

Flexible Delivery

An evaluation of the use of the virtual learning environment in higher education across Scotland

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Preface

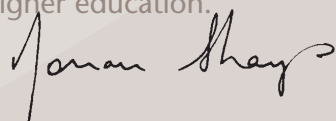
The approach to quality and standards in Scotland is enhancement-led and learner-centred. It was developed through a partnership of the Scottish Funding Council (SFC), Universities Scotland, the National Union of Students in Scotland (NUS Scotland) and the Quality Assurance Agency for Higher Education (QAA) Scotland. The Higher Education Academy has also joined that partnership. The Enhancement Themes are a key element of a five-part framework which has been designed to provide an integrated approach to quality assurance and enhancement, supporting learners and staff at all levels in enhancing higher education in Scotland drawing on developing, innovative practice within the UK and internationally.

The five elements of the framework are:

- a comprehensive programme of subject-level reviews undertaken by the higher education institutions themselves; guidance on internal reviews is published by SFC (www.sfc.ac.uk)
- enhancement-led institutional review (ELIR) run by QAA Scotland (www.qaa.ac.uk/reviews/ELIR)
- improved forms of public information about quality; guidance on the information to be published by higher education institutions is provided by SFC (www.sfc.ac.uk)
- a greater voice for students in institutional quality systems, supported by a national development service - student participation in quality scotland (sparqs) (www.sparqs.org.uk)
- a national programme of Enhancement Themes aimed at developing and sharing good practice to enhance the student learning experience, which are facilitated by QAA Scotland (www.enhancementthemes.ac.uk).

The topics for the Themes are identified through consultation with the sector and implemented by steering committees whose members are drawn from the sector and the student body. The steering committees have the task of developing a programme of development activities, which draw upon national and international good practice. Publications emerging from each Theme are intended to provide important reference points for higher education institutions in the ongoing strategic enhancement of their teaching and learning provision. Full details of each Theme, its steering committee, the range of research and development activities, and the outcomes are published on the Enhancement Themes website (www.enhancementthemes.ac.uk).

To further support the implementation and embedding of a quality enhancement culture within the sector, including taking forward the outcomes of the various Enhancement Themes, a new overarching committee has been established, chaired by Professor Kenneth Miller (Vice-Principal, University of Strathclyde). It has the important dual role of supporting the overall approach of the enhancement themes, including the five-year rolling plan, and of supporting institutional enhancement strategies and management of quality. We very much hope that the new committee, working with the individual topic-based Themes' steering committees, will provide a powerful vehicle for the progression of the enhancement-led approach to quality and standards in Scottish higher education.



Norman Sharp, Director, QAA Scotland

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Introduction

The Flexible Delivery Enhancement Theme

Following its establishment in January 2004, the Enhancement Theme Steering Committee for Flexible Delivery has sought to implement a programme of work which would address the growing challenge faced by higher education institutions (HEIs) to develop and adapt their provision to allow greater flexibility for today's large and diverse student body, as part of the wider implementation of a learner-centred approach.

To this end, the Steering Committee adopted the broadest possible interpretation of flexible delivery, to encompass not only modes of study, but also methods of delivery, together with underpinning support and infrastructure. Accordingly, its programme of work has sought to encapsulate a vision of a learner-centred model of pedagogy and learner support, appropriate to the needs of the individual learner, located within a high-quality learning environment, and supported by efficient and effective business and administrative processes. This work was informed by exemplars of good practice in HEIs worldwide, reflecting changing practice in learning and teaching to promote flexibility, and by the outcomes from a series of workshops involving a number of international experts together with UK and Scottish practitioners.

As a practical means of ensuring that the breadth of the Enhancement Theme was reflected in the scope of its development projects, the Steering Committee formulated a typology of flexible delivery, which comprised the following key operational areas: flexible admissions; credit, recognition of prior informal learning (RPL), accreditation of prior experiential learning; flexible programmes; student support, advice and guidance; continuing professional development (CPD); and collaborative partnerships. This typology provided a framework to support the planning and implementation of a number of projects addressing different practical applications of flexible delivery, the outputs from which would provide a suite of tools to inform and support institutions, practitioners and learners, in taking forward strategic development and practical implementation.

