAR content in one subject.
T	T test statistical value, quoted when the parametric T test has been carried out on data. It is also quoted by MINITAB (the statistical package used for analysis in this report) when the non-parametric Wilcoxon statistical test has been carried out on the data.
Teachers	A generic term to describe teaching staff in sixth form schools or FE colleges
Temporary password	Temporary student and teacher passwords were available to schools to allow those without their own personal username and password to access SCHOLAR. Use of temporary usernames was largely excluded from the analysis in this report where it was necessary to know either (a) whether that username had been used by just one or by many individuals, and/or (b) any personal information about the user concerned – name, gender, exam results data etc.
URL	This is the address of a website. The acronym stands for 'uniform resource locators'.
Y12 or Y13	Year 12 or Year 13, i.e. when students are completing AS and A2 exams respectively.

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