A report on an evaluation of the use of the virtual learning environment in higher education across Scotland

This is the second of a series of publications from the Flexible Delivery Enhancement Theme. It represents the outcomes from one of six development projects supported by the Steering Committee.

Recognising the integral and growing role played by the virtual learning environment (VLE) in the flexible delivery of higher education (HE), this publication aims to

- identify patterns of VLE use, and common experiences of a positive or negative nature
- develop an overview of this aspect of flexible delivery in the Scottish HE context, to enable benchmarking by individual users, teachers, managers and other stakeholders
- contribute to the sum of knowledge and best practice in VLE development in the Scottish HE sector, identifying norms and trends and, where possible, to inform future investment in learning technology.

Other publications from this Enhancement Theme

Other publications from this Enhancement Theme will address different dimensions of flexible delivery, including: flexible entry and flexible programmes, with a focus on RPL and credit transfer in the context of the Scottish Credit and Qualifications Framework (SCQF) and curriculum design for achieving learning outcomes by a variety of different routes and modes of assessment; and the strategic planning and implementation of flexible programmes, with a particular focus on blended learning. The compilation of an on-line resource to facilitate access to information, tools and materials from Joint Information Systems Committee (JISC) development programmes, and from the work of the Higher Education Academy, will further assist institutions in enhancing flexible delivery within the context of their individual missions.

Contributors

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Case Study 2:	Professor Phillip John, Department of Chemistry, Heriot Watt University

Chapter 5: The SCHOLAR programme in Scotland

Professor Phillip John, Chair, SCHOLAR Forum, Heriot-Watt University, Edinburgh, UK

Summary

SCHOLAR is a highly successful e-learning programme, originally developed by Heriot-Watt University for supporting its own undergraduates in science and technology subjects. Now providing learning resources for over 60,000 learners in schools and FE colleges at SCQF levels 6 and 7, it is believed to be the world's largest programme at these levels, and is now being extended into international markets.

SCHOLAR learning resources are designed to support both students and their tutors with an in-built assessment and feedback system that allows students to proceed flexibly at their own pace. Such is the impact of the SCHOLAR learning community, the Scottish Executive has supported its adoption by all 32 education authorities in Scotland as well as private-sector schools. Whilst such support was critical in the formative stages, SCHOLAR is now a sustainable operation with subscription income from the Education Authorities covering the operational expenses. The annual budget is around £1 million covering operational and development income.

The SCHOLAR Forum is a not-for-profit partnership between Heriot-Watt University and the Association of Directors of Education in Scotland (ADES) formed to deliver the SCHOLAR programme. The success of SCHOLAR derives from its partnership model, professional development of teachers in e-pedagogy and the project management approach to developing high quality e-learning content.

On the access front, SCHOLAR is helping to retain students in the traditionally difficult science, technology and now language subjects. It is also helping individual students who might otherwise have been unable to continue their advanced studies or who might have had to drop a subject through ill health.

Background

The SCHOLAR programme is a truly national and, increasingly international, programme of e-learning, bringing to fruition a learning community which bridges schools, FE and HE in Scotland at SCQF levels 6 and 7. It is one of the world's largest e-learning programmes adopted by over 400 secondary schools in Scotland including all the schools in the state sector and the majority in the independent sector. SCHOLAR has developed rapidly into a unique collaboration between HE and the post-compulsory school sector to provide a national educational resource for the core sciences and mathematics. It is the purpose of this article to trace the steps of SCHOLAR from a small initiative to a national programme and illustrate that the integration of quality cycles, evaluation, and using the skills and expertise of pupils and teachers across the web can affect a transformation in educational practice.

More young people than ever before are getting the opportunity to go to college and university. Virtually 50 per cent of those in the 18-30 age range are now entering FE and HE in Scotland. Whilst encouraging, this level of participation is unlikely to suffice for the Scottish science and engineering base. The proportion of school pupils in Scotland studying chemistry, physics and biology at Higher grade exhibited a steady decline between 1993-94 and 2000-01. The challenges are acute if it is to provide the twenty-first-century impetus for economic development and social change.

HE and FE is a national asset and epitomises a technological advanced nation. Its importance has been recognised in providing both personal self-fulfilment and equipping its graduates with the skills the country requires for a knowledge-dominated age. It is paramount to drive forward the economy against increasingly competitive global competition with the skills of its young people.

The UK government and the Scottish Executive have launched a number of initiatives to attempt to stimulate interest by schoolchildren in the sciences with various degrees of success. In many ways the initiatives did not get to the heart of the matter. The close relationships between science teachers and pupils needed nurturing. The teachers required the time to spend enthusing the pupils rather than being weighed down by the perceived drudgery of conventional teaching practice alongside the increasing burdensome administrative and assessment tasks.

The MacFarlane Report (Committee of Scottish University Principals, 1992) generated a debate on the learning environment needed to respond to these needs; echoed by the Dearing Report (National Committee of Inquiry into Higher Education, 1997). Three major challenges were identified:

- curriculum development to create programmes that appeal to these new student groups
- changes in the ways in which students learn and are assessed
- new ways of delivering the curriculum, particularly those using information and communications technology (ICT).

It was against this backdrop and the confluence of ideas that led to the SCHOLAR programme. The University prides itself on being a leading science, engineering and business institution. It required bold academic leadership to invest in its future health and prosperity. It did so, not by adopting well-worn ideas, but by making a financial commitment to develop the SCHOLAR e-learning materials through a strategic open learning initiative.

The further expansion of student numbers in FE and HE implies an increasing diversity of entrants. Particular emphasis of the Scottish Executive policy is placed on recruiting students from disadvantaged backgrounds who are currently under-represented in tertiary education. Participation by young people in post-compulsory education has increased but with a stubborn gap between the social classes. There is a real need to bridge that gap by increasing the participation from talented pupils from poorly performing schools and authorities. It is simply not acceptable that a person with mathematical or scientific ability should be hindered by their postcode. In short, we also need to make sure that access to HE is fair by 'levelling the playing field'.

The SCHOLAR programme in Scotland, whose cumulative income since 2000 exceeds £5 million, is managed through an innovative partnership model - the SCHOLAR Forum. The Forum is a formal partnership between the University and the ADES. The framework for the Forum is consultative and is founded on the precept of fostering a learning community across the educational sectors.

Over the past 10 years, the Heriot-Watt University has developed a leading position in distributed learning and in computer-supported open learning and e-assessment. This expertise provides underpinning research that has resulted in the quality of the learning materials. The SCHOLAR programme built on these foundations and has also developed a pragmatic financial model for the large-scale sustainable delivery that has significantly contributed to educational transformation in Scotland.

Achievement of excellence

It is imperative to provide the vision and share that vision with all the participants irrespective of their role. Through mainly informal means, the SCHOLAR team was driven by the stated goals to:

- give talented young people, irrespective of background, opportunities to excel and achieve their personal academic goals
- encourage the disciplines of mathematics, the sciences and modern languages which have experienced a serious decline over the past decade
- 'level the playing field' in schools, allowing teachers and pupils equal access to high quality learning materials.
- give teachers the flexibility to focus on student learning, rather than the rote delivery of content.
- bring fresh excitement and enthusiasm into teaching through developing professional competencies in teaching science in the modern world.

The first stage was to recognise that the creation of the materials could only be achieved through seconding authors full-time into the project and blending their expertise within a creative environment supported by learning technologists. The authoring teams were experienced teachers and subject specialists seconded full time to the University for the duration of the development phase. At the peak of development, the full authoring team consisted of over 50 individuals, including technology developers. The academic staff that managed the authoring teams for SCHOLAR were fully engaged with developing the e-pedagogy and e-assessment policies throughout and brought that experience back into the University.

But that was insufficient. Academic staff were recruited from each discipline to assume responsibility not only for academic rigour but to deliver the materials against strict deadlines. Teams were therefore established in the original SCHOLAR subjects of biology, chemistry, computing, mathematics and physics and were given the task of producing complete Advanced Higher courses (100 contact hours) for the start of the 2000-01 academic year. We had nailed our colours to the mast and there was no turning back. It was crucial to the credibility of the project, the reputation of

the University and the spur to the authors that the intent was widely advertised amongst the education authorities. The SCHOLAR authoring team knew that the adoption of SCHOLAR depended on the quality of the materials they created.

The programme started as a pilot in 1999 with four education authorities (Edinburgh, Midlothian, East Lothian and the Borders). It grew to roughly half the authorities and then to all the authorities within two years. In practical terms it is delivering complete Scottish Qualifications Agency (SQA) programmes at Higher, Advanced Higher and Higher National to over 400 secondary schools in Scotland within each of the 32 education authorities with high-quality educational materials making full use of the impact and flexibility of web delivery. Our guiding principles are embedded in sound academic pedagogy superimposed on the opportunities afforded by ICT.

The SCHOLAR programme thus required the learning environment to be considered more analytically, much as the McFarland Report recommended some eight years before the start of the initiative. It was helped along this path by the experience of staff in the Institute of Computer Based Learning and operationally through the Learning Technology Centre at the University. In a far-sighted approach, it was recognised that ICT provides a combination of text, graphic, video, audio and communication resources that can be adapted for effective and flexible learning. All that was required was the vision and audacity of the management team of SCHOLAR to believe it could grow from a concept in 1999 through a pilot phase with four authorities to a full national programme in three years.

But to achieve the necessary transformation, more was required than the simple delivery of content, no matter how innovative. An associated CPD programme was developed and delivered across Scotland. The emphasis has changed over the years but always underpinned by the continuously improving e-pedagogical approach. Currently the Forum delivers about 2,500 teacher days per annum of training in e-learning pedagogy and management issues. The greatest challenge to the wide-scale adoption of supported e-learning is not necessarily the technical infrastructure in schools but overcoming the very human reluctance to change. Those teachers and lecturers who have embraced the e-learning approach have recognised the value and support that can be provided to pupils' learning and delight in achievement. We retain the teacher as the central element of pupils' learning combined with flexible learning techniques. We rejected a technology-driven approach to learning in favour of blending the best of both approaches.

That is the reason for the paramount importance we place on the staff development programme, rather than placing emphasis on the technological aspects of e-learning. So in addition to the teaching and learning materials and tools supplied by SCHOLAR, schools in partner local authorities are entitled to participate in a programme of continuing professional development designed to support and encourage the use of the SCHOLAR resource and e-learning in general. Given the resources we have at our disposal, the CPD programme is delivered on a crude model of one teacher per subject per year per school. This provides the rationale for the target of 2,500 teacher days per annum, given there are over 420 secondary schools in Scotland. The programme is phased

through an 'Entry Level' course for teachers who are unsure of their IT skills through to a new course in 2004-05 in the 'Management Issues in e-Learning' aimed at senior managers in schools. The uptake of the latter course testifies to the impact that SCHOLAR is having on the day-to-day operation and planning of e-learning in schools. The courses on offer to classroom teachers are:

- Entry Level
- SCHOLAR in the Classroom
- The SCHOLAR Coordinator
- Managing and Monitoring Learning with SCHOLAR
- SCHOLAR - Supporting Language at Work in French.

These address the pedagogic implications of on-line learning as well as issues specific to the successful implementation of the SCHOLAR resource and utilisation of the ever-growing range of tools available to support the twenty-first-century teacher. These opportunities are all free at the point of use for educational staff in participating schools and authorities. The SCHOLAR Forum is accredited with the GTC National Register of CPD providers. The quality enhancement procedures, monitoring and evaluations demonstrate that the courses are of a consistently high standard and meet, if not exceed, the expectations of the attendees.

Thus SCHOLAR provides an integrated set of materials and educational and administrative services which meet the needs of both students and their teachers. These include:

- comprehensive on-line interactive learning materials (SQA Higher and Advanced Higher) and activities, including assessments and revision packs
- on-line services through our virtual learning environment, which give access to on-line communities, resources, monitoring information and information tools
- printed study guides, distributing to all pupils in Scotland studying the SCHOLAR subjects, containing the text version of the web materials, key reference materials and learning activities
- tutor notes with valuable curriculum and planning information
- organising the annual SCHOLAR conference. Since 2000 this event attracts over 300 delegates from across the education sectors. It was designed to be deliberately inclusive to attract pupils through to Directors of Education, showing the way forward in implementing e-learning pedagogy.
- instigating a national e-tutoring scheme in which pupils across Scotland have access to an experienced tutor in each of the SCHOLAR subjects through an integrated SCHOLAR 'web-board'
- pioneering the development of a similar suite of programmes in European languages starting with Advanced Higher French in 2003-04.

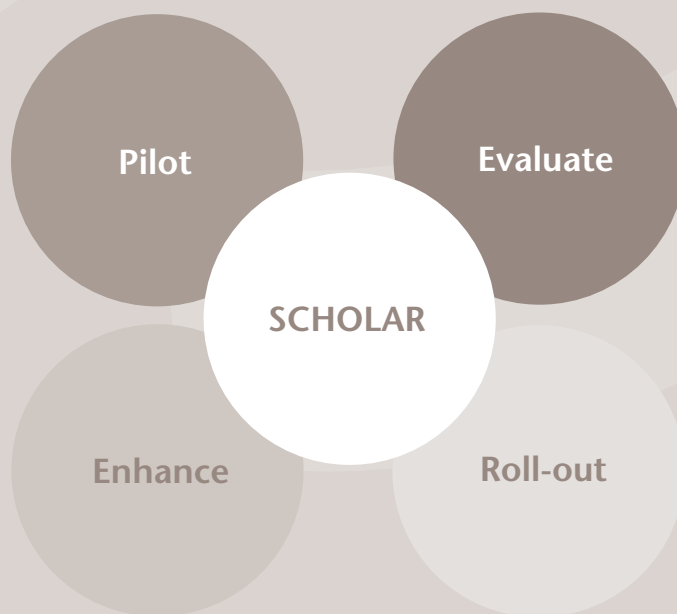
Each was broken down into small topics of around ten student effort hours; sections of which are easily assimilated by the student and consolidated easily into lesson plans. It is acknowledged that most modern pedagogy seeks to engage students in 'active' learning. The SCHOLAR programme has achieved that goal through the design of the content where the student has to take a role in the interactive animations, which permeate the material or proceed via other activities such as assessment. Whilst animations and simulations in science are of proven worth, the expense of their production has limited their use. We have minimised the cost through production savings and shown that the limitation is now the educational value rather than the available resource.

By constructing each course with the same 'look and feel' within the learning environment, the learner is not disadvantaged by poor navigation design. Similarly, the teamwork and associated common guidance on pedagogy produced an internal sharing of good practice as the materials were authored. The subject matter adhered strictly to the learning outcomes and framework documents devised by SQA and the associated guidance notes produced complete and comprehensive courses covering the final two years in secondary schools and the first year at a Scottish university.

Quality circles

The fundamental approach to SCHOLAR development is embodied in Figure 5.1. The process is contained within a circle of pilot, evaluate, roll-out and enhance before the sequence repeats itself.

Figure 5.1

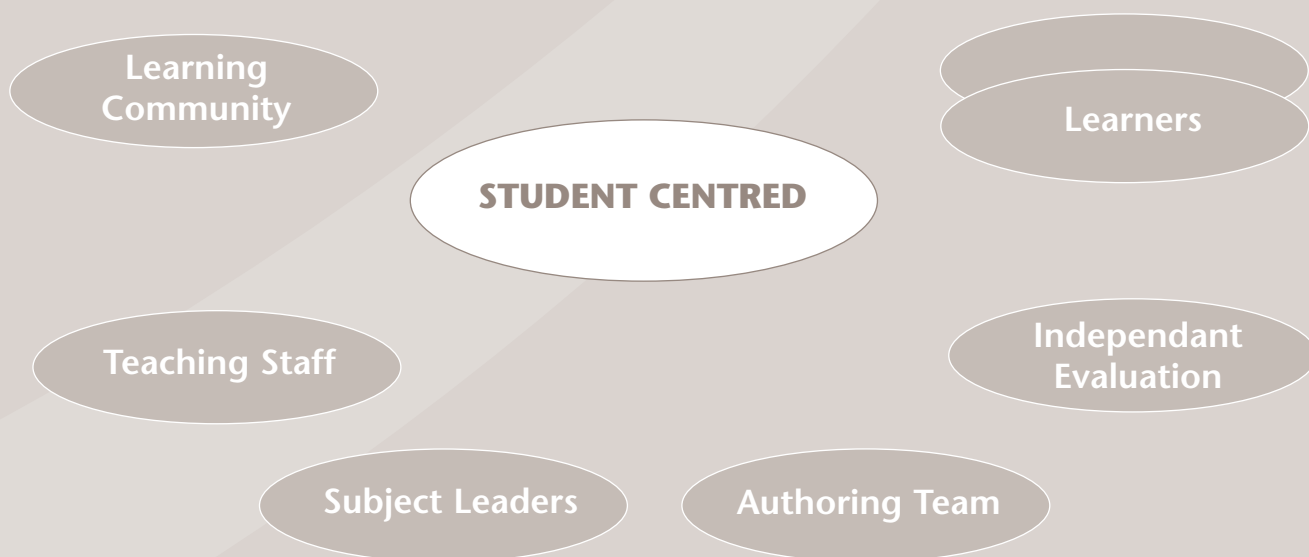


'SCHOLAR Higher chemistry was exceptionally useful. I have prepared most of my lessons for the next month using SCHOLAR as a resource!' Brilliant! Thanks!' Classroom teacher (Lochgelly High School).

This is one of many plaudits for SCHOLAR. The process for producing academically sound and effective teaching material was essentially iterative. The framework for creating, maintaining and improving complete on-line courses is based on assuring quality at each and every stage of the process. Central to this approach is team authoring. Allocation of the individual tasks within each team would be the responsibility of the team and, critically, other members of the team reviewed each other's material. Frequently, the academic member of staff would contribute and occasionally adjudicate on disputed issues. The academic role of the staff member would be to select specialists within each department to review the content. Any subsequent changes would need the agreement of all concerned, testing the diplomatic and management skills of the course leader. Weekly meetings of the entire authoring team were established to share best practice, ensure consistency in approach and raise unresolved educational issues. Fortnightly meetings of the academic leaders over the two-year period were used to manage a complex process, create the climate of mutual cooperation whilst focusing on meeting the approaching deadlines.

Feedback into the teams from the users was just one of the complex web of information rapidly disseminating through the authors, leaders and technologists.

Figure 5.2



Early testing of the material as soon as placed on the web was accomplished through the CPD programmes. Teachers were tasked to review and criticise the available material during the 'hands-on' sessions. The documentation and feedback forms were subsequently distributed to the authoring teams for reflection on the issues raised and asked whether corrective action would be necessary. Tracking changes in such a large programme tested the content management processes of the technologists involved.

During the CPD training, the concept of a 'learning community' was stressed to the teachers. One aspect of this was the ability to make rapid changes to the web content. Procedures were put in place to gather information, errors and suggestions for improvements through a variety of conduits to grow and improve the content through community engagement. Occasionally, resources were assigned to make major improvements to particular courses by responding to syllabus changes or increasing the extent of interactivities.

Reflection and evaluation

Evaluation at key points **throughout** the programme was important to enhancing the quality. Four formal independent evaluations have been carried out:

- SCHOLAR Programme Evaluation, Open Campus Learning Ltd, Glasgow Caledonian University, June 2001
- A Strategic Review of Scotland's E-Learning Capability, Synphonix Ltd on behalf of Scottish Enterprise, June 2001
- Evaluation of Phase Two of the SCHOLAR Programme, The Quality in Education Centre, University of Strathclyde, January 2004
- Learning and Skills Council Report of SCHOLAR in England, March 2005

and these have been invaluable in directing future growth.

The Forum is a self-financing, not-for-profit activity organisation, which needs to be sensitive to the requirements of the learners but also to provide a leadership role in shaping the e-learning agenda in Scotland. Development grants from the Scottish Executive Education Department (SEED) supported the Forum's development in the formative phases. For example, £700,000 was awarded to support the creation of the Forum in 2002. Subsequently £600,000 was granted in 2004 to modify the materials to provide enhanced support and encouragement for independent learning. A further £60,000 was awarded in 2005 to enhance the reporting system, which provided teachers with a detailed overview of class results in the automatically marked assessments and has given them the opportunity to award and moderate marks on-line.

The reports on SCHOLAR have noted the significant impact on pupils, teachers, schools and education authorities. SCHOLAR is perceived as responsible for innovative e-learning in Scotland.

On a personal level the impact on individuals has been important. We have numerous examples of pupils who could not study science or maths without the SCHOLAR resource. Similarly many pupils testify that without SCHOLAR they would have under-performed or discontinued their studies. With the current age profile of teachers of science another major impact has been in revitalising science teachers and science teaching. Many head teachers testify to a new enthusiasm among their science staff. More than 30 students of AH French are the only student in their school studying the subject. Without SCHOLAR they might have had no opportunity to study within a class. With SCHOLAR they are now benefiting from the on-line materials as well as having work set and corrected on-line and are sharing their studies with others in a virtual classroom.

All these reports provided endorsement of its leading position and the Scottish Enterprise strategy - see below - recognised that the programmes were 'a strong driver of Scotland's e-learning market' which resulted in the formation of a 'spin-out' company The Interactive University Ltd to market SCHOLAR globally. The creation of the Interactive University as a not-for-profit company, jointly owned by the University and Scottish Enterprise (the national economic development agency) will enable the global distribution of SCHOLAR.

Joint initiatives

SCHOLAR has led the University into a number of important national educational initiatives. We have worked closely with The Scottish Centre for Research into On-Line Learning and Assessment (SCROLLA) funded by the Scottish Higher Education Funding Council. The Centre has a distributed character with a presence at each of the three directing institutions. SCROLLA provides a focus for multidisciplinary research into the use of ICT in education concentrating on on-line learning and assessment. SCROLLA has a collaborative venture with SQA under the PASSIT programme to deliver the research required to launch e-assessment into national examinations in 2004. The symbiosis of SCHOLAR and PASSIT has enabled the introduction of e-assessment into national examinations faster and more securely than would have been hitherto possible. The SCHOLAR programme has adopted a state-of-the-art assessment engine developed and validated within the University and used in a pilot summative mode by the SQA. In educational terms, an examination may not be any better for being delivered on paper or screen. Assessment and learning must be designed and developed in tandem. The SCHOLAR programme has benefited immensely from the research contributions of the PASSIT team and the practical applications of e-assessment can be achieved on a large scale. The materials were written against a pedagogic model that included 'The SCHOLAR Formative Assessment Policy', a document that is part of the briefing of all new SCHOLAR authors. One consequence of this policy is that the SCHOLAR material, irrespective of the nature of the subject, has formative assessments built in within and at the end of a topic, end of unit and end of course. Since pupils are exposed to and practise this type of formative testing makes the transition to on-line national examinations more attractive: a strategic aim of the SQA.

Innovation and quality

ICT is a powerful aid for teachers to explain difficult concepts, giving access to a huge range of resources within SCHOLAR, and engaging pupils easily. Since 1998 the government has invested over £1 billion creating an ICT infrastructure in schools in the UK, connecting broadband to secondary schools. This investment will only have a dramatic effect if the teachers have confidence they can access high-quality and relevant curriculum content. Electronic whiteboards and data projectors installed in laboratories and science teaching areas, under the control of technically confident teachers, bring new dimensions to whole class teaching. For example, teachers in Scotland are able to project the SCHOLAR materials directly onto a whiteboard and improve the class interaction through personalisation and distributed e-notes. Teachers are finding that the professionally produced graphics and interactivities enliven the class and produce new opportunities for improved classroom practice, ie use of on-line assessments with automatic feedback. Schools are increasingly investing in these types of technology with the confidence of the long-term provision of SCHOLAR.

Distinctive character

We have created a national consultative framework. At its hub is the SCHOLAR Forum Partnership Board, responsible for the financial aspects, and the Academic Policy Board, which has senior representatives from the academic stakeholders and advises on academic strategy. Members comprise senior executives from Learning and Teaching Scotland (LTS), HMI, SQA, ADES and FE Principals. An Advisory Committee is responsible for monitoring the effectiveness of delivery whilst three regional user groups (East, West and North of Scotland) complete the consultative and feedback mechanisms.

In this way SCHOLAR has worked intimately with the main government agencies in Scotland, namely, the SEED, LTS and SQA. Examples of demonstrable outcomes of this approach, linked to national priorities, are:

- The Distance Learning in National Qualifications (OFDL) programme. OFDL is a Learning and Teaching Scotland managed project, financed by the Scottish Executive, to develop a range of learning and teaching electronic resources to support National Qualifications core skills units: communication, numeracy, problem-solving and IT
- collaboration with the Principal Examiners at SQA in analysing, from their annual reports, areas of weakness. With Scottish executive funding we have introduced in 2004 innovative ways of rectifying these problems through a combination of on-line learning materials, learning and revision tools to foster self-reliance and independent learning capabilities in the weaker students
- working with the SQA-sponsored PASSIT programme SCHOLAR has introduced in 2004 a leading-edge personalised 'reporting system' for pupils as part of the e-assessment tools enabling learners to manage their e-learning and supporting their progression. From 2005 the

current teachers' reporting system on student achievement in the assessments will be updated with new funding from the Scottish Executive

- establishing a development through annual subscriptions from the education authorities for updating the material in line with SQA curriculum changes and introducing new subjects in line with national priorities and the revision of the science curriculum in Scotland.

In 2003-04 SCHOLAR undertook a research project financed by the Scottish Executive to identify the management issues in e-learning. The research focused initially on developing good practice in schools. Many exemplars of good practice were revealed and the research also identified the challenges still facing schools in the adoption of e-learning methodology. Eleven whole-school case studies have been published and from them exemplars of pedagogic change were identified. These included:

- effective use of the interactive whiteboard in mathematics
- facilitating independent learning in AH biology
- using SCHOLAR to support a range of teaching strategies in chemistry
- enhanced differentiation, motivation and monitoring in Higher biology.

Impact

The SEED has evaluated the SCHOLAR programme (Evaluation of Phase Two of the SCHOLAR Programme). The findings indicated that SCHOLAR raised the standard of attainment in the nationally important area of the sciences and mathematics and, for the first time, allowed the students to choose the time, place and environment of their learning. Over 85 per cent of the pupils said they used the on-line materials with nearly 70 per cent working up to two hours or more at home.

The evidence suggests that the majority of coordinators, teachers and students have welcomed the provision of SCHOLAR. Seventy-eight per cent of the teachers said they would recommend SCHOLAR to colleagues and 85 per cent of the students said they would recommend it to other students. It has provided teachers with high quality resources to complement traditional classroom teaching approaches.

The evidence suggested that SCHOLAR has raised the students' standard of educational attainment. Overall, the SCHOLAR students performed better in the 2001-02 and 2002-03 SQA examinations compared to non-SCHOLAR students. However, the factors underpinning this finding are more complex than simply being registered with SCHOLAR or not. It is possible that there are important differences in the two groups of students in that the former may have been more motivated to study and the opportunities provided by the programme made this more effective.

The findings suggest that the SCHOLAR programme affected the way students learned. It provided students with an opportunity for greater flexibility in and control of their learning in that they were able to choose to learn in their own time, at their own pace and in their own environment. Some students were able to use SCHOLAR to personalise their learning to meet their own needs and engage in self-regulated learning. Students in schools and colleges used SCHOLAR more than their teachers appreciated; a consequence of the extensive home use of SCHOLAR. From usage statistics it was found that the majority of teachers were not monitoring the students' use of the programme or engaging in follow-up discussions. Thus an opportunity has been missed to date to add depth to the learning experience by creating a bridge between classroom and independent study. On a more positive note, the web statistics provide the evidence to influence the management of the CPD programme to drive home the benefits of reviewing individual's achievements.

Almost half of the coordinators and teachers stated they would like even more staff development. However, it was clear from the analysis of all the data collected that there was blending of established and ICT-based teaching. This gave students the opportunity to make decisions about how they used the range of SCHOLAR materials to support classroom learning. The independent and self-regulated use of the materials by students gave them an opportunity to experience and develop learning strategies that will be useful if they continue into FE and HE. In this way, SCHOLAR may contribute to creating a link between the students' study in their final years at school and their experience in HE.

Future plans

The SCHOLAR Forum is a unique partnership. The consultation and decision-making processes of the Forum ensure genuine participation, ownership and partnership. The SCHOLAR Forum is well placed for long-term and sustained development. The agreement with the education authority members is on a three-year rolling basis ensuring stability, sustainability and the financial resources for further development. A development fund has been established to ensure that ongoing developments and curriculum changes can be financed from Forum resources. Thus new subjects such as information systems, human biology and business management have been added to the SCHOLAR portfolio. The Forum represents an exemplar for delivery of e-learning capitalising on the advantages of flexible learning through web delivery. Its phenomenal growth and uptake by all the education authorities is testimony to the achievement of the ambitious goals and the original concept. SCHOLAR was selected by the Scottish Executive to be 'showcased' at the 2003 Conference of Commonwealth Education Ministers and also at the G8 Summit in Gleneagles in 2005.

